



Local Government Energy Audit: Energy Audit Report



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Audubon Junior & Senior High School

Audubon Board of Education

350 Edgewood Avenue
Audubon, NJ 08106

April 12, 2018

Final Report by:
TRC Energy Services

Disclaimer

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

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

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

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

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I EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPUB) has sponsored this Local Government Energy Audit (LGEA) Report for Audubon Junior & Senior 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 provide information and assistance to help facilities implement ECMs. The LGEA report also contains valuable information on financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing ECMs.

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

I.1 Facility Summary

Audubon Junior & Senior High School is a 192,432 square foot facility with four blocks (A, B, C, &D). Blocks A and C have three floors each. Block B contains two floors and block D has one. Most of the building have concrete block construction. Some parts of the old building (block A) has plaster and lathe. The building consists of spaces like classrooms, gym, auditorium, locker rooms, fully equipped kitchen, cafeteria, athletic fields and mechanical spaces. The building operates round the year with mainly sports activities on the weekends.

Lighting in the building is mostly 4-foot T8 fixtures, 2-foot u-bent fixtures and some incandescent and CFL (Compact Fluorescent Lamps) in the smaller spaces. The lighting is old and requires upgrades. Heating in the building is provided using gas-fired, condensing hot water boilers. Space cooling varies between the different blocks. Block A is served by an air-cooled chiller and the other blocks have a combination of rooftop packaged units and split AC systems.

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

I.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated 12 measures which together represent an opportunity for Audubon Junior & Senior High School to reduce annual energy costs by \$76,377 and annual greenhouse gas emissions by 504,208 lbs CO₂e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 10.7 years. The breakdown of existing and potential utility costs after project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce Audubon Junior & Senior High School's annual energy use by 21%.

Figure 1 – Previous 12 Month Utility Costs

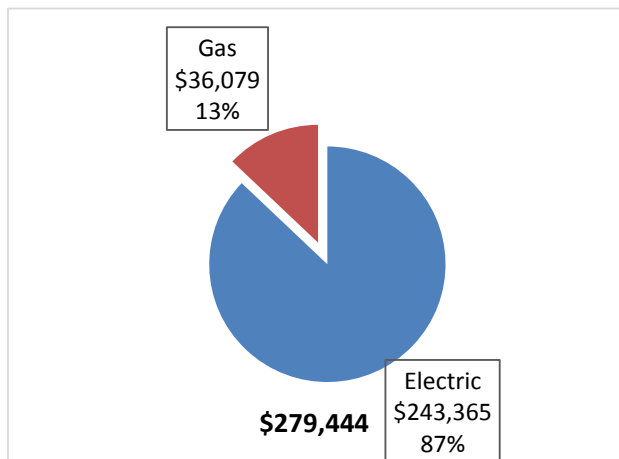
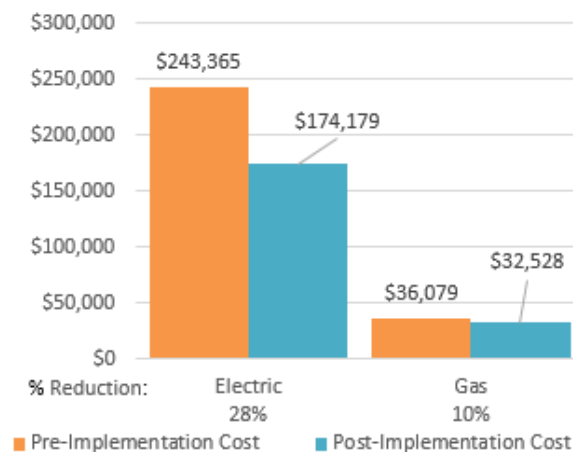


Figure 2 – Potential Post-Implementation Costs



A detailed description of Audubon Junior & Senior High School’s existing energy use can be found in Section 3.

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

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure	Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades		232,092	61.1	0.0	\$35,230.15	\$245,477.98	\$28,040.00	\$217,437.98	6.2	233,715
ECM 1 Install LED Fixtures	Yes	37,420	5.9	0.0	\$5,680.16	\$18,752.50	\$4,800.00	\$13,952.50	2.5	37,682
ECM 2 Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	156,532	47.7	0.0	\$23,760.59	\$206,016.76	\$22,300.00	\$183,716.76	7.7	157,626
ECM 3 Retrofit Fixtures with LED Lamps	Yes	31,461	7.1	0.0	\$4,775.55	\$11,996.77	\$940.00	\$11,056.77	2.3	31,681
ECM 4 Install LED Exit Signs	Yes	6,679	0.4	0.0	\$1,013.84	\$8,711.96	\$0.00	\$8,711.96	8.6	6,726
Lighting Control Measures		19,920	6.7	0.0	\$3,023.76	\$12,288.00	\$1,980.00	\$10,308.00	3.4	20,059
ECM 5 Install Occupancy Sensor Lighting Controls	Yes	19,920	6.7	0.0	\$3,023.76	\$12,288.00	\$1,980.00	\$10,308.00	3.4	20,059
Variable Frequency Drive (VFD) Measures		61,525	6.6	0.0	\$9,339.06	\$22,227.95	\$0.00	\$22,227.95	2.4	61,955
ECM 6 Install VFDs on Chilled Water Pumps	Yes	10,065	1.3	0.0	\$1,527.85	\$6,551.70	\$0.00	\$6,551.70	4.3	10,136
ECM 7 Install VFDs on Hot Water Pumps	Yes	51,459	5.3	0.0	\$7,811.20	\$15,676.25	\$0.00	\$15,676.25	2.0	51,819
Electric Unitary HVAC Measures		71,212	64.0	0.0	\$10,809.48	\$224,430.00	\$9,476.00	\$214,954.00	19.9	71,709
ECM 8 Install High Efficiency Electric AC	Yes	71,212	64.0	0.0	\$10,809.48	\$224,430.00	\$9,476.00	\$214,954.00	19.9	71,709
Domestic Water Heating Upgrade		0	0.0	386.3	\$3,551.70	\$30,395.82	\$1,050.00	\$29,345.82	8.3	45,236
ECM 9 Install High Efficiency Gas Water Heater	Yes	0	0.0	306.5	\$2,817.91	\$30,066.00	\$1,050.00	\$29,016.00	10.3	35,890
ECM 10 Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	79.8	\$733.79	\$329.82	\$0.00	\$329.82	0.4	9,346
Plug Load Equipment Control - Vending Machine		9,671	0.0	0.0	\$1,468.01	\$1,380.00	\$0.00	\$1,380.00	0.9	9,739
ECM 11 Vending Machine Control	Yes	9,671	0.0	0.0	\$1,468.01	\$1,380.00	\$0.00	\$1,380.00	0.9	9,739
Custom Measures		61,366	56.4	396.0	\$12,955.46	\$320,400.00	\$0.00	\$320,400.00	24.7	61,795
ECM 12 Install Building Automation System	Yes	61,366	56.4	396.0	\$12,955.46	\$320,400.00	\$0.00	\$320,400.00	24.7	61,795
TOTAL OF ALL EVALUATED ECMS		455,785	194.8	782.3	\$76,377.61	\$856,599.75	\$40,546.00	\$816,053.75	10.7	504,208

* - 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 not needed. Automated control reduces reliance on occupant behavior for adjusting lights. These measures save energy by reducing the amount of time lights are on.

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

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

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

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

Energy Efficient Practices

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

- Reduce Air Leakage
- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Clean and/or Replace HVAC Filters
- Install Plug Load Controls
- Water Conservation

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

On-Site Generation Measures

TRC evaluated the potential for installing on-site generation for Audubon Junior & Senior 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	75	kWDC STC
Electric Generation	89,353	kWh/yr
Displaced Cost	\$7,770	/yr
Installed Cost	\$195,000	

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

I.3 Implementation Planning

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

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

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

- SmartStart
- Pay for Performance - Existing Building (P4P)
- Energy Savings Improvement Program (ESIP)

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

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

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

The Demand Response Energy Aggregator is a (non-NJCEP) program designed to reduce electric loads at commercial facilities, when wholesale electricity prices are high or when the reliability of the electric grid

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

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

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 5 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Bud Rutter	Director of Facilities	brutter@audubonschools.org	856-547-7695 Ext 4172
TRC Energy Services			
Smruti Srinivasan	Auditor	ssrinivasan@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On December 27, 2016, TRC performed an energy audit at Audubon Junior & Senior High School located in Audubon, New Jersey. TRC's auditor met with Geoff Metzger to review the facility operations and help focus our investigation on specific energy-using systems.

Audubon Junior & Senior High School is a 192,432 square foot facility with four blocks (A, B, C, D). The building was originally constructed in 1928 with additions made in the later years. Blocks A and C have three floors each. Block B contains two floors and block D has one. Most of the building has concrete block construction. Some parts of the old building (block A) has plaster and lathe. The building consists of spaces like classrooms, gym, auditorium, locker rooms, fully equipped kitchen, cafeteria, athletic fields and mechanical spaces. The building is operates round the year with mainly sports activities in the weekends.

Lighting at the building is mostly inefficient and in need of replacement. Heat is provided by gas-fired, condensing hot water boilers. Space cooling varies between the different blocks. Block A is served by an air-cooled chiller and the other blocks have a combination of rooftop packaged units and split AC systems.

2.3 Building Occupancy

The typical schedule is presented in the table below. In the weekends and summer the facility is predominantly used for sports activities. During a typical day, the facility is occupied by approximately 1,000 people including full time staff (admin, teachers and maintenance staff) and students.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Audubon Junior & Senior High School	Weekday	6:30AM - 11PM
Audubon Junior & Senior High School	Weekend	Saturday: 7AM - 3PM Sunday: 10AM - 2PM

2.4 Building Envelope

The building for the most part has a concrete block construction with a brick façade. The site contact specified that the older parts of the building (block A) has plaster and lathe and block B has a framed construction with sheet rock. The buildings have flat roofs covered with slag membrane. These roofs were redone in 2005. The windows have double pane windows which were also installed in 2005 and are in good condition. The exterior doors are constructed of aluminum and in good condition.



Image 1 - Building envelope and roof

2.5 On-Site Generation

Audubon Junior & Senior High School does not have any on-site electric generation capacity.

2.6 Energy-Using Systems

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

Lighting System

Lighting is provided mostly by 32-Watt linear fluorescent T8 lamps with electronic ballasts as well as some compact fluorescent lamps (CFL). Most of the fixtures are 2-lamp or 3-lamp, 4-foot long troffers. The gym hallways have 4-foot, 3-lamp fixtures using T5 lamps.

A small area of the building (locker rooms shower, closets) are lit with 13-Watt or 18-Watt CFL lamps and 70-Watt incandescent lamps in either recessed can ceiling fixtures or regular ceiling mount fixtures. Lighting control in all spaces are provided by wall switches.

The building's exterior lighting has a mixture of metal halide [four 70-Watt, (22) 175-Watt, four 150-Watt, four 100-Watt] high pressure sodium fixtures (two 400-Watt lamps)] and some LED fixtures. These are controlled using timers and photocells.



Image 2 Typical lighting fixtures at the facility

Hot Water (or Steam) Heating System

The hot water system consists of three gas-fired condensing hot water boilers with an output capacity of 1720 MBH and an efficiency of 86%. Heating hot water is distributed throughout the facility via two hot water pumps of 20 hp, two pumps of 5 hp and one pump of 3 hp serving the various zones of the building. Hot water is supplied at 180°F when the outside air temperature (OAT) is below 50°F and modulated proportionally and reset based on the outside air temperature until 65°F. Above 70°F OAT the boiler is shut down. The boilers provide hot water to air handlers # 1 and #2 and the perimeter convection heaters. The classrooms and hallways have unit ventilators and fan coil units to distribute heat to the units. Larger spaces like the auditorium, cafeteria and the gym have air handlers that distribute heat.

The boilers operate in a lead/lag configuration. All boilers may be required during cold weather. The boilers are new, in good condition and well maintained.





Image 3 - Boiler and terminal heat distribution units

Chilled Water Air Conditioning System (CHW)

Space cooling of block A is provided by the chiller which is located on the roof of the block B. The chiller is 160-ton air cooled screw chiller. The air distribution is via the air handler units in block A. (these were not accessible on site and capacity of the supply fans are unknown). The unit is 11 years old, in good condition and well maintained.



Image 4 - Chiller providing space cooling for block A

Direct Expansion Air Conditioning System (DX)

Space cooling in other blocks is provided by a combination of packaged rooftop AC units and split AC unit. The classrooms and SGI rooms have 3 or 4 ton packaged units that provide cooling whereas spaces such as the band room and fitness center have packaged units of 6 ton and 5 tons respectively.

The auditorium and the auxiliary gym are cooled using packaged AC units of 50 tons and 25 tons respectively. Furthermore, there are smaller offices (such as the board office and AD office) that use 1.5 ton split unit systems. The controls are provided using thermostats in the various zones.

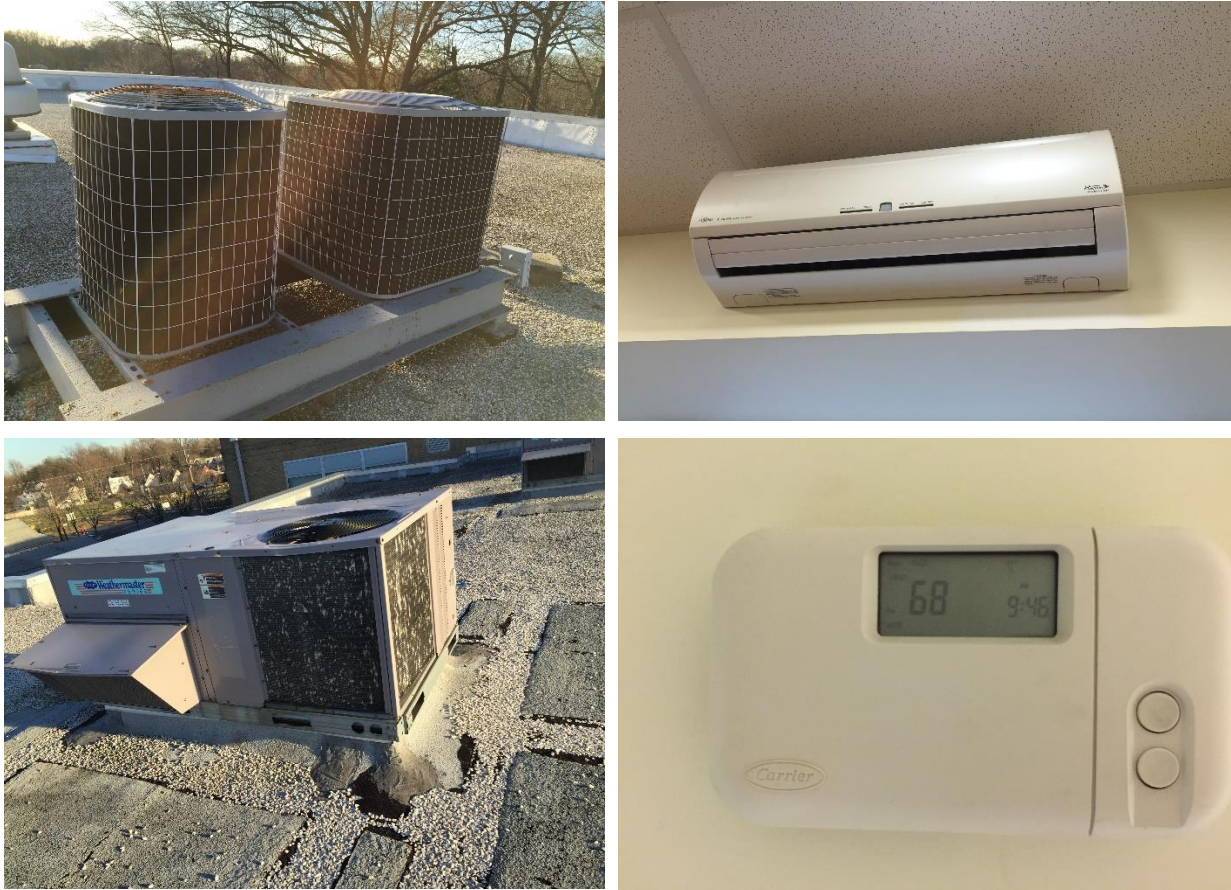


Image 5 - Space cooling unit samples and controlling thermostat

Domestic Hot Water Heating System

The domestic hot water heating system for the facility consists of three (two gas fired and one electric) hot water heaters. The gas fired water heaters have an input capacity of 80 MBH, a storage capacity of 1000 gallons and an efficiency of 60% each. These are 20 years old and are recommended for replacement. The electric hot water heater has an input capacity of 4 kW and a storage capacity of 80 gallons. This unit is nine years old and in good condition.



Image 6 - Domestic hot water heaters found at the facility

Food Service & Laundry Equipment

The facility has a full commercial kitchen that is used to prepare breakfast and lunch. Approximately 1,000 meals are prepared on the weekdays the school is open. There is a combination of electric and gas ovens, range tops and griddles. There are also insulated food holding cabinets and a single conveyor dishwasher. Most equipment were found to be in good condition and hence not recommended for replacements.



Image 7 - Sample of the kitchen equipment

Refrigeration

The kitchen has three commercial glass door refrigerators (merchandise units for holding drinks) and two stand-up solid door freezers (to hold ingredients and prepared food), both having a capacity of about 15 cubic feet. These are ENERGY STAR® rated equipment. There are two ice makers in the kitchen and in the trainer's room respectively.

Building Plug Load

There are 266 computer work stations throughout the facility. Roughly 90% of the computers are desktop units with LCD monitors. There is no centralized PC power management software installed.

Other plug loads include printers, paper shredder, projectors etc., in the classrooms and office. There are kitchenette equipment such as coffee machines, toasters, microwave ovens and refrigerators in the teacher's lounges. The home economics room and also a number of washers, dryers and dishwashers. A bunch of these equipment are energy star rated and some are not. When these equipment are due for replacement it is recommended that they be replaced with a higher efficiency energy star rated unit.

The facility has a large number of refrigerated beverage vending machines (six in total). There were no controls for these and are hence recommended.

2.7 Water-Using Systems

There are 20 restrooms at this facility. A sampling of restrooms found that faucets are rated at 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 two restrooms with showers that bicycle commuters use in the morning. The showerheads are rated at 5 gpm. The school has a girl's and boy's locker room and these were observed to be under 2.0 gpm.

3 SITE ENERGY USE AND COSTS

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

3.1 Total Cost of Energy

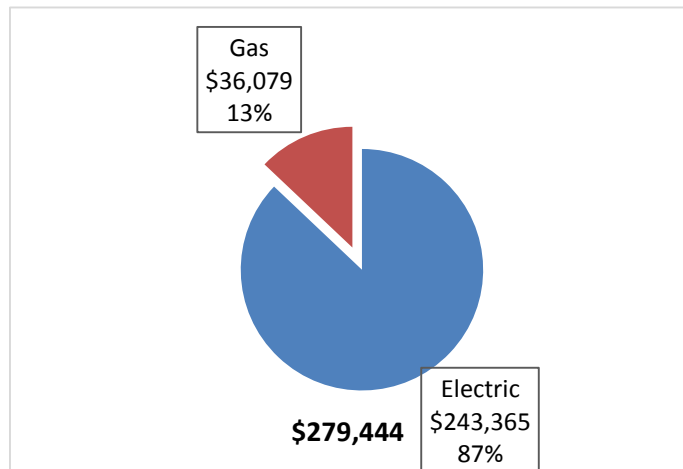
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 7 - Utility Summary

Utility Summary for Audubon BOE		
Fuel	Usage	Cost
Electricity	1,603,256 kWh	\$243,365
Natural Gas	39,246 Therms	\$36,079
Total		\$279,444

The current annual energy cost for this facility is \$279,444 as shown in the chart below.

Figure 8 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by PSE&G. The average electric cost over the past 12 months was \$0.152/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The third party electric supply is provided by Direct Energy. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 9 - Electric Usage & Demand

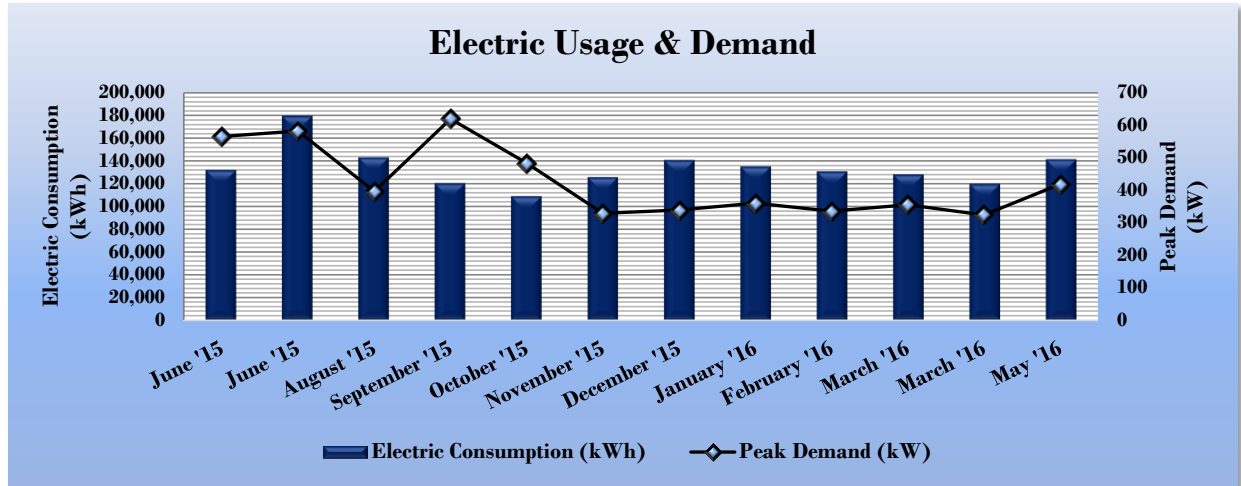


Figure 10 - Electric Usage & Demand

Electric Billing Data for Audubon BOE					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
6/24/15	29	131,300	566	\$6,855	\$23,515
7/15/15	21	178,870	582	\$7,089	\$31,331
8/17/15	33	142,480	396	\$4,829	\$25,520
9/22/15	36	119,835	619	\$7,577	\$20,257
10/22/15	30	108,503	483	\$1,752	\$15,709
11/20/15	29	125,223	329	\$1,194	\$17,416
12/23/15	33	140,106	339	\$1,230	\$18,775
1/25/16	33	134,597	360	\$1,306	\$17,784
2/25/16	31	130,278	336	\$1,217	\$17,432
3/17/16	21	127,590	355	\$1,298	\$16,856
4/15/16	29	119,214	324	\$1,186	\$16,122
5/24/16	39	140,868	418	\$1,533	\$21,981
Totals	364	1,598,864	619.3	\$37,067	\$242,698
Annual	365	1,603,256	619.3	\$37,169	\$243,365

3.3 Natural Gas Usage

Natural Gas is provided by PSE&G. The average gas cost for the past 12 months is \$0.919/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below. The third party gas supply is provided by Woodruff.

Figure 11 - Natural Gas Usage

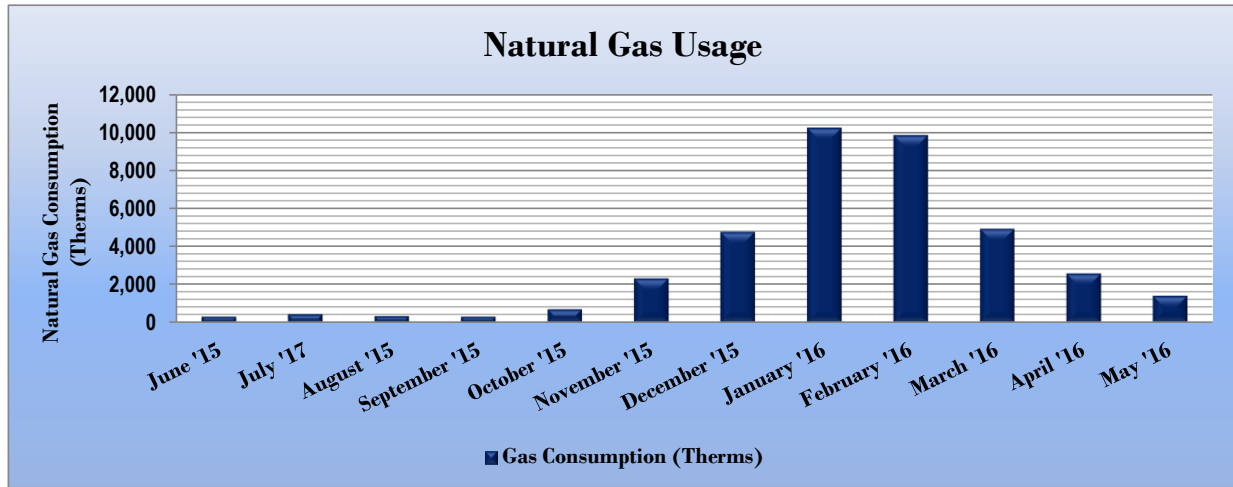


Figure 12 - Natural Gas Usage

Gas Billing Data for Audubon BOE			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
6/25/15	29	298	\$996
7/24/17	20	428	\$478
8/25/15	32	319	\$759
9/22/15	35	298	\$322
10/22/15	30	694	\$533
11/20/15	28	2,310	\$2,735
12/23/15	32	4,761	\$4,072
1/25/16	32	10,232	\$7,228
2/25/16	30	9,837	\$11,652
3/24/16	20	4,919	\$3,747
4/25/16	28	2,567	\$1,660
5/24/16	38	1,400	\$811
Totals	354	38,064	\$34,992
Annual	365	39,246	\$36,079

3.4 Benchmarking

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

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

Figure 13 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Audubon BOE	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft ²)	110.7	141.4
Site Energy Use Intensity (kBtu/ft ²)	48.8	58.2

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

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

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Audubon Senior and Junior High School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft ²)	83.2	141.4
Site Energy Use Intensity (kBtu/ft ²)	38.7	58.2

Many types of commercial buildings are also eligible to receive an ENERGY STAR™ score. This score is a percentile ranking from 1 to 100. It compares your building’s energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide and may be eligible for ENERGY STAR® certification.. This facility has a current score of 80.

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

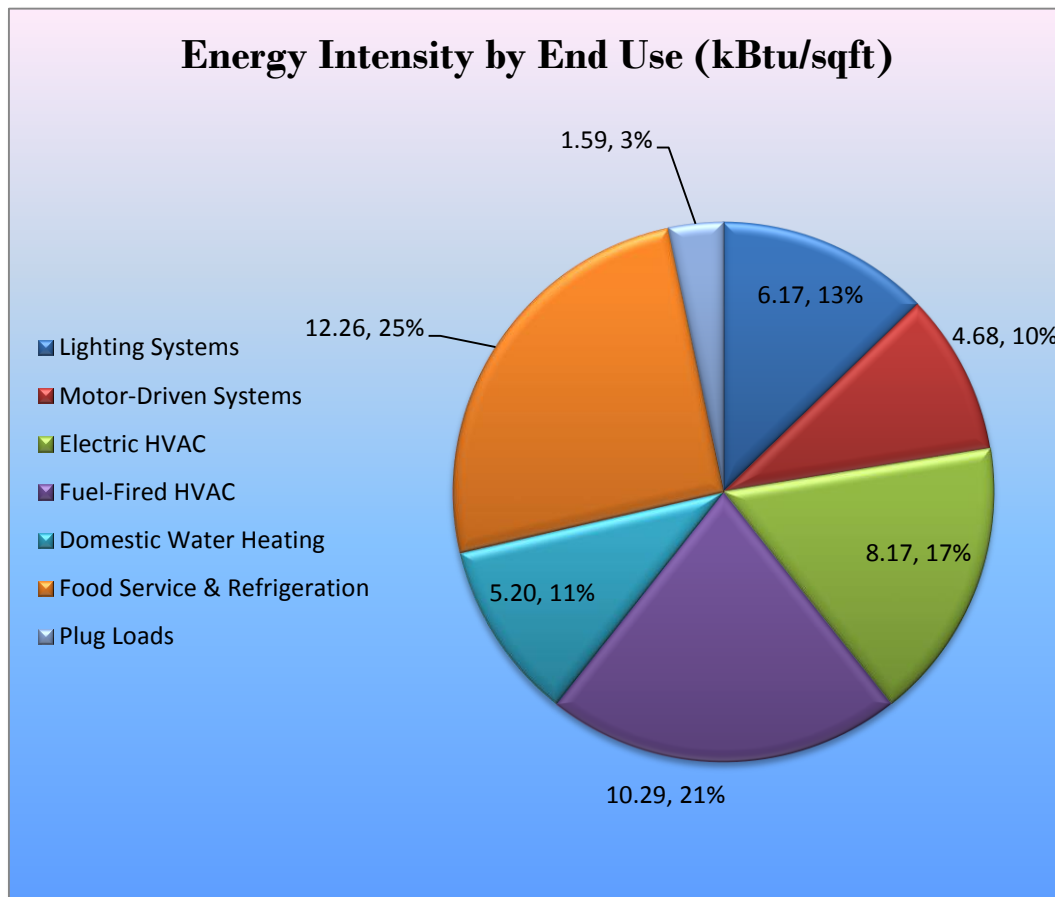
For more information on ENERGY STAR® certification go to: <https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1>.

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

3.5 Energy End-Use Breakdown

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

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



4 ENERGY CONSERVATION MEASURES

Level of Analysis

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

The following sections describe the evaluated measures.

4.1 Recommended ECMs

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

Figure 16 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades		232,092	61.1	0.0	\$35,230.15	\$245,477.98	\$28,040.00	\$217,437.98	6.2	233,715
ECM 1	Install LED Fixtures	37,420	5.9	0.0	\$5,680.16	\$18,752.50	\$4,800.00	\$13,952.50	2.5	37,682
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	156,532	47.7	0.0	\$23,760.59	\$206,016.76	\$22,300.00	\$183,716.76	7.7	157,626
ECM 3	Retrofit Fixtures with LED Lamps	31,461	7.1	0.0	\$4,775.55	\$11,996.77	\$940.00	\$11,056.77	2.3	31,681
ECM 4	Install LED Exit Signs	6,679	0.4	0.0	\$1,013.84	\$8,711.96	\$0.00	\$8,711.96	8.6	6,726
Lighting Control Measures		19,920	6.7	0.0	\$3,023.76	\$12,288.00	\$1,980.00	\$10,308.00	3.4	20,059
ECM 5	Install Occupancy Sensor Lighting Controls	19,920	6.7	0.0	\$3,023.76	\$12,288.00	\$1,980.00	\$10,308.00	3.4	20,059
Variable Frequency Drive (VFD) Measures		61,525	6.6	0.0	\$9,339.06	\$22,227.95	\$0.00	\$22,227.95	2.4	61,955
ECM 6	Install VFDs on Chilled Water Pumps	10,065	1.3	0.0	\$1,527.85	\$6,551.70	\$0.00	\$6,551.70	4.3	10,136
ECM 7	Install VFDs on Hot Water Pumps	51,459	5.3	0.0	\$7,811.20	\$15,676.25	\$0.00	\$15,676.25	2.0	51,819
Electric Unitary HVAC Measures		71,212	64.0	0.0	\$10,809.48	\$224,430.00	\$9,476.00	\$214,954.00	19.9	71,709
ECM 8	Install High Efficiency Electric AC	71,212	64.0	0.0	\$10,809.48	\$224,430.00	\$9,476.00	\$214,954.00	19.9	71,709
Domestic Water Heating Upgrade		0	0.0	386.3	\$3,551.70	\$30,395.82	\$1,050.00	\$29,345.82	8.3	45,236
ECM 9	Install High Efficiency Gas Water Heater	0	0.0	306.5	\$2,817.91	\$30,066.00	\$1,050.00	\$29,016.00	10.3	35,890
ECM 10	Install Low-Flow Domestic Hot Water Devices	0	0.0	79.8	\$733.79	\$329.82	\$0.00	\$329.82	0.4	9,346
Plug Load Equipment Control - Vending Machine		9,671	0.0	0.0	\$1,468.01	\$1,380.00	\$0.00	\$1,380.00	0.9	9,739
ECM 11	Vending Machine Control	9,671	0.0	0.0	\$1,468.01	\$1,380.00	\$0.00	\$1,380.00	0.9	9,739
Custom Measures		61,366	56.4	396.0	\$12,955.46	\$320,400.00	\$0.00	\$320,400.00	24.7	61,795
ECM 12	Install Building Automation System	61,366	56.4	396.0	\$12,955.46	\$320,400.00	\$0.00	\$320,400.00	24.7	61,795
TOTAL OF ALL EVALUATED ECMs		455,785	194.8	782.3	\$76,377.61	\$856,599.75	\$40,546.00	\$816,053.75	10.7	504,208

* - 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

Recommended upgrades to existing lighting fixtures are summarized in Figure 17 below.

Figure 17 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			232,092	61.1	0.0	\$35,230.15	\$245,477.98	\$28,040.00	\$217,437.98	6.2	233,715
ECM 1	Install LED Fixtures	Yes	37,420	5.9	0.0	\$5,680.16	\$18,752.50	\$4,800.00	\$13,952.50	2.5	37,682
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	156,532	47.7	0.0	\$23,760.59	\$206,016.76	\$22,300.00	\$183,716.76	7.7	157,626
ECM 3	Retrofit Fixtures with LED Lamps	Yes	31,461	7.1	0.0	\$4,775.55	\$11,996.77	\$940.00	\$11,056.77	2.3	31,681
ECM 4	Install LED Exit Signs	Yes	6,679	0.4	0.0	\$1,013.84	\$8,711.96	\$0.00	\$8,711.96	8.6	6,726

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

ECM 1: Install LED Fixtures

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)	Estimated Net Cost (\$)	Simple Payback Period (yrs)	CO ₂ e Emissions Reduction (lbs)
Interior	14,348	2.8	0.0	\$2,177.88	\$2,344.06	\$600.00	\$1,744.06	0.8	14,448
Exterior	23,073	3.0	0.0	\$3,502.29	\$16,408.43	\$4,200.00	\$12,208.43	3.5	23,234

Measure Description

The facility has replaced a few of their exterior lighting fixtures to LED. We recommend replacing existing fixtures containing HID lamps (on the exterior fixtures) with new high performance LED light fixtures as well. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

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

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)	Estimated Net Cost (\$)	Simple Payback Period (yrs)	CO ₂ e Emissions Reduction (lbs)
Interior	156,532	47.7	0.0	\$23,760.59	\$206,016.76	\$22,300.00	\$183,716.76	7.7	157,626
Exterior	0	0.0	0.0	\$0.00	\$0.00	\$0.00	\$0.00	0.0	0

Measure Description

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

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

ECM 3: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)	Estimated Net Cost (\$)	Simple Payback Period (yrs)	CO ₂ e Emissions Reduction (lbs)
Interior	29,371	6.8	0.0	\$4,458.28	\$11,497.85	\$910.00	\$10,587.85	2.4	29,576
Exterior	2,090	0.3	0.0	\$317.27	\$498.92	\$30.00	\$468.92	1.5	2,105

Measure Description

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

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

ECM 4: Install LED Exit Signs

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)	Estimated Net Cost (\$)	Simple Payback Period (yrs)	CO ₂ e Emissions Reduction (lbs)
Interior	6,679	0.4	0.0	\$1,013.84	\$8,711.96	\$0.00	\$8,711.96	8.6	6,726
Exterior	0	0.0	0.0	\$0.00	\$0.00	\$0.00	\$0.00	0.0	0

Measure Description

Existing exit lights contain 9-Watt fluorescent bulbs. We recommend replacing all incandescent or compact fluorescent exit signs with LED signs. LED exit signs require virtually no maintenance and have a life expectancy of at least 20 years. This measure saves energy by installing LED fixtures, which use less power than other technologies with an equivalent lighting output.

4.1.2 Lighting Control Measures

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 ₂ e Emissions Reduction (lbs)
Lighting Control Measures	19,920	6.7	0.0	\$3,023.76	\$12,288.00	\$1,980.00	\$10,308.00	3.4	20,059
ECM 5 Install Occupancy Sensor Lighting Controls	19,920	6.7	0.0	\$3,023.76	\$12,288.00	\$1,980.00	\$10,308.00	3.4	20,059

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

ECM 5: Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)	Estimated Net Cost (\$)	Simple Payback Period (yrs)	CO ₂ e Emissions Reduction (lbs)
19,920	6.7	0.0	\$3,023.76	\$12,288.00	\$1,980.00	\$10,308.00	3.4	20,059

Measure Description

We recommend installing occupancy sensors (wall mount or remote sensors) to control lighting fixtures that are currently controlled by manual switches in classrooms, locker rooms, storage rooms, office spaces and restrooms (wall mount occupancy sensors not allowed for restrooms). Lighting sensors detect occupancy using ultrasonic and/or infrared sensors. For most spaces, we recommend lighting controls use dual technology sensors, which can eliminate the possibility of any lights turning off unexpectedly. Lighting systems are enabled when an occupant is detected. Fixtures are automatically turned off after an area has been vacant for a preset period. Some controls also provide dimming options and all modern occupancy controls can be easily over-ridden by room occupants to allow them to manually turn fixtures on or off, as desired. Energy savings results from only operating lighting systems when they are required.

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

4.1.3 Variable Frequency Drive Measures

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

Figure 19 – Summary of Variable Frequency Drive ECMs

Energy Conservation Measure	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 ₂ e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures	61,525	6.6	0.0	\$9,339.06	\$22,227.95	\$0.00	\$22,227.95	2.4	61,955
ECM 6 Install VFDs on Chilled Water Pumps	10,065	1.3	0.0	\$1,527.85	\$6,551.70	\$0.00	\$6,551.70	4.3	10,136
ECM 7 Install VFDs on Hot Water Pumps	51,459	5.3	0.0	\$7,811.20	\$15,676.25	\$0.00	\$15,676.25	2.0	51,819

ECM 6: Install VFDs on Hot Water Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)	Estimated Net Cost (\$)	Simple Payback Period (yrs)	CO ₂ e Emissions Reduction (lbs)
51,459	5.3	0.0	\$7,811.20	\$15,676.25	\$0.00	\$15,676.25	2.0	51,819

Measure Description

We recommend installing a variable frequency drives (VFD) to control the two 20 hp and two 5 hp hot water pumps. This measure requires that a majority of the hot water coils are served by 2-way valves and that a differential pressure sensor is installed in the hot water loop. As the hot water valves close, the differential pressure increases. The VFD modulates pump speed to maintain a differential pressure setpoint. Energy savings results from reducing pump motor speed (and power) as hot water valves close. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

ECM 7: Install VFDs on Chilled Water Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)	Estimated Net Cost (\$)	Simple Payback Period (yrs)	CO ₂ e Emissions Reduction (lbs)
10,065	1.3	0.0	\$1,527.85	\$6,551.70	\$0.00	\$6,551.70	4.3	10,136

Measure Description

We recommend installing a variable frequency drives (VFD) to control chilled water pumps. This measure requires that chilled water coils be served are 2-way valves and that a differential pressure sensor be installed in the chilled water loop. As the chilled water valves close, the differential pressure increases. The VFD modulates pump speed to maintain a differential pressure setpoint. Energy savings results from

reducing pump motor speed (and power) as chilled water valves close. The magnitude of energy savings is based on the estimated amount of time that the system operates at reduced loads.

4.1.4 Electric Unitary HVAC Measures

Our recommendations for unitary HVAC measures are summarized in Figure 20 below.

Figure 20 - 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 ₂ e Emissions Reduction (lbs)
Electric Unitary HVAC Measures	71,212	64.0	0.0	\$10,809.48	\$224,430.00	\$9,476.00	\$214,954.00	19.9	71,709
ECM 8 Install High Efficiency Electric AC	71,212	64.0	0.0	\$10,809.48	\$224,430.00	\$9,476.00	\$214,954.00	19.9	71,709

ECM 8: Install High Efficiency Air Conditioning Units

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)	Estimated Net Cost (\$)	Simple Payback Period (yrs)	CO ₂ e Emissions Reduction (lbs)
71,212	64.0	0.0	\$10,809.48	\$224,430.00	\$9,476.00	\$214,954.00	19.9	71,709

Measure Description

The split AC units serving the locker rooms and offices (two 3-ton and four 1.5-ton) and packaged AC units serving rooms B101-107, all purpose room, wood shop, art room, Nurse's office, classrooms in C-wing and faculty lounge ((19) 4-ton and three 5-ton units) are all over 18 years old. We recommend replacing standard efficiency packaged air conditioning units with high efficiency packaged air conditioning units. There have been significant improvements in both compressor and fan motor efficiencies over the past several years. Therefore, electricity savings can be achieved by replacing older units with new high efficiency units. A higher EER or SEER rating indicates a more efficient cooling system. The magnitude of energy savings for this measure depends on the relative efficiency of the older unit versus the new high efficiency unit, the average cooling load, and the estimated annual operating hours.

4.1.5 Domestic Hot Water Heating System Upgrades

Our recommendations for domestic water heating system improvements are summarized in Figure 21 below.

Figure 21 - Summary of Domestic Water Heating ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		0	0.0	386.3	\$3,551.70	\$30,395.82	\$1,050.00	\$29,345.82	8.3	45,236
ECM 9	Install High Efficiency Gas Water Heater	0	0.0	306.5	\$2,817.91	\$30,066.00	\$1,050.00	\$29,016.00	10.3	35,890
ECM 10	Install Low-Flow Domestic Hot Water Devices	0	0.0	79.8	\$733.79	\$329.82	\$0.00	\$329.82	0.4	9,346

ECM 9: Install High Efficiency Gas-Fired Water Heater

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)	Estimated Net Cost (\$)	Simple Payback Period (yrs)	CO ₂ e Emissions Reduction (lbs)
0	0.0	306.5	\$2,817.91	\$30,066.00	\$1,050.00	\$29,016.00	10.3	35,890

Measure Description

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

ECM 10: 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 ₂ e Emissions Reduction (lbs)
0	0.0	79.8	\$733.79	\$329.82	\$0.00	\$329.82	0.4	9,346

Measure Description

We recommend installing low-flow domestic hot water devices (specifically in the restrooms and the classrooms sinks) to reduce overall hot water demand. Energy demand from domestic hot water heating systems can be reduced by reducing water usage in general. Faucet aerators and low-flow showerheads can reduce hot water usage, relative to standard showerheads and aerators, which saves energy. Low-flow devices reduce the overall water flow from the fixture, while still adequate pressure for washing. This reduces the amount of water used per day resulting in energy and water savings.

4.1.6 Plug Load Equipment Control - Vending Machines

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

Figure 22 - Summary of Pug Load 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 ₂ e Emissions Reduction (lbs)
Plug Load Equipment Control - Vending Machine	9,671	0.0	0.0	\$1,468.01	\$1,380.00	\$0.00	\$1,380.00	0.9	9,739
ECM 11 Vending Machine Control	9,671	0.0	0.0	\$1,468.01	\$1,380.00	\$0.00	\$1,380.00	0.9	9,739

ECM 11: 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 ₂ e Emissions Reduction (lbs)
9,671	0.0	0.0	\$1,468.01	\$1,380.00	\$0.00	\$1,380.00	0.9	9,739

Measure Description

Vending machines operate continuously, even during non-business hours. It was observed onsite that the existing vending machines in the schools does not have any controls and hence we recommended to install occupancy sensor controls to reduce the energy use. These controls power down vending machines when the vending machine area has been vacant for some time, then power up at regular intervals, as needed, to turn machine lights on or keep the product cool. Energy savings are a dependent on vending machine and activity level in the area surrounding the machines.

4.1.7 Custom Measures

Additional custom measure energy saving opportunities are addressed in this section. Recommended custom measures are summarized in Figure 23 below.

Figure 23 - Summary of Custom Measures

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 ₂ e Emissions Reduction (lbs)
Custom Measures	61,366	56.4	396.0	\$12,955.46	\$320,400.00	\$0.00	\$320,400.00	24.7	61,795
ECM 12 Install Building Automation System	61,366	56.4	396.0	\$12,955.46	\$320,400.00	\$0.00	\$320,400.00	24.7	61,795

ECM 12: Install Building Automation System

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 ₂ e Emissions Reduction (lbs)
61,366	56.4	396.0	\$12,955.46	\$320,400.00	\$0.00	\$320,400.00	24.7	61,795

Measure Description

HVAC and lighting are the two largest users of energy in commercial building. A significant portion of the HVAC and lighting energy consumed in buildings is wasted because of the lack of controls or the inability to use existing building automation systems (BAS) properly. Much of the waste occurs because of the inability to manage and control buildings efficiently using manual controls such as a thermostat or ON/OFF switches.

A building automation system (BAS) offers benefits in many areas including saving on energy costs, limiting environmental impact and improving building security and safety. Additionally, proper control of outside air provides necessary air changes for occupant comfort and health, minimizes energy costs by space pre-conditioning, allows for free cooling when applicable, and reduces the use of outside air when it is not needed.

It is estimated that a BAS can save between 5% and 20% on utility costs by managing HVAC and lighting systems. A BAS system can monitor every zone of the building and make instant adjustments to maintain comfort while lowering energy usage. Lighting can be reduced in areas of the building that are not occupied which also cuts energy costs.

The energy savings and cost estimates presented above are based on rule of thumb estimates and could vary significantly based on the functionality of the control systems chosen and equipment being controlled. A controls contractor should be consulted to firm up the numbers presented.

5 ENERGY EFFICIENT PRACTICES

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

Reduce Air Leakage

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

Perform 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.

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 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.

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 4.1.5 for any low-flow ECM recommendations.

6 ON-SITE GENERATION MEASURES

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

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

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

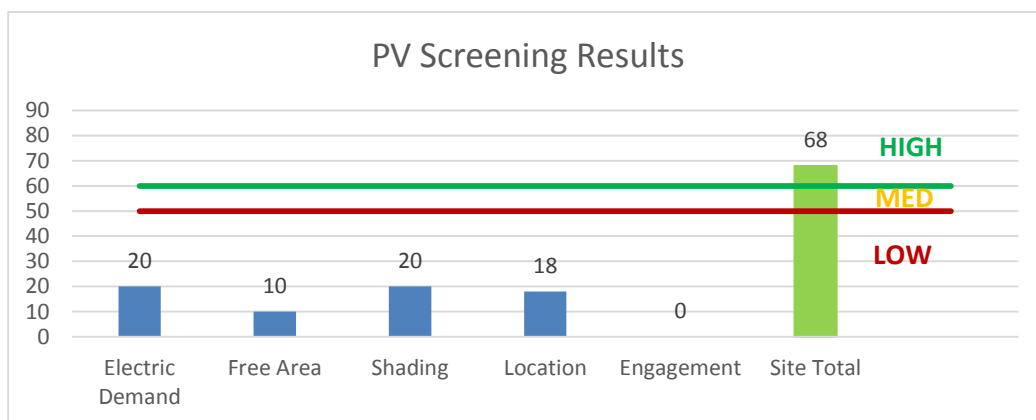
6.1 Photovoltaic

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

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

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

Figure 24 - Photovoltaic Screening



Potential	High	
System Potential	75	kW DC STC
Electric Generation	89,353	kWh/yr
Displaced Cost	\$7,770	/yr
Installed Cost	\$195,000	

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

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

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

6.2 Combined Heat and Power

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

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

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

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

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

7 DEMAND RESPONSE

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

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

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

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

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

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

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

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey’s Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 25 for a list of the eligible programs identified for each recommended ECM.

Figure 25 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Pay For Performance Existing Buildings
ECM 1	Install LED Fixtures	x		x
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	x		x
ECM 3	Retrofit Fixtures with LED Lamps	x		x
ECM 4	Install LED Exit Signs			x
ECM 5	Install Occupancy Sensor Lighting Controls	x		x
ECM 6	Install VFDs on Chilled Water Pumps	x		x
ECM 7	Install VFDs on Hot Water Pumps			x
ECM 8	Install High Efficiency Electric AC	x		x
ECM 9	Install High Efficiency Gas Water Heater	x		x
ECM 10	Install Low-Flow Domestic Hot Water Devices			x
ECM 11	Vending Machine Control			x
ECM 12	Install Building Automation System		x	x

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

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

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

8.1 SmartStart

Overview

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

Equipment with Prescriptive Incentives Currently Available:

Electric Chillers

Electric Unitary HVAC

Gas Cooling

Gas Heating

Gas Water Heating

Ground Source Heat Pumps

Lighting

Lighting Controls

Refrigeration Doors

Refrigeration Controls

Refrigerator/Freezer Motors

Food Service Equipment

Variable Frequency Drives

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

Incentives

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

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

How to Participate

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

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

8.2 Pay for Performance - Existing Buildings

Overview

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

Incentives

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

How to Participate

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

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

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

8.3 SREC Registration Program

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

After the registration is accepted, construction is complete, and final paperwork has been submitted and is deemed complete, the project is issued a New Jersey certification number which enables it to generate New Jersey SRECs. 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.

8.4 Energy Savings Improvement Program

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

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

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

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

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

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

8.5 Demand Response Energy Aggregator

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

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

See Section 7 for additional information.

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

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

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

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

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

9.2 Retail Natural Gas Supply Options

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

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

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

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

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

Location	Existing Conditions					Proposed Conditions								Energy Impact & Financial Analysis						
	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	
Exterior wall mount	2	High-Pressure Sodium: (1) 70W Lamp	Wall Switch	95	2,880	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	20	2,880	0.10	497	0.0	\$75.41	\$781.35	\$200.00	7.71	
Exterior posts	2	Incandescent Ceiling mount - 1 lamp	Wall Switch	150	2,880	Relamp	No	2	LED Screw-In Lamps: Ceiling mount - 1 lamp	Wall Switch	20	2,880	0.17	861	0.0	\$130.71	\$107.51	\$10.00	0.75	
Entrance Chandelier	1	Incandescent Chandelier fixture - 6 lamps	Wall Switch	180	2,880	Relamp	No	1	LED Screw-In Lamps: Chandelier fixture - 6 lamps	Wall Switch	54	2,880	0.08	417	0.0	\$63.35	\$322.52	\$30.00	4.62	
Entrance Chandelier	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,880	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	2,880	0.03	147	0.0	\$22.37	\$31.90	\$5.00	1.20	
Entrance	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	30	0.0	\$4.59	\$107.56	\$0.00	23.45	
Child study office	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,016	0.66	3,315	0.0	\$503.14	\$2,220.00	\$260.00	3.90	
Hallway	7	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	7	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	212	0.0	\$32.11	\$752.89	\$0.00	23.45	
Hallway	18	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	18	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.58	2,951	0.0	\$447.94	\$2,367.00	\$270.00	4.68	
A112 - Audio Visual Room	2	Incandescent Wall mount fixture - 1 lamp	Wall Switch	100	2,880	Relamp	No	2	LED Screw-In Lamps: Wall mount fixture - 1 lamp	Wall Switch	14	2,880	0.11	570	0.0	\$86.47	\$107.51	\$10.00	1.13	
A112 - Audio Visual Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.13	656	0.0	\$99.54	\$526.00	\$60.00	4.68	
AV room hallway	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,040	Relamp & Reballast	No	11	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,040	0.36	651	0.0	\$98.85	\$1,446.50	\$165.00	12.96	
AV room hallway	3	Exit Signs: Incandescent	None	30	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.05	725	0.0	\$110.10	\$322.67	\$0.00	2.93	
AN32 - Band Room	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	156	Relamp & Reballast	No	16	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	156	0.52	142	0.0	\$21.57	\$2,104.00	\$240.00	86.43	
Storage	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	520	Relamp & Reballast	No	12	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	520	0.39	355	0.0	\$53.92	\$1,578.00	\$180.00	25.93	
A106 - Tech Support	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	6	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.19	984	0.0	\$149.31	\$789.00	\$90.00	4.68	
Storage - back stage	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	520	Relamp & Reballast	No	9	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	520	0.29	266	0.0	\$40.44	\$1,183.50	\$135.00	25.93	
Dressing room hallway	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	520	Relamp & Reballast	No	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	520	0.10	89	0.0	\$13.48	\$394.50	\$45.00	25.93	
Women Dress Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	520	Relamp & Reballast	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	520	0.06	59	0.0	\$8.99	\$263.00	\$30.00	25.93	
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	780	Relamp & Reballast	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	780	0.03	44	0.0	\$6.74	\$131.50	\$15.00	17.29	
Hallway	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	9	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.29	1,475	0.0	\$223.97	\$1,183.50	\$135.00	4.68	
A122-SAC councillor	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.10	492	0.0	\$74.66	\$394.50	\$45.00	4.68	
Technology office	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.10	492	0.0	\$74.66	\$394.50	\$45.00	4.68	
Men dressing room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	520	Relamp & Reballast	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	520	0.06	59	0.0	\$8.99	\$263.00	\$30.00	25.93	
Storage - back stage	2	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	60	0.0	\$9.18	\$215.11	\$0.00	23.45	
Dressing room hallway	2	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	60	0.0	\$9.18	\$215.11	\$0.00	23.45	

Location	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
	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
Women Dress Room	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	30	0.0	\$4.59	\$107.56	\$0.00	23.45
Hallway	3	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	91	0.0	\$13.76	\$322.67	\$0.00	23.45
Stage	30	Incandescent: Recessed fixture - 1 lamp	Wall Switch	85	2,880	Relamp	No	30	LED Screw-In Lamps: Recessed fixture - 1 lamp	Wall Switch	20	2,880	1.28	6,458	0.0	\$980.35	\$1,612.59	\$150.00	1.49
Stage	6	Metal Halide: (2) 400W Lamps	Wall Switch	916	2,880	Fixture Replacement	No	6	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	194	2,880	2.84	14,348	0.0	\$2,177.88	\$2,344.06	\$600.00	0.80
Stage	28	Halogen Incandescent: Wall hanging fixture - Tungsten Halogen - 1 lamp	Wall Switch	250	2,880	Relamp	No	28	LED Screw-In Lamps: 1 lamp	Wall Switch	90	2,880	2.94	14,838	0.0	\$2,252.28	\$2,739.88	\$140.00	1.15
Stage	4	Compact Fluorescent: Ceiling mount - 1 lamp	Wall Switch	26	2,880	Relamp	No	4	LED Screw-In Lamps: Ceiling mount fixture - 1 lamp	Wall Switch	7	2,880	0.05	252	0.0	\$38.21	\$215.01	\$20.00	5.10
Stage	11	Exit Signs: Incandescent	None	30	8,760	Fixture Replacement	No	11	LED Exit Signs: 2 W Lamp	None	6	8,760	0.17	2,660	0.0	\$403.70	\$1,183.11	\$0.00	2.93
Choir room stairs	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.13	656	0.0	\$99.54	\$526.00	\$60.00	4.68
A12 - Vocal music room	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,080	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	756	0.62	1,165	0.0	\$176.89	\$1,244.00	\$245.00	5.65
Choir room stairs	3	Compact Fluorescent Recessed fixture - 1 lamp	Wall Switch	26	2,880	Relamp	No	3	LED Screw-In Lamps: Recessed fixture - 1 lamp	Wall Switch	7	2,880	0.04	189	0.0	\$28.66	\$161.26	\$0.00	5.63
A12 - Vocal music room	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	1,080	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,080	0.04	72	0.0	\$10.93	\$126.40	\$0.00	11.56
Choir room stairs	3	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	91	0.0	\$13.76	\$322.67	\$0.00	23.45
A12 - Vocal music room	2	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	60	0.0	\$9.18	\$215.11	\$0.00	23.45
Walnut street entrance	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	5	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.16	820	0.0	\$124.43	\$657.50	\$75.00	4.68
A101 - Science Classroom	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.37	1,139	0.0	\$172.96	\$1,299.50	\$155.00	6.62
A100 - Science Classroom	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.37	1,139	0.0	\$172.96	\$1,299.50	\$155.00	6.62
Storage A102	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	520	Relamp & Reballast	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	520	0.06	59	0.0	\$8.99	\$263.00	\$30.00	25.93
A103 - Classroom	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.33	1,013	0.0	\$153.74	\$1,168.00	\$140.00	6.69
A104 - Classroom	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.33	1,013	0.0	\$153.74	\$1,168.00	\$140.00	6.69
Walnut street entrance	2	Exit Signs: Incandescent	None	30	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.03	484	0.0	\$73.40	\$215.11	\$0.00	2.93
Girls' restroom	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	780	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	546	0.08	105	0.0	\$15.89	\$621.00	\$35.00	36.88
Boys' restroom	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	780	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	546	0.08	105	0.0	\$15.89	\$621.00	\$35.00	36.88
Storage	1	Incandescent: Ceiling mount - 1 lamp	Wall Switch	75	520	Relamp	No	1	LED Screw-In Lamps: Ceiling mount - 1 lamp	Wall Switch	11	520	0.04	38	0.0	\$5.81	\$53.75	\$5.00	8.39
A116 - Assistant principal office	1	Compact Fluorescent: Ceiling mount - 1 lamp	Wall Switch	14	1,760	Relamp	No	1	LED Screw-In Lamps: Ceiling mount - 1 lamp	Wall Switch	4	1,760	0.01	20	0.0	\$3.07	\$53.75	\$0.00	17.50
A116 - Assistant principal office	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.25	760	0.0	\$115.30	\$905.00	\$110.00	6.89

Location	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
	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
A116 - Assistant principal office	1	Incandescent Ceiling mount - 1 lamp	Wall Switch	75	1,760	Relamp	No	1	LED Screw-In Lamps: Ceiling mount	Wall Switch	14	1,760	0.04	123	0.0	\$18.74	\$53.75	\$5.00	2.60
A111 - General office	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.33	1,013	0.0	\$153.74	\$1,168.00	\$140.00	6.69
A111 - General office	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	1,760	Relamp & Reballast	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,760	0.04	117	0.0	\$17.82	\$234.00	\$0.00	13.13
Restroom	1	Compact Fluorescent: Ceiling mount - 1 lamp	Wall Switch	28	780	Relamp	No	1	LED Screw-In Lamps: Ceiling mount - 1 lamp	Wall Switch	7	780	0.01	19	0.0	\$2.86	\$53.75	\$0.00	18.80
Conference Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,040	Relamp & Reballast	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	728	0.25	449	0.0	\$68.13	\$905.00	\$110.00	11.67
Janitors office	3	Incandescent Ceiling mount - 1 lamp	Wall Switch	75	156	Relamp	No	3	LED Screw-In Lamps: Ceiling mount - 1 lamp	Wall Switch	11	156	0.13	34	0.0	\$5.23	\$161.26	\$15.00	27.97
A126 - Classroom	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.41	1,266	0.0	\$192.17	\$1,431.00	\$170.00	6.56
A115 - offices	22	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	22	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.90	2,785	0.0	\$422.78	\$3,009.00	\$350.00	6.29
A128 - Storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	520	Relamp & Reballast	No	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	520	0.10	89	0.0	\$13.48	\$394.50	\$45.00	25.93
A130 - Classroom	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.25	760	0.0	\$115.30	\$905.00	\$110.00	6.89
Hallway	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,016	0.12	621	0.0	\$94.34	\$510.50	\$65.00	4.72
Elevator	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	104	Relamp & Reballast	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	104	0.04	7	0.0	\$1.02	\$161.83	\$20.00	139.51
Hallway	22	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	22	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.71	3,607	0.0	\$547.49	\$2,893.00	\$330.00	4.68
A214 Classroom	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.41	1,266	0.0	\$192.17	\$1,431.00	\$170.00	6.56
A217 Classroom	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.37	1,139	0.0	\$172.96	\$1,299.50	\$155.00	6.62
A212 Classroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.08	253	0.0	\$38.43	\$379.00	\$50.00	8.56
A210 Classroom	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.33	1,013	0.0	\$153.74	\$1,168.00	\$140.00	6.69
A115 - offices	2	Compact Fluorescent: Recessed fixture - 1 lamp	Wall Switch	40	1,760	Relamp	No	2	LED Screw-In Lamps: Recessed fixture - 1 lamp	Wall Switch	9	1,760	0.04	125	0.0	\$19.05	\$107.51	\$0.00	5.64
A215 Classroom	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.33	1,013	0.0	\$153.74	\$1,168.00	\$140.00	6.69
Boys' restroom	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	780	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	546	0.08	112	0.0	\$17.03	\$621.00	\$65.00	32.64
Stairwell	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	6	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.19	984	0.0	\$149.31	\$789.00	\$90.00	4.68
A213 Classroom	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.33	1,013	0.0	\$153.74	\$1,168.00	\$140.00	6.69
A208 Classroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.08	253	0.0	\$38.43	\$379.00	\$50.00	8.56
A211 Classrom	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.25	760	0.0	\$115.30	\$905.00	\$110.00	6.89
A209 A Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.12	380	0.0	\$57.65	\$510.50	\$65.00	7.73

Location	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
	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
Projection room	4	Incandescent Spot fixture - 1 lamp	Wall Switch	40	520	Relamp	No	4	LED Screw-In Lamps: Spot fixture - 1 lamp	Wall Switch	9	520	0.08	74	0.0	\$11.26	\$215.01	\$20.00	17.33
A209 Computer lab	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.49	1,519	0.0	\$230.61	\$1,694.00	\$200.00	6.48
Faculty Lounge	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,760	0.06	200	0.0	\$30.42	\$263.00	\$30.00	7.66
A207 Classroom	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.33	1,013	0.0	\$153.74	\$1,168.00	\$140.00	6.69
Stairwell	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	6	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.19	984	0.0	\$149.31	\$789.00	\$90.00	4.68
Girls' restroom	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	780	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	546	0.08	112	0.0	\$17.03	\$621.00	\$65.00	32.64
A205 Classroom	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.33	1,013	0.0	\$153.74	\$1,168.00	\$140.00	6.69
A202 Classroom	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.33	1,013	0.0	\$153.74	\$1,168.00	\$140.00	6.69
A203 Classroom	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.33	1,013	0.0	\$153.74	\$1,168.00	\$140.00	6.69
A201 Classroom	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.37	1,139	0.0	\$172.96	\$1,299.50	\$155.00	6.62
A200 Classroom	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.37	1,139	0.0	\$172.96	\$1,299.50	\$155.00	6.62
A1 Physics Lab	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.57	1,772	0.0	\$269.04	\$1,957.00	\$230.00	6.42
A2 Home Economics	29	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	780	Relamp & Reballast	Yes	29	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	546	1.19	1,627	0.0	\$246.99	\$3,929.50	\$455.00	14.07
Stairwell	2	Compact Fluorescent: Ceiling mount - 1 lamp	Wall Switch	28	2,880	Relamp	No	2	LED Screw-In Lamps: Ceiling mount - 1 lamp	Wall Switch	4	2,880	0.03	159	0.0	\$24.13	\$107.51	\$0.00	4.45
Stairwell	2	Exit Signs: Fluorescent	Wall Switch	9	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	Wall Switch	6	8,760	0.00	60	0.0	\$9.18	\$215.11	\$0.00	23.45
Stairwell	2	Exit Signs: Fluorescent	Wall Switch	9	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	Wall Switch	6	8,760	0.00	60	0.0	\$9.18	\$215.11	\$0.00	23.45
Girls' restroom	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	780	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	546	0.08	105	0.0	\$15.89	\$621.00	\$35.00	36.88
Men's restroom	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	780	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	546	0.08	105	0.0	\$15.89	\$621.00	\$35.00	36.88
A3 Classroom	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.62	1,899	0.0	\$288.26	\$2,088.50	\$245.00	6.40
A3 Classroom	1	Incandescent Wall mount fixture - 1 lamp	Wall Switch	75	1,760	Relamp	Yes	1	LED Screw-In Lamps: Wall mount fixture - 1 lamp	Occupancy Sensor	11	1,232	0.04	136	0.0	\$20.68	\$169.75	\$25.00	7.00
A5 Faculty Lounge	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	No	9	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,760	0.29	902	0.0	\$136.87	\$1,183.50	\$135.00	7.66
Cafeteria	41	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	No	41	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,760	1.33	4,108	0.0	\$623.53	\$5,391.50	\$615.00	7.66
Elevator Room	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	208	Fixture Replacement	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	208	0.04	14	0.0	\$2.14	\$83.43	\$0.00	38.95
Elevator Room	4	Exit Signs: Incandescent	None	30	8,760	Fixture Replacement	No	4	LED Exit Signs: 2 W Lamp	None	6	8,760	0.06	967	0.0	\$146.80	\$430.22	\$0.00	2.93
Exterior	3	Metal Halide: (1) 70W Lamp	Wall Switch	95	4,380	Fixture Replacement	No	3	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	20	4,380	0.15	1,133	0.0	\$172.03	\$1,172.03	\$300.00	5.07

Location	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
	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
Exterior	1	Metal Halide: (1) 70W Lamp	Wall Switch	95	4,380	Fixture Replacement	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	20	4,380	0.05	378	0.0	\$57.34	\$390.68	\$100.00	5.07
Room A6 Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.08	253	0.0	\$38.43	\$379.00	\$50.00	8.56
A8 Art Room	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.57	1,772	0.0	\$269.04	\$1,957.00	\$230.00	6.42
Band Room	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,080	Relamp & Reballast	No	16	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,080	0.52	984	0.0	\$149.31	\$2,104.00	\$240.00	12.48
Boiler Room	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,880	Relamp & Reballast	No	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,880	0.39	1,967	0.0	\$298.63	\$2,106.00	\$180.00	6.45
Boiler Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.06	328	0.0	\$49.77	\$263.00	\$30.00	4.68
Kitchen	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	14	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.45	2,295	0.0	\$348.40	\$1,841.00	\$210.00	4.68
Sprinkler Room	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	7	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.23	1,148	0.0	\$174.20	\$920.50	\$105.00	4.68
A11 Classroom	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.53	1,646	0.0	\$249.82	\$1,825.50	\$215.00	6.45
A11 Classroom	1	Incandescent: Ceiling mount - 1 lamp	Wall Switch	75	1,760	Relamp	No	1	LED Screw-In Lamps: Ceiling mount fixture - 1 lamp	Wall Switch	9	1,760	0.04	134	0.0	\$20.28	\$53.75	\$5.00	2.40
Cafeteria	4	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	4	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	121	0.0	\$18.35	\$430.22	\$0.00	23.45
A8 Art Room	2	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	60	0.0	\$9.18	\$215.11	\$0.00	23.45
Band Room	2	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	60	0.0	\$9.18	\$215.11	\$0.00	23.45
Boiler Room	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	30	0.0	\$4.59	\$107.56	\$0.00	23.45
Kitchen	2	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	60	0.0	\$9.18	\$215.11	\$0.00	23.45
Displaylight	4	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	22	2,880	Relamp & Reballast	No	4	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	2,880	0.04	179	0.0	\$27.15	\$374.00	\$20.00	13.04
A130 - Classroom	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.57	1,772	0.0	\$269.04	\$1,957.00	\$230.00	6.42
Utility closet	1	Incandescent: Ceiling mount - 1 lamp	Wall Switch	75	520	Relamp	No	1	LED Screw-In Lamps: Ceiling mount - 1 lamp	Wall Switch	9	520	0.04	39	0.0	\$5.99	\$53.75	\$5.00	8.14
Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	156	Relamp & Reballast	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	156	0.09	24	0.0	\$3.59	\$468.00	\$40.00	119.07
A18 - Maintenance supply	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	520	Relamp & Reballast	No	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	520	0.13	118	0.0	\$17.97	\$526.00	\$60.00	25.93
Hallway	18	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	18	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.58	2,951	0.0	\$447.94	\$2,367.00	\$270.00	4.68
A20 - office	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.25	760	0.0	\$115.30	\$905.00	\$110.00	6.89
A20 - office	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,760	Relamp & Reballast	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,232	0.16	506	0.0	\$76.87	\$818.00	\$80.00	9.60
A15 - Graphic arts	23	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	23	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.94	2,912	0.0	\$442.00	\$3,140.50	\$365.00	6.28
Stairwell	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	6	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.19	984	0.0	\$149.31	\$789.00	\$90.00	4.68

Location	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
	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
A15 - Graphic arts	5	Compact Fluorescent: Ceiling mount - 1 lamp	Wall Switch	28	1,760	Relamp	No	5	LED Screw-In Lamps: Ceiling mount fixture - 1 lamp	Wall Switch	7	1,760	0.07	213	0.0	\$32.26	\$268.77	\$0.00	8.33
Hallway	4	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	4	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	121	0.0	\$18.35	\$430.22	\$0.00	23.45
A20 - office	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	30	0.0	\$4.59	\$107.56	\$0.00	23.45
Stairwell	2	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	60	0.0	\$9.18	\$215.11	\$0.00	23.45
B- Building - Hallway Entrance	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	8	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.26	1,312	0.0	\$199.09	\$1,052.00	\$120.00	4.68
Entrance Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,016	0.08	414	0.0	\$62.89	\$379.00	\$50.00	5.23
Electrical Machine room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,880	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,880	0.02	109	0.0	\$16.59	\$117.00	\$10.00	6.45
Loading dock	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,880	Relamp & Reballast	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,880	0.11	546	0.0	\$82.95	\$585.00	\$50.00	6.45
B101 Classroom	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.37	1,139	0.0	\$172.96	\$1,299.50	\$155.00	6.62
B100 Classroom	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.37	1,139	0.0	\$172.96	\$1,299.50	\$155.00	6.62
B103 Classroom	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.37	1,139	0.0	\$172.96	\$1,299.50	\$155.00	6.62
B102 Classroom	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.37	1,139	0.0	\$172.96	\$1,299.50	\$155.00	6.62
B105 Classroom	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.37	1,139	0.0	\$172.96	\$1,299.50	\$155.00	6.62
B104 Classroom	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.37	1,139	0.0	\$172.96	\$1,299.50	\$155.00	6.62
B107 Classroom	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.37	1,139	0.0	\$172.96	\$1,299.50	\$155.00	6.62
B106 Classroom	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.37	1,139	0.0	\$172.96	\$1,299.50	\$155.00	6.62
Hallway	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	11	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.36	1,803	0.0	\$273.74	\$1,446.50	\$165.00	4.68
Girls' restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	780	Relamp & Reballast	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	546	0.08	112	0.0	\$17.03	\$533.00	\$65.00	27.48
Boys' restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	780	Relamp & Reballast	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	546	0.08	112	0.0	\$17.03	\$533.00	\$65.00	27.48
Utility closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	520	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	520	0.02	20	0.0	\$3.00	\$117.00	\$10.00	35.72
Hallway	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	14	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.45	2,295	0.0	\$348.40	\$1,841.00	\$210.00	4.68
B201 - Counseling	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.08	253	0.0	\$38.43	\$379.00	\$50.00	8.56
B203 - Office	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.21	633	0.0	\$96.09	\$773.50	\$95.00	7.06
B200 - Classroom	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.37	1,139	0.0	\$172.96	\$1,299.50	\$155.00	6.62
B205 - SGI Classroom	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.21	633	0.0	\$96.09	\$773.50	\$95.00	7.06

Location	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
	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
B202 - Chemistry Lab	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.62	1,899	0.0	\$288.26	\$2,088.50	\$245.00	6.40
B207 - Biology Lab	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.62	1,899	0.0	\$288.26	\$2,088.50	\$245.00	6.40
B204 - Prep room	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	No	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,760	0.10	301	0.0	\$45.62	\$394.50	\$45.00	7.66
B209 - Prep room	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	No	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,760	0.10	301	0.0	\$45.62	\$394.50	\$45.00	7.66
B211 - Bio Lab	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.62	1,899	0.0	\$288.26	\$2,088.50	\$245.00	6.40
B206 - Chemistry lab	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.62	1,899	0.0	\$288.26	\$2,088.50	\$245.00	6.40
B202 - Chemistry Lab	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	22	1,760	Relamp & Reballast	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,760	0.01	30	0.0	\$4.61	\$196.00	\$10.00	40.36
B206 - Chemistry lab	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	22	2,880	Relamp & Reballast	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,880	0.00	25	0.0	\$3.77	\$98.00	\$5.00	24.66
Hallway	4	Exit Signs: LED - 2 W Lamp	Wall Switch	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	Wall Switch	6	8,760	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Loading dock	1	Exit Signs: LED - 2 W Lamp	Wall Switch	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	Wall Switch	6	8,760	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Hallway	3	Exit Signs: LED - 2 W Lamp	Wall Switch	6	8,760	None	No	3	Exit Signs: LED - 2 W Lamp	Wall Switch	6	8,760	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
B202 - Chemistry Lab	1	Exit Signs: LED - 2 W Lamp	Wall Switch	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	Wall Switch	6	8,760	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
B207 - Biology Lab	1	Exit Signs: LED - 2 W Lamp	Wall Switch	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	Wall Switch	6	8,760	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
BOE office	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.53	1,646	0.0	\$249.82	\$1,825.50	\$215.00	6.45
Superintendent office	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.25	760	0.0	\$115.30	\$905.00	\$110.00	6.89
Ticket booth	1	Compact Fluorescent: Recessed fixture - 1 lamp	Wall Switch	28	520	Relamp	No	1	LED Screw-In Lamps: Recessed fixture - 1 lamp	Wall Switch	4	520	0.02	14	0.0	\$2.18	\$53.75	\$0.00	24.67
Display light	20	Incandescent: Spot fixture - 1 lamp	Wall Switch	60	2,880	Relamp	No	20	LED Screw-In Lamps: Spot fixture - 1 lamp	Wall Switch	9	2,880	0.67	3,378	0.0	\$512.80	\$1,075.06	\$100.00	1.90
Atheletic director's office	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,760	Relamp & Reballast	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,760	0.17	534	0.0	\$81.11	\$936.00	\$80.00	10.55
Atheletic director's office	1	Compact Fluorescent: Ceiling mount - 1 lamp	Wall Switch	26	1,760	Relamp	No	1	LED Screw-In Lamps: Ceiling mount - 1 lamp	Wall Switch	4	1,760	0.01	45	0.0	\$6.76	\$53.75	\$0.00	7.95
Atheletic director's office	1	Incandescent: Ceiling mount - 1 lamp	Wall Switch	40	1,760	Relamp	No	1	LED Screw-In Lamps: Ceiling mount - 1 lamp	Wall Switch	7	1,760	0.02	67	0.0	\$10.14	\$53.75	\$5.00	4.81
Gym Hallway	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	11	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.36	1,803	0.0	\$273.74	\$1,446.50	\$165.00	4.68
Gym 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
Stairwell	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,880	Relamp & Reballast	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,880	0.09	437	0.0	\$66.36	\$468.00	\$40.00	6.45
Pump room	6	Compact Fluorescent: Wall mount fixture - 1 lamp	Wall Switch	18	2,880	Relamp	No	6	LED Screw-In Lamps: Wall mount fixture - 1 lamp	Wall Switch	4	2,880	0.06	278	0.0	\$42.23	\$322.52	\$0.00	7.64
Girls' locker room	33	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	780	Relamp & Reballast	No	33	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	780	1.07	1,465	0.0	\$222.42	\$4,339.50	\$495.00	17.29

Location	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
	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' locker room	1	Compact Fluorescent: Ceiling mount - 1 lamp	Wall Switch	18	780	Relamp	No	1	LED Screw-In Lamps: Ceiling mount - 1 lamp	Wall Switch	9	780	0.01	8	0.0	\$1.23	\$53.75	\$0.00	43.86
Girls' locker room	1	Compact Fluorescent: Recessed fixtures - 2 lamps	Wall Switch	52	780	Relamp	No	1	LED Screw-In Lamps: Recessed fixture - 2 lamp	Wall Switch	18	780	0.02	30	0.0	\$4.63	\$107.51	\$0.00	23.22
Girls' locker room	1	Incandescent: Ceiling mount - 2 lamp	Wall Switch	80	780	Relamp	No	1	LED Screw-In Lamps: Ceiling mount - 2 lamp	Wall Switch	22	780	0.04	52	0.0	\$7.90	\$107.51	\$10.00	12.35
Girls' locker room	2	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	60	0.0	\$9.18	\$215.11	\$0.00	23.45
Storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	520	Relamp & Reballast	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	520	0.06	59	0.0	\$8.99	\$351.00	\$30.00	35.72
Men's Locker	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	780	Relamp & Reballast	No	13	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	780	0.28	385	0.0	\$58.41	\$1,521.00	\$130.00	23.81
Coach Locker	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	780	Relamp & Reballast	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	780	0.06	89	0.0	\$13.48	\$351.00	\$30.00	23.81
Coach's Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	780	Relamp & Reballast	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	780	0.09	118	0.0	\$17.97	\$468.00	\$40.00	23.81
Stairwell	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,880	Relamp & Reballast	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,880	0.09	437	0.0	\$66.36	\$468.00	\$40.00	6.45
Coach's locker	1	Compact Fluorescent: Wall mount fixture - 2 lamp	Wall Switch	36	780	Relamp	No	1	LED Screw-In Lamps: Wall mount fixture - 2 lamp	Wall Switch	8	780	0.02	25	0.0	\$3.81	\$107.51	\$0.00	28.20
Coach's Office	2	Compact Fluorescent: Wall mount fixture - 2 lamp	Wall Switch	52	1,760	Relamp	No	2	LED Screw-In Lamps: Wall mount fixture - 2 lamp	Wall Switch	14	1,760	0.05	154	0.0	\$23.35	\$215.01	\$0.00	9.21
Coach's Office	1	Incandescent: Wall mount fixture - 1 lamp	Wall Switch	75	1,760	Relamp	No	1	LED Screw-In Lamps: Wall mount fixture - 1 lamp	Wall Switch	14	1,760	0.04	123	0.0	\$18.74	\$53.75	\$5.00	2.60
Stairwell	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,880	Relamp & Reballast	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,880	0.09	437	0.0	\$66.36	\$468.00	\$40.00	6.45
Stairwell	2	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	60	0.0	\$9.18	\$215.11	\$0.00	23.45
C-Building - Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	520	Relamp & Reballast	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	520	0.04	39	0.0	\$5.99	\$234.00	\$20.00	35.72
C-Building - Hallway	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	14	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.45	2,295	0.0	\$348.40	\$1,841.00	\$210.00	4.68
Electrical room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	208	Relamp & Reballast	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	208	0.06	24	0.0	\$3.59	\$263.00	\$30.00	64.82
Elevator Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	208	Relamp & Reballast	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	208	0.03	12	0.0	\$1.80	\$131.50	\$15.00	64.82
C11 Computer lab	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,760	None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,760	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
C11 Computer lab	13	LED Screw-In Lamps: Recessed fixture - 1 lamp	Wall Switch	14	1,760	None	No	13	LED Screw-In Lamps: Recessed fixture - 1 lamp	Wall Switch	14	1,760	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
C11 Computer lab	11	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	1,760	None	No	11	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	1,760	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
C5 - Storage	2	Incandescent: Ceiling mount - 1 lamp	Wall Switch	100	520	Relamp	No	2	LED Screw-In Lamps: Ceiling mount - 1 lamp	Wall Switch	14	520	0.11	103	0.0	\$15.61	\$1,505.08	\$140.00	87.43
C4 - ISS	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	No	9	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,760	0.29	902	0.0	\$136.87	\$1,183.50	\$135.00	7.66
C7 - Art Room	34	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,760	Relamp & Reballast	No	34	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,760	0.74	2,271	0.0	\$344.71	\$3,978.00	\$340.00	10.55
C6 - Wood Shop	38	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,760	Relamp & Reballast	No	38	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,760	0.82	2,538	0.0	\$385.27	\$4,446.00	\$380.00	10.55

Location	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
	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
C9 - Classroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,760	Relamp & Reballast	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,760	0.04	113	0.0	\$17.20	\$161.83	\$20.00	8.24
C9 - Classroom	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.62	1,899	0.0	\$288.26	\$2,088.50	\$245.00	6.40
All purpose room	44	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	880	Relamp & Reballast	No	44	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	880	1.62	2,494	0.0	\$378.51	\$7,120.67	\$880.00	16.49
Stairwell	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,880	Relamp & Reballast	No	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,880	0.22	1,093	0.0	\$165.90	\$1,170.00	\$100.00	6.45
C110 Classroom	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,760	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,232	0.25	760	0.0	\$115.30	\$1,169.00	\$110.00	9.18
Hallway	3	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	91	0.0	\$13.76	\$322.67	\$0.00	23.45
C6 - Wood Shop	2	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	60	0.0	\$9.18	\$215.11	\$0.00	23.45
All purpose room	3	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	91	0.0	\$13.76	\$322.67	\$0.00	23.45
C111 - Classroom	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,760	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,232	0.33	1,013	0.0	\$153.74	\$1,520.00	\$140.00	8.98
C109 - Classroom	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,760	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,232	0.33	1,013	0.0	\$153.74	\$1,520.00	\$140.00	8.98
C108 - Media Center	48	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,760	Relamp & Reballast	Yes	48	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,232	2.31	7,131	0.0	\$1,082.44	\$7,884.00	\$980.00	6.38
C112 - Classroom	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,760	Relamp & Reballast	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,232	0.22	675	0.0	\$102.49	\$1,052.00	\$100.00	9.29
Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	156	Relamp & Reballast	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	156	0.04	12	0.0	\$1.80	\$234.00	\$20.00	119.07
C107 - Classroom	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,760	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,232	0.33	1,013	0.0	\$153.74	\$1,520.00	\$140.00	8.98
C105 - Nurse office	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,760	Relamp & Reballast	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,760	0.17	534	0.0	\$81.11	\$936.00	\$80.00	10.55
C103 - Faculty lounge	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,760	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,232	0.11	338	0.0	\$51.25	\$584.00	\$60.00	10.23
C104 - Attendance	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,760	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,232	0.25	760	0.0	\$115.30	\$1,169.00	\$110.00	9.18
Stairwell	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,880	Relamp & Reballast	No	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,880	0.22	1,093	0.0	\$165.90	\$1,170.00	\$100.00	6.45
Hallway	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	10	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.32	1,639	0.0	\$248.86	\$1,315.00	\$150.00	4.68
Hallway	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	11	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.36	1,803	0.0	\$273.74	\$1,446.50	\$165.00	4.68
Faculty bathroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	780	Relamp & Reballast	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	780	0.02	26	0.0	\$3.95	\$117.00	\$0.00	29.63
Faculty bathroom	2	Incandescent Ceiling mount fixture - 1 lamp	Wall Switch	75	780	Relamp	No	2	LED Screw-In Lamps: Ceiling mount fixture - 1 lamp	Wall Switch	9	780	0.09	118	0.0	\$17.97	\$107.51	\$10.00	5.43
C103 - Faculty lounge	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	1,080	Relamp & Reballast	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	756	0.03	48	0.0	\$7.33	\$233.00	\$20.00	29.04
Storage	2	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	60	0.0	\$9.18	\$215.11	\$0.00	23.45
Hallway	4	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	4	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	121	0.0	\$18.35	\$430.22	\$0.00	23.45

Location	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
	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
C203 - Classroom	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	7	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.29	886	0.0	\$134.52	\$1,036.50	\$125.00	6.78
Boys' restroom	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	780	Relamp & Reballast	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	546	0.16	224	0.0	\$34.07	\$796.00	\$95.00	20.58
C205 classroom	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.49	1,519	0.0	\$230.61	\$1,694.00	\$200.00	6.48
Girls' restroom	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	780	Relamp & Reballast	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	546	0.19	263	0.0	\$39.98	\$917.33	\$115.00	20.07
C207 Classroom	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,760	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,232	0.33	1,013	0.0	\$153.74	\$1,520.00	\$140.00	8.98
C202 Classroom	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,760	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,232	0.33	1,013	0.0	\$153.74	\$1,520.00	\$140.00	8.98
C204 Classroom	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,760	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,232	0.33	1,013	0.0	\$153.74	\$1,520.00	\$140.00	8.98
C209 Classroom	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,760	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,232	0.33	1,013	0.0	\$153.74	\$1,520.00	\$140.00	8.98
C211 Classroom	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,760	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,232	0.33	1,013	0.0	\$153.74	\$1,520.00	\$140.00	8.98
C206 Classroom	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,760	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,232	0.33	1,013	0.0	\$153.74	\$1,520.00	\$140.00	8.98
Stairwell	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	10	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.32	1,639	0.0	\$248.86	\$1,315.00	\$150.00	4.68
Hallway	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	10	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.32	1,639	0.0	\$248.86	\$1,315.00	\$150.00	4.68
Gym	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,880	Relamp & Reballast	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,880	0.17	874	0.0	\$132.72	\$936.00	\$80.00	6.45
Gym	24	Linear Fluorescent - T5: 4' T5 (28W) - 3L	Wall Switch	90	2,880	Relamp & Reballast	No	24	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.73	3,696	0.0	\$561.06	\$3,156.00	\$360.00	4.98
Trainer's Room	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,760	Relamp & Reballast	No	7	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,760	0.15	468	0.0	\$70.97	\$819.00	\$70.00	10.55
Stairwell	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,880	Relamp & Reballast	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,880	0.02	116	0.0	\$17.60	\$196.00	\$10.00	10.57
Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,760	0.06	200	0.0	\$30.42	\$263.00	\$30.00	7.66
D-building - Hallway	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,880	Relamp & Reballast	No	10	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,880	0.32	1,639	0.0	\$248.86	\$1,315.00	\$150.00	4.68
D-building - Fitness Center	14	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,760	Relamp & Reballast	No	14	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,760	0.51	1,587	0.0	\$240.87	\$2,265.67	\$280.00	8.24
D-building - Fitness Center	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,760	Relamp & Reballast	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,760	0.04	134	0.0	\$20.28	\$234.00	\$20.00	10.55
Gym Hallway	42	Linear Fluorescent - T5: 4' T5 (28W) - 4L	Wall Switch	120	2,880	Relamp & Reballast	No	42	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,880	1.71	8,624	0.0	\$1,309.14	\$6,797.00	\$840.00	4.55
D4 - office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,760	0.06	200	0.0	\$30.42	\$263.00	\$30.00	7.66
Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	208	Relamp & Reballast	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	208	0.04	16	0.0	\$2.40	\$234.00	\$20.00	89.30
Coach office	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	No	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,760	0.10	301	0.0	\$45.62	\$394.50	\$45.00	7.66
D1 - Classroom	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,232	0.37	1,139	0.0	\$172.96	\$1,299.50	\$155.00	6.62

Location	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
	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
D7 Communication education	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,760	Relamp & Reballast	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,760	0.06	200	0.0	\$30.42	\$263.00	\$30.00	7.66
Bathroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	780	Relamp & Reballast	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	780	0.03	44	0.0	\$6.74	\$131.50	\$15.00	17.29
Stairwell	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
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
Gym	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Hallway	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Fitness center	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
Gym 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
Girls bathroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	780	Relamp & Reballast	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	546	0.08	112	0.0	\$17.03	\$533.00	\$65.00	27.48
Bathroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	780	Relamp & Reballast	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	780	0.01	16	0.0	\$2.38	\$98.00	\$5.00	39.03
Boys' restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	780	Relamp & Reballast	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	546	0.08	112	0.0	\$17.03	\$533.00	\$65.00	27.48
Exterior walls	4	Metal Halide: (1) 70W Lamp	Daylight Dimming	95	4,380	Fixture Replacement	No	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	18	4,380	0.20	1,551	0.0	\$235.49	\$1,562.71	\$400.00	4.94
Exterior walls	22	Metal Halide: (1) 175W Lamp	Wall Switch	215	4,380	Fixture Replacement	No	22	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	89	4,380	1.82	13,963	0.0	\$2,119.43	\$8,594.89	\$2,200.00	3.02
Gym entrance	4	Metal Halide: (1) 100W Lamp	Daylight Dimming	128	4,380	Fixture Replacement	No	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	89	4,380	0.10	786	0.0	\$119.28	\$1,562.71	\$400.00	9.75
Exterior walls	2	High-Pressure Sodium: (1) 400W Lamp	Daylight Dimming	465	4,380	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	194	4,380	0.36	2,730	0.0	\$414.41	\$781.35	\$200.00	1.40
Exterior walls	4	Metal Halide: (1) 150W Lamp	Wall Switch	190	4,380	Fixture Replacement	No	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	89	4,380	0.26	2,035	0.0	\$308.89	\$1,562.71	\$400.00	3.76
Exterior walls	4	Halogen Incandescent: Wall pack - 150 Watt - 1 lamp -white light	Wall Switch	150	4,380	Relamp	No	4	LED Screw-In Lamps: Wall pack bulb - 1 lamp	Wall Switch	89	4,380	0.16	1,229	0.0	\$186.56	\$391.41	\$20.00	1.99
Exterior	6	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	100	4,380	None	No	6	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	100	4,380	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00

Motor Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
		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
Tech support room	Heat pump	1	Other	0.2	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Back stage	Back stage	1	Other	0.3	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Offices	Offices	1	Other	0.3	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Dressign Rooms	Dressing Rooms	1	Other	0.3	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Back stage	Back stage	1	Other	0.3	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Boiler room	Boiler room	1	Water Supply Pump	0.3	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Boiler room	Air compressors	2	Air Compressor	2.0	85.5%	No	4,957	No	85.5%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Boiler room	Boiler	2	Heating Hot Water Pump	20.0	91.0%	No	3,391	No	91.0%	Yes	2	4.94	48,370	0.0	\$7,342.25	\$12,668.60	\$0.00	1.73
Elevator room	Elevator	1	Other	20.0	91.0%	No	3,391	No	91.0%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Fire room	Fire sprinkler	1	Other	25.0	91.0%	No	4,067	No	91.0%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Elevator room	Elevator	1	Other	25.0	91.0%	No	4,067	No	91.0%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
B building pump room	Boiler	2	Chilled Water Pump	5.0	88.5%	No	2,745	No	88.5%	Yes	2	1.27	10,065	0.0	\$1,527.85	\$6,551.70	\$0.00	4.29
B building pump room	Boiler	1	Heating Hot Water Pump	3.0	86.5%	No	2,745	No	86.5%	Yes	1	0.39	3,089	0.0	\$468.95	\$3,007.65	\$0.00	6.41
Elevator room	Elevator	1	Other	20.0	91.0%	No	3,391	No	91.0%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
All school	AHU	4	Supply Fan	3.0	86.5%	No	2,745	No	86.5%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Classrooms and offices	Unit ventilators	30	Supply Fan	0.3	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00

Electric HVAC Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions		Proposed Conditions										Energy Impact & Financial Analysis						
		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
Rooftop	Auditorium	1	Packaged AC	50.00		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Rooftop	Auxiliary gym	1	Packaged AC	25.00		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Rooftop	Fitness center	1	Packaged AC	5.00		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Rooftop	New bandroom	1	Packaged AC	6.00		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Rooftop	Rooms above rooftop b - 2,5,4,3	4	Packaged AC	4.00		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Rooftop	Classrooms, Health, Hall/CE, Stage costume, Stage dressing room, Stage electric room, VP office, Rooms above rooftop B- 6,7,1,8	11	Split-System AC	3.00		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Rooftop	Trainer's office	1	Split-System AC	2.00		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Rooftop	All purpose room, wood shop and art room	3	Packaged AC	5.00		Yes	3	Packaged AC	5.00		14.00		No	6.46	7,020	0.0	\$1,065.59	\$34,034.40	\$1,380.00	30.64
Boys locker room	Boys locker room, Board office conf/kitch	2	Split-System AC	3.00		Yes	2	Split-System AC	3.00		14.00		No	3.98	6,711	0.0	\$1,018.75	\$8,977.32	\$552.00	8.27
Rooftop	Superintendent office, copyroom, board office,AD office	4	Split-System AC	1.50		Yes	4	Split-System AC	1.50		14.00		No	3.23	5,446	0.0	\$826.75	\$8,977.32	\$552.00	10.19
Classroom	B100,101,102,103,104,105,106,107,	8	Packaged AC	4.00		Yes	8	Packaged AC	4.00		14.00		No	21.20	24,686	0.0	\$3,747.14	\$72,606.72	\$2,944.00	18.59
Art Room 2, Choir Room, CAD Room	Art Room 2, Choir Room, CAD Room, ISS suspension	4	Packaged AC	3.00		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
On roof C	203,204,205,209,211, Faculty lounge, Nurse's office, 107,108,109,110	11	Packaged AC	4.00		Yes	11	Packaged AC	4.00		14.00		No	29.16	31,680	0.0	\$4,808.83	\$99,834.24	\$4,048.00	19.92
Rooftop	C206	1	Packaged AC	4.00		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
C111	C111	1	Packaged AC	4.00		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Shop rite Computer lab	Shop rite Computer lab	2	Split-System AC	1.25		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00

Electric Chiller Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions		Proposed Conditions							Energy Impact & Financial Analysis							
		Chiller Quantity	System Type	Cooling Capacity per Unit (Tons)	Install High Efficiency Chillers?	Chiller Quantity	System Type	Constant/Variable Speed	Cooling Capacity (Tons)	Full Load Efficiency (kW/Ton)	IPLV Efficiency (kW/Ton)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Rooftop	B Building	1	Air-Cooled Screw Chiller	160.00	No							0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00

Fuel Heating Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis							
		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	High school	3	Condensing Hot Water Boiler	1,720.00	No							0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00

DHW Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions			Proposed Conditions					Energy Impact & Financial Analysis						
		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	Restrooms and classrooms	1	Storage Tank Water Heater (≤ 50 Gal)	Yes	1	Storage Tank Water Heater (> 50 Gal)	Natural Gas	95.00%	Et	0.00	0	153.3	\$1,408.95	\$15,033.00	\$525.00	10.30
Boiler Room	Restrooms and classrooms	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Boiler Room	Restrooms and classrooms	1	Storage Tank Water Heater (≤ 50 Gal)	Yes	1	Storage Tank Water Heater (> 50 Gal)	Natural Gas	95.00%	Et	0.00	0	153.3	\$1,408.95	\$15,033.00	\$525.00	10.30

Low-Flow Device Recommendations

Location	Recommendation Inputs				Energy Impact & Financial Analysis						
	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
Classrooms	5	Faucet Aerator (Kitchen)	2.50	2.20	0.00	0	2.4	\$21.71	\$35.85	\$0.00	1.65
All Women restroom	23	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	43.5	\$399.46	\$164.91	\$0.00	0.41
All Men restroom	18	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	34.0	\$312.62	\$129.06	\$0.00	0.41

Walk-In Cooler/Freezer Inventory & Recommendations

Location	Existing Conditions		Proposed Conditions			Energy Impact & Financial Analysis						
	Cooler/Freezer Quantity	Case Type/Temperature	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Evaporator Fan Control?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Low Temp Freezer (-35F to -5F)	No	No	No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Kitchen	1	Cooler (35F to 55F)	No	No	No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00

Commercial Refrigerator/Freezer Inventory & Recommendations

Location	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
	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	3	Stand-Up Refrigerator, Glass Door (≤15 cu. ft.)	Yes	No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Kitchen	2	Stand-Up Refrigerator, Solid Door (≤15 cu. ft.)	Yes	No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00

Commercial Ice Maker Inventory & Recommendations

Location	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
	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
Kitchen	1	Ice Making Head (≥450 lbs/day), Batch	No	No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Trainers room	1	Ice Making Head (<450 lbs/day), Batch	No	No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00

Cooking Equipment Inventory & Recommendations

Location	Existing Conditions			Proposed Conditions	Energy Impact & Financial Analysis						
	Quantity	Equipment Type	High Efficiency Equipment?	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
Home Economics room	3	Gas Combination Oven/Steam Cooker (<15 Pans)	No	No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Kitchen	1	Electric Combination Oven/Steam Cooker (<15 Pans)	No	No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Kitchen	2	Gas Griddle (4 Feet Width)	No	No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Kitchen	2	Electric Convection Oven (Half Size)	No	No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Kitchen	2	Insulated Food Holding Cabinet (Full Size)	No	No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Kitchen	2	Gas Convection Oven (Full Size)	Yes	No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Kitchen	4	Gas Fryer	No	No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00

Dishwasher Inventory & Recommendations

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

Plug Load Inventory

Location	Existing Conditions			
	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Audubon Junior and Senior high school	266	Computer	75.0	Yes
Audubon Junior and Senior high school	8	Laptop	40.0	Yes
Audubon Junior and Senior high school	10	Printer - Small	20.0	Yes
Audubon Junior and Senior high school	36	Printer - Medium	50.0	Yes
Audubon Junior and Senior high school	8	Printer - Big	300.0	Yes
Audubon Junior and Senior high school	3	Paper Shredder	360.0	No
Audubon Junior and Senior high school	51	Projector	200.0	Yes
Audubon Junior and Senior high school	22	Microwave	900.0	No
Audubon Junior and Senior high school	5	Refrigerator - Small	27.6	No
Audubon Junior and Senior high school	6	Refrigerator - Medium	50.0	No
Audubon Junior and Senior high school	10	Refrigerator - Large	100.0	No
Audubon Junior and Senior high school	12	Coffee Machine	400.0	Yes
Audubon Junior and Senior high school	3	Toaster	850.0	No
Audubon Junior and Senior high school	3	Toaster oven	1,200.0	No
Audubon Junior and Senior high school	1	Clothes Washer	900.0	No
Audubon Junior and Senior high school	1	Clothes Dryer	1,600.0	No
Audubon Junior and Senior high school	1	Dishwasher	1,500.0	No
Audubon Junior and Senior high school	11	Television - CRT	150.0	No
Audubon Junior and Senior high school	4	Television - LCD	120.0	No
Audubon Junior and Senior high school	1	Space heater	1,500.0	No
Audubon Junior and Senior high school	19	Smart Board	5.0	Yes
Audubon Junior and Senior high school	6	Blender	500.0	No
Audubon Junior and Senior high school	1	Plug in freezer	50.0	Yes

Vending Machine Inventory & Recommendations

Location	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Faculty lounge	1	Refrigerated	Yes	0.00	1,612	0.0	\$244.67	\$230.00	\$0.00	0.94
Cafeteria	2	Refrigerated	Yes	0.00	3,224	0.0	\$489.34	\$460.00	\$0.00	0.94
Gym	1	Refrigerated	Yes	0.00	1,612	0.0	\$244.67	\$230.00	\$0.00	0.94
Boys locker room	1	Refrigerated	Yes	0.00	1,612	0.0	\$244.67	\$230.00	\$0.00	0.94
Faculty lounge	1	Refrigerated	Yes	0.00	1,612	0.0	\$244.67	\$230.00	\$0.00	0.94

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR®
Score¹

Audubon Jr/Sr High School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 192,432
Built: 1928

For Year Ending: May 31, 2016
Date Generated: May 25, 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
Audubon Jr/Sr High School 350 Edgewood Avenue Audubon, New Jersey 08106	_____ () - _____	_____ () - _____
Property ID: 5898663		

Energy Consumption and Energy Use Intensity (EUI)

Site EUI	Annual Energy by Fuel	National Median Comparison
48.4 kBtu/ft ²	Electric - Grid (kBtu) 5,508,167 (59%)	National Median Site EUI (kBtu/ft ²) 66
	Natural Gas (kBtu) 3,808,522 (41%)	National Median Source EUI (kBtu/ft ²) 150.8
		% Diff from National Median Source EUI -27%
Source EUI	Annual Emissions	
110.7 kBtu/ft ²	Greenhouse Gas Emissions (Metric Tons CO ₂ e/year) 834	

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)