Local Government Energy Audit:
Energy Audit Report

Lawrence High School

2525 Princeton Pike

Lawrenceville, New Jersey 08648

Lawrence Township BOE

December 6, 2018

Final Report by:

TRC Energy Services

Disclaimer

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

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

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

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

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1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Lawrence 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 public school districts in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

1.1 Facility Summary

Lawrence High School is a 240,000 square foot facility comprised of classrooms on two floors, a technology center, library, gymnasium, locker rooms, indoor pool, auditorium, kitchen and offices. The high school is in full operation September through June, Monday through Friday between 7:00 AM and 3:00 PM. However, the building remains open between the hours of 6:00 AM and 11:00 PM. Large areas such as the commons/cafeteria, gymnasium, pool and auditorium are occupied on weekday evenings between 3:00 PM and 10:00 PM. The high school is utilized on Saturdays from November to April every year for sports and recreational activities between 7:00 AM and 9:00 PM. There is summer school in July and August when two wings of classrooms are occupied as well as the library. Summer school is typically held from 8:00 AM to 12:00 PM. The kitchen serves lunch for every student each school day. The kitchen has walk-in refrigeration equipment.

The high school is 100% heated and about 40% cooled. Roof top equipment serves the commons/cafeteria, library, main office, technology center, gymnasiums and the 300's wing of classrooms. There are also a number of window air-conditioning (AC) units in other classrooms for summer school. The high school is in the process of implementing LED lighting upgrades. The hydronic heating system boilers and existing HVAC controls are aging and inefficient. Some equipment and controls are in need of replacement or upgrade. A thorough description of the facility and our observations are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC recommends 11 high priority measures which together represent an opportunity for Lawrence High School to reduce annual energy costs by roughly $59,678 and annual greenhouse gas emissions by 607,809 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 4.6 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 Lawrence High School's annual energy use by 12%.

TRC evaluated a total of 18 measures which together represent an opportunity for Lawrence High School to reduce annual energy costs by roughly $103,840 and annual greenhouse gas emissions by 1,150,845 lbs CO_2e. We estimate that if all measures were implemented, the project would pay for itself in 13.4 years. The breakdown of existing and potential utility costs after project implementation are illustrated in Figure 1 and Figure 3, respectively. Together these measures represent an opportunity to reduce Lawrence High School's annual energy use by 28%.

Figure 1 – Previous 12 Month Utility Costs

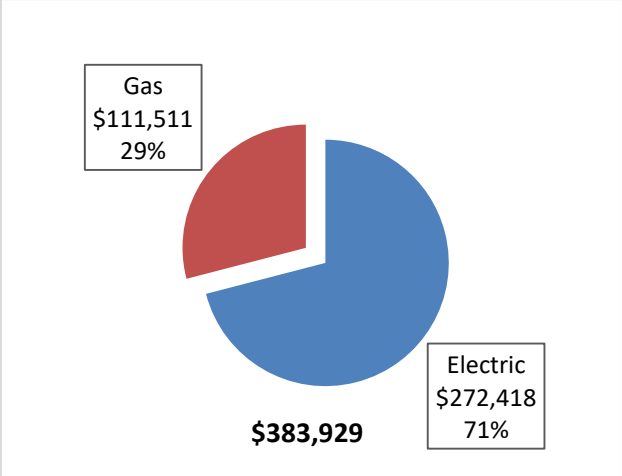


Figure 2 – Potential Post-Implementation Costs (High Priority Measures)

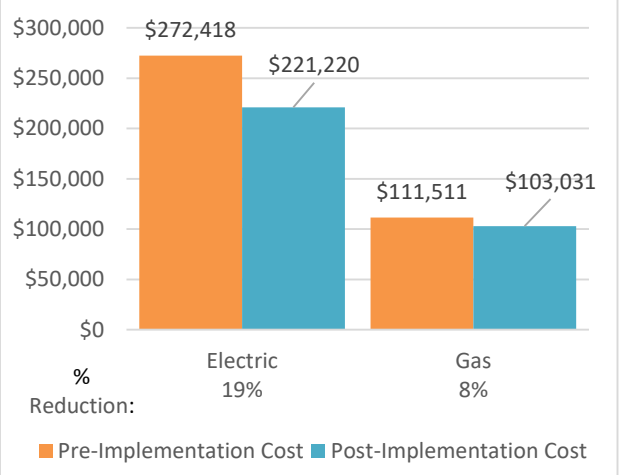
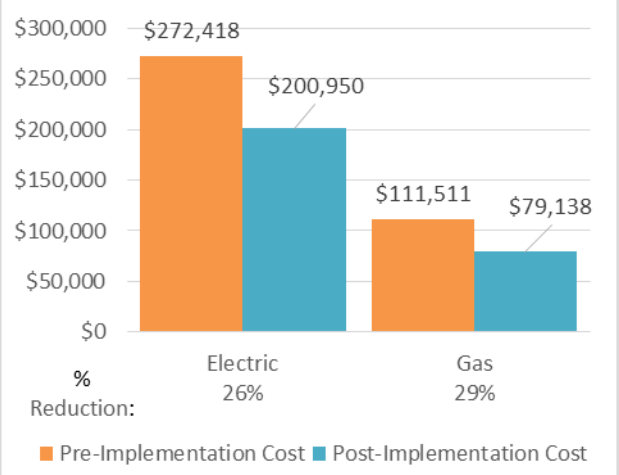


Figure 3 – Potential Post-Implementation Costs (All Evaluated Measures)



A detailed description of Lawrence 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 4. A brief description of each category can be found below and a description of savings opportunities can be found in Section 4.

Figure 4 – Summary of Energy Reduction Opportunities

	Energy Conservation Measure	Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**305,434**	**60.1**	**0.0**	**$32,593**	**$115,824**	**$24,665**	**$91,159**	**2.8**	**307,570**
ECM 1	Install LED Fixtures	Yes	9,012	0.9	0.0	$962	$15,654	$1,605	$14,049	14.6	9,075
ECM 2	Retrofit Fixtures with LED Lamps	Yes	296,422	59.1	0.0	$31,631	$100,170	$23,060	$77,110	2.4	298,495
Lighting Control Measures			**10,374**	**1.5**	**0.0**	**$1,107**	**$10,858**	**$1,215**	**$9,643**	**8.7**	**10,446**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	9,263	1.3	0.0	$988	$9,258	$1,075	$8,183	8.3	9,328
ECM 4	Install High/Low Lighitng Controls	Yes	1,111	0.2	0.0	$119	$1,600	$140	$1,460	12.3	1,118
Motor Upgrades			**2,716**	**0.5**	**0.0**	**$290**	**$14,170**	**$0**	**$14,170**	**48.9**	**2,735**
ECM 5	Premium Efficiency Motors	Yes	2,716	0.5	0.0	$290	$14,170	$0	$14,170	48.9	2,735
Variable Frequency Drive (VFD) Measures			**129,762**	**40.9**	**0.0**	**$13,847**	**$86,236**	**$9,400**	**$76,836**	**5.5**	**130,670**
ECM 6	Install VFDs on Constant Volume (CV) HVAC	Yes	93,927	34.0	0.0	$10,023	$62,216	$9,400	$52,816	5.3	94,583
ECM 7	Install VFDs on Hot Water Pumps	Yes	35,836	6.9	0.0	$3,824	$24,020	$0	$24,020	6.3	36,086
Electric Unitary HVAC Measures			**59,801**	**39.1**	**0.0**	**$6,381**	**$455,146**	**$20,348**	**$434,798**	**68.1**	**60,219**
	Install High Efficiency Electric AC	No	59,801	39.1	0.0	$6,381	$455,146	$20,348	$434,798	68.1	60,219
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**1,600.0**	**$12,742**	**$307,812**	**$11,600**	**$296,212**	**23.2**	**187,337**
	Install High Efficiency Hot Water Boilers	No	0	0.0	1,237.4	$9,854	$233,383	$0	$233,383	23.7	144,881
	Install High Efficiency Furnaces	No	0	0.0	362.6	$2,888	$74,429	$11,600	$62,829	21.8	42,456
HVAC System Improvements			**74,995**	**16.9**	**0.0**	**$8,003**	**$20,750**	**$7,250**	**$13,500**	**1.7**	**75,519**
	Install Dual Enthalpy Outside Economizer Control	No	74,995	16.9	0.0	$8,003	$20,750	$7,250	$13,500	1.7	75,519
Domestic Water Heating Upgrade			**0**	**0.0**	**61.4**	**$489**	**$301**	**$0**	**$301**	**0.6**	**7,189**
ECM 8	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	61.4	$489	$301	$0	$301	0.6	7,189
Food Service Equipment & Refrigeration Measures			**2,028**	**0.2**	**0.0**	**$216**	**$3,640**	**$0**	**$3,640**	**16.8**	**2,042**
	Replace Refrigeration Equipment	No	2,028	0.2	0.0	$216	$3,640	$0	$3,640	16.8	2,042
Plug Load Equipment Control - Vending Machine			**6,447**	**0.0**	**0.0**	**$688**	**$920**	**$200**	**$720**	**1.0**	**6,492**
ECM 9	Vending Machine Control	Yes	6,447	0.0	0.0	$688	$920	$200	$720	1.0	6,492
Custom Measures			**78,170**	**0.0**	**2,403.6**	**$27,484**	**$447,635**	**$0**	**$447,635**	**16.3**	**360,149**
ECM 10	Building Envelope Weatherization	Yes	212	0.0	303.3	$2,438	$11,620	$0	$11,620	4.8	35,725
	Computer Power Management Software	No	3,924	0.0	0.0	$419	$4,015	$0	$4,015	9.6	3,951
ECM 11	Retro-Commissioning Study & HVAC Improvements	Yes	24,834	0.0	700.1	$8,226	$72,000	$0	$72,000	8.8	106,981
	Installation of an Energy Management System	No	49,201	0.0	1,400.2	$16,401	$360,000	$0	$360,000	21.9	213,493
TOTALS FOR HIGH PRIORITY MEASURES			**479,780**	**102.9**	**1,064.8**	**$59,678**	**$311,929**	**$35,480**	**$276,449**	**4.6**	**607,809**
TOTALS FOR ALL EVALUATED MEASURES			**669,728**	**159.2**	**4,065.0**	**$103,840**	**$1,463,292**	**$74,678**	**$1,388,614**	**13.4**	**1,150,370**

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

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

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

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

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

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

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

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

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

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

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

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

Energy Efficient Practices

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

- Reduce Air Leakage
- Close Doors and Windows
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Perform Routine Motor Maintenance
- Use Fans to Reduce Cooling Load
- Ensure Economizers are Functioning Properly
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Check for and Seal Duct Leakage
- Perform Proper Boiler Maintenance
- Perform Proper Water Heater Maintenance
- Install Plug Load Controls
- Water Conservation

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

On-Site Generation Measures

TRC evaluated the potential for installing on-site generation for Lawrence High School. This high level screening is based on the potential evaluated for the main parking lot. Based on the configuration of the site and its loads, there is a high potential for installing a photovoltaic (PV) array in this area.

Figure 5 – Photovoltaic Potential

Potential	High	
System Potential	375	kW DC STC
Electric Generation	446,764	kWh/yr
Displaced Cost	$38,870	/yr
Installed Cost	$1,267,500	

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

1.3 Implementation Planning

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

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

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

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

For facilities wanting to pursue only selected individual measures (or planning to phase implementation of selected measures over multiple years), incentives are available through the SmartStart program. To participate in this program you may utilize internal resources, or an outside firm or contractor, to do the final design of the ECM(s) and do the installation. Program pre-approval is required for some SmartStart incentives, so only after receiving pre-approval should you proceed with ECM installation. The incentive estimates listed above in Figure 4 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.

There is a potential for the High School to qualify for the P4P program. However, this requires total source savings for measures to be greater than 15% and limits the contribution lighting savings can be to 50% of the total source savings. The energy and economic results provided demonstrate that the recommended project including only high priority measures would not meet these requirements, however the total project including all evaluated measures would. Additional opportunities may also be identified by an ESCO moving forward.

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

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

By enabling grid operators to call upon commercial facilities to reduce their electric usage during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment Service Providers provide regular payments to medium and large consumers of electric power for their participation in DR programs. Program participation is voluntary and facilities receive payments whether or not they are called upon to curtail their load during times of peak demand. Refer to Section 7 for additional information on this program.

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

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 6 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
James Alberti	Director of Facilities	JAlberti@ltps.org	609-847-9605
Tom Eldridge	Business Administrator	TEldridge@ltps.org	609-649-9109
Designated Representative			
Luis	Head Custodian		
TRC Energy Services			
Aimee Lalonde	Auditor	ALalonde@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On July 16, 2018, TRC performed an energy audit at Lawrence High School located in Lawrenceville, New Jersey. TRC's team met with Luis, the head custodian to review the facility operations and help focus our investigation on specific energy-using systems.

Lawrence High School is a 240,000 square foot facility comprised of classrooms on two floors, a technology center, library, gymnasium, locker rooms, indoor pool, auditorium, kitchen and offices. The kitchen serves lunch for every student each school day. The kitchen has walk-in refrigeration equipment.

The building was constructed in 1967. Over the last few years the facility has replaced T8 fluorescent fixtures with LED panels in the hallway areas, have begun this process in the classrooms, and have installed occupancy based sensors in the majority of classrooms and offices throughout the facility. These lighting upgrades have been completed after the baseline utility period and are still ongoing. We have estimated the energy savings based on the status of the project at the time the site audit was conducted.

The high school is 100% heated and about 40% cooled. Roof top equipment serves the commons/cafeteria, library, main office, technology center, gymnasiums and the 300's wing of classrooms. There are also a number of window air-conditioning (AC) units in other classrooms for summer school. Cooling equipment is in good condition. However, the site is interested in installing new boilers and HVAC controls. The hydronic heating system boilers and existing HVAC controls are aging and inefficient. The unit ventilators throughout the building vary in condition. HVAC equipment and controls are in need of replacement and have been evaluated within this energy audit report.

2.3 Building Occupancy

The high school is in full operation September through June, Monday through Friday between 7:00 AM and 3:00 PM. However, the building remains open between the hours of 6:00 AM and 11:00 PM. Large areas such as the commons/cafeteria, gymnasium, pool and auditorium are occupied on weekday evenings between 3:00 PM and 10:00 PM. The high school is utilized on Saturdays from November to April every year for sports and recreational activities between 7:00 AM to 9:00 PM. There is summer school in July and August when two wings of classrooms are occupied as well as the library. Summer school typically operates from 8:00 AM to 12:00 PM. The typical schedule is presented in the table below. The entire facility is used year-round by the community. During a typical day, the facility is occupied by approximately 172 staff and 1155 students.

Figure 7 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
High School (Peak Occupancy)	Weekday	7:00 AM to 3:00 PM
Some Classrooms	Weekend	7:00 AM to 3:00 PM
High School (Custodial Staff)	Weekday	6:00 AM to 11:00 PM
Sports/Recreation	Weekend	7:00 AM to 9:00 PM
Commons/Café/Gym/Pool/Auditorium	Weekday	3:00 PM to 10:00 PM
Summer School		
Classrooms & Library	Weekday	8:00 AM to 2:15 PM
Commons/Café/Gym/Pool/Auditorium	Weekend	8:00 AM to 2:15 PM

2.4 Building Envelope

The building is constructed of concrete block and structural steel with a stone or brick facade. The building has flat roof sections which are covered with stone or a black membrane and appear in fair condition. The building has metal framed, operable double pane windows which are in good condition. The frames of the windows show some signs of excessive infiltration. The exterior doors are constructed of aluminum and/or glass with metal frames and in good condition, except that the door seals have worn out which increases the level of outside air infiltration.

Building Envelope Deficiencies

2.5 On-Site Generation

Lawrence High School has previously implemented a solar energy project. The project included photovoltaic (PV) arrays which cover a significant amount of the roof space. Based on conversations with facility personnel, the system is said to produce approximately 500,000 kWh/year and is owned by the Lawrence Township Board of Education. The system provides approximately 20% of the electricity required by the facility and generates an excess of about 1%.

Refer to Section 3.2 for more information and the graphical representation of estimated electrical consumption for the high school.

Roof Mounted Photovoltaic (PV) System

2.6 Energy-Using Systems

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

Lighting System

Facility lighting is provided mostly by 32-Watt linear fluorescent T8 lamps with electronic ballasts as well as some incandescent and compact fluorescent lamps (CFL). Most of the fixtures are 2-lamp or 3-lamp, 2x4 recessed troffer fixtures with prismatic lenses. There are also other styles of linear fluorescent fixtures including continuous row pendant mounted with parabolic louvers in the kitchen serving area, surface mounted wrap fixtures in some classrooms, continuous row pendant mounted up light fixtures in other classrooms and continuous rows of cove light fixtures in the library. There are also some 2x2 T8 U-lamp fixtures and 2x2 fixtures with 2-foot long lamps with diffusers.

The high school began a lighting project which started to replace typical lighting in hallways and classrooms with LED 2x4 lay-in panels. The hallways were completed at the time of the audit and the 2nd floor of classrooms were under construction. The locker room lighting was also being upgraded to new high-performance LED dome fixtures. The auditorium had also had new LED recessed downlights installed. Restrooms are slowly being upgraded to include LED bath vanity fixtures as well.

The gymnasium and auxiliary gyms are lit by 54-Watt linear fluorescent T5 high output lamps and electronic ballasts in high bay fixtures which have occupancy sensor controls. The cafeteria has wall mounted and ceiling mounted high-pressure sodium fixtures which are assumed to contain 35-Watt and 50-Watt lamps. There are also LED low-bay fixtures in the cafeteria which are newer and in good condition.

A majority of the fixtures in classrooms, offices, hallways and sports rooms are controlled by occupancy-based sensors. The auditorium has dimming controls. The remaining areas and rooms have wall switch lighting controls.

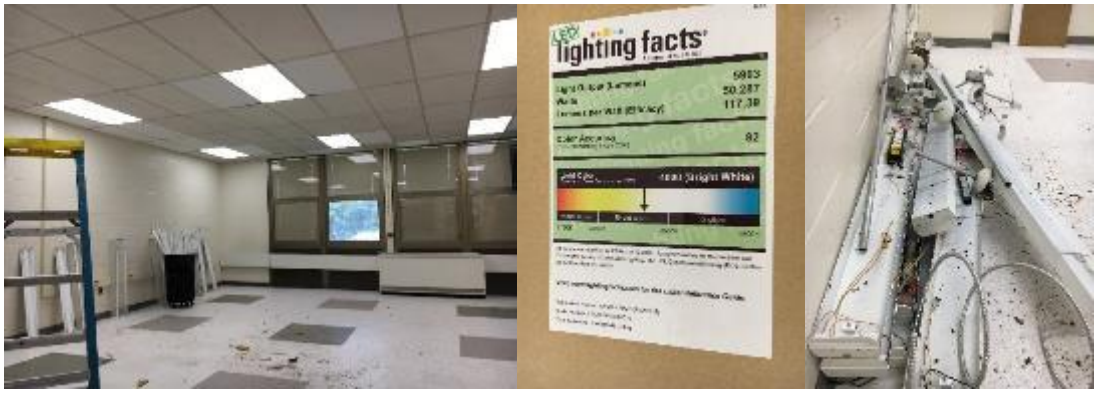
Interior Lighting Systems

New LED Dome Fixtures in Locker Rooms under Construction

Interior Lighting Systems

Interior Lighting Controls

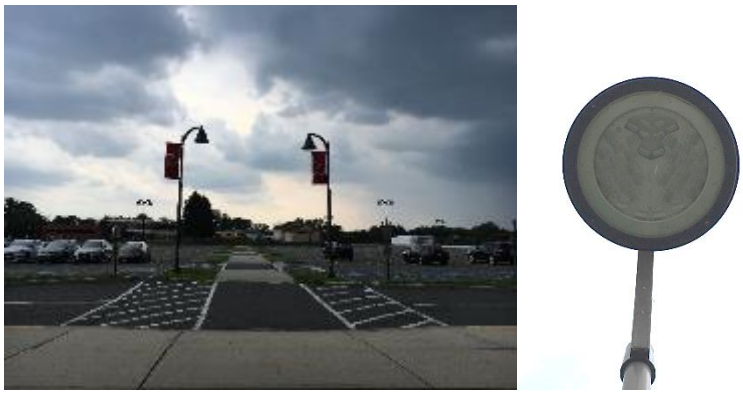
Old T8 4 Wrap Fixtures in Continuous Rows to be Replaced by New LED Panels



New LED Lay-in 2x4 Panel under construction in 2nd floor classroom

The building's exterior lighting includes building mounted, under canopy, and pole mounted area light fixtures. These primarily contain high pressure sodium (HPS) or metal halide (MH) lamps and ballasts which are controlled by timeclocks. There are also fluorescent lamp fixtures mounted around the exterior of the building as well as a few LED fixtures. The building mounted fixtures are set to operate 15 hours a night and the parking lot pole mounted fixtures are set to operate 12 hours a night.

Exterior Lighting Systems



Parking Lot Lighting Systems

Exterior Lighting Timeclock Controls

Chilled Water System

The classroom wing with two floors is cooled by a single chilled water system. The system consists of a packaged 30 ton, Trane air-cooled centrifugal chiller which is estimated to be ten years old and is in fair condition. There are two zones: Zone B-1 serves the upstairs rooms and Zone B-2 serves the downstairs rooms. There are two constant flow primary pumps. Chilled water is distributed to the air handling units that serve the classroom wings based on a reset schedule. TRC was unable to verify the actual set points during the on-site assessment, however it is assumed that chilled water is distributed at about 40°F when the outside air temperature is above 60°F and is reset to 50°F when the outside air is below 55°F. The system is likely locked out and turned off in the winter months.

Chilled Water System

Hot Water Heating System

The hot water system consists of three HB Smith 4540 MBH output, non-condensing cast iron sectional gas fired boilers. The boilers are very old and at the end of their useful life. They serve the hydronic heating system and also provide heating for the indoor pool via a heat exchanger located in the boiler room. The boilers operate in a lead/lag configuration. All three boilers may be required during cold weather while only one may be required when pool water heating is required but space heating is not. The lead boiler is rotated throughout the winter months. The boilers have an estimated combustion efficiency of 71% based on the original efficiency, age and condition. Each boiler has a boiler burner motor, forced draft fan and feed water pump motor.

Cast Iron Boilers

The boilers are configured in a constant flow primary distribution with two 10 HP hot water pumps and two 15 HP hot water pumps. There are also two 3 HP hot water pumps which supply the library and 2nd floor classroom area. These motors range from five to 15 years old and in fair condition. They are all

constant speed motors. Hot water is generally supplied at 180°F when the outside air temperature is below 50°F. The boilers provide hot water to air handling units and perimeter heaters and unit ventilators. Each of these heating-ventilation (HV) units have supply fans and motors which were inaccessible during the audit. They are assumed to be in fair condition and of standard efficiency.

Boiler Burner Motors and Hot Water Pump Motors

Gymnasium and Locker Room Heating-Ventilating (HV) Units with Hot Water Coils

Library HVAC System and Supply Fan Motor Nameplate

Forced Air Heating Systems

The pool, gym and kitchen are heated by forced air gas fired Greenheck and McQuay furnaces which are five years old and in good condition. They have a nominal heating efficiency of 80%. The pool also has powered ventilators which provide exhaust and include three HP motors. The kitchen has exhaust hoods which are assumed to have fractional horsepower motors. The makeup air units (MUAs) serve the kitchen and pool and include 5 HP to 7.5 HP supply fan motors.

The majority of HVAC equipment includes packaged roof top units (RTUs) which include gas-fired forced air furnaces for the heating season, and utilize direct expansion (DX) coils for cooling in the summer. These are mostly AAON units which are 13 years or older which vary in capacity between 73 MBH and 219 MBH. Based on the original efficiency, age and condition of equipment the existing heating efficiency is assumed to be about 73%. The photos of these units are provided in the section that follows.

Pool Heating and Ventilation System and Make Up Air Units (MUAs)

Direct Expansion Air Conditioning Systems (DX)

The majority of cooling for the building is provided by the packaged roof top units (RTUs) listed in the above section. These are mostly AAON units which are 13 years or older which vary in capacity between 4 tons and 26 tons. Based on the original efficiency, age and condition of equipment the existing cooling efficiency is assumed to be about 8.5 EER (energy efficiency ratio). There are also Daikin packaged RTUs that are 15 and 20 ton units that are five years old, in good condition with an efficiency of about 10 EER. There is also a Trane RTU that is about 15 years old that is 8.5 tons with an efficiency of about 10 EER.

Typical Roof Top Units (RTUs)

There are two 20 ton Daikin Energy Recovery Units (ERU) that are five years old, in good condition and have an efficiency of about 11.5 EER that provide cooling for the gym. These units include a supply fan motor, exhaust fan motor and an energy recovery wheel motor. These units are equipped with a direct-expansion (DX) coil and high efficiency compressors. The units have outside air economizers to utilize free cooling when the outside air temperature is lower than the return air temperature. The units are controlled by individual thermostats located in the gym. The ERUs operate in the summer months to maintain the building space temperature set point around 72°F. Both units are reportedly required to maintain the space temperature set point during the summer months.

Gymnasium Energy Recovery Units (ERUs)

Gymnasium and Library Manual Dial Thermostats

There are unit ventilators in classrooms throughout the building. These vary in age and condition and are equipped with a fan motor and heating hot water coil. The athletics room is conditioned by an energy recovery ventilator which is in good condition and high efficiency. These unitary HVAC equipment are controlled by manual dial thermostats located in the room. The unit ventilators throughout the building have supply fan motors, dampers and valves which operate through the use of a pneumatic control system. This system is original to the building and appears to be in poor operating condition. The air compressor for the pneumatic controls is located in the boiler room and was recently installed. It is in good condition with a high efficiency motor.

Athletics Room Energy Recovery Ventilator (ERV) and Classroom Unit Ventilator

Typical Manual Dial Thermostats

There are a number of split air-conditioning (AC) systems throughout the building. There are a variety of outdoor condensing units that serve these systems which are located on the roof of the building. These units are 5 to 15 years in age and vary in condition and efficiencies between 10 EER up to 15.9 EER. They are by ICP, SANYO, EMI and Carrier. They mostly serve office spaces and server rooms. The space temperature set points are controlled by manual remote controls in the room.

Outdoor Condensing Units and Split AC Systems

There are two 8 ton air-source heat pump systems and one 45 ton air-source heat pump system which provide cooling, ventilation and supplemental heating to the areas they serve. These are served by Daikin outdoor condensing units on the roof which are five years old and in good condition. The units are controlled by programmable thermostats located in zones. The heat pumps operate based on building occupancy to maintain the zone space temperature set point between 68°F and 70°F (adjustable by occupants).

Heat Pump Systems

Programmable Thermostat for Heat Pump Systems

There are also through wall and window AC units located in some building offices and classrooms. These range in efficiency between 10 EER and 12 EER and are all about two tons in cooling capacity. These are manually turned on and off by room occupants.

Window AC Units

Domestic Hot Water Heating Systems

The domestic hot water heating system for the facility consists of two A.O. Smith gas fired storage tank hot water heaters each with an input rating of 300 MBH each and a nominal efficiency of 80%. Each water heater has a 130 gallon storage tank. A fractional horsepower recirculation pump and motor distribute 140°F water to the entire site except the kitchen.

Domestic Hot Water Heating System

The kitchen has an A.O. Smith gas fired storage tank hot water heater with an input rating of 150 MBH, a nominal efficiency of 80%, and a tank capacity of 100 gallons. The system is capable of providing 160°F hot water. There are two fractional horsepower recirculation pump and motor to distribute water.

Domestic Hot Water Heating System for Kitchen

Food Service Equipment

The school has a kitchen that is used to prepare lunches for almost every student each school day. Most of the cooking is done using a number of gas ovens and griddles. An electric steamer and fryer are also used and there are a number of insulated holding cabinets. A majority of this equipment is in good condition and of standard efficiency. There is also an electric dishwater that is used each school day.

Kitchen Food Service Equipment

Dishwasher

Refrigeration

The kitchen has a walk-in low temperature, medium temperature freezer as well as a walk-in cooler. These are used to store food prepared for school lunches. The evaporators and doors are in good condition and high efficiency. There are also a number of stand-up refrigerators and refrigeration chests. These are in good condition and standard to high efficiency. There is also an icemaker that is in good condition. All of this equipment was on and mostly empty during the onsite energy audit conducted in the summer. Consider cleaning out and unplugging equipment during the summer months to reduce electrical energy consumption.

Walk in Refrigeration Equipment

Ice Maker and Stand-up Refrigeration Equipment

Building Plug Load

There are roughly 101 computer work stations throughout the facility. It is assumed that there is no centralized PC power management software installed. Plug loads throughout the building include general café and office equipment. There are typical classroom loads including smart boards, projectors and fans. The shop areas also include tool loads, and the gymnasium areas also includes workout equipment. There are also a number of residential style refrigerators throughout the building. These vary in condition and efficiency. There were a few noted to be almost empty. These should be considered for consolidation; if unnecessary refrigerators could then be removed. Refrigerated drink machines are located in the hallways and in the cafeteria. These do not currently have controls.

Vending Machines

Residential Refrigerators and Café Equipment

2.7 Water-Using Systems

There are restrooms throughout this facility. A sampling of restrooms found that majority of the faucets are rated for 2.2 gallons per minute (gpm) or higher, the toilets are rated at 2.5 gallons per flush (gpf) and the urinals are rated at 2 gpf. The showerheads in the locker rooms are said to not be used anymore.

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

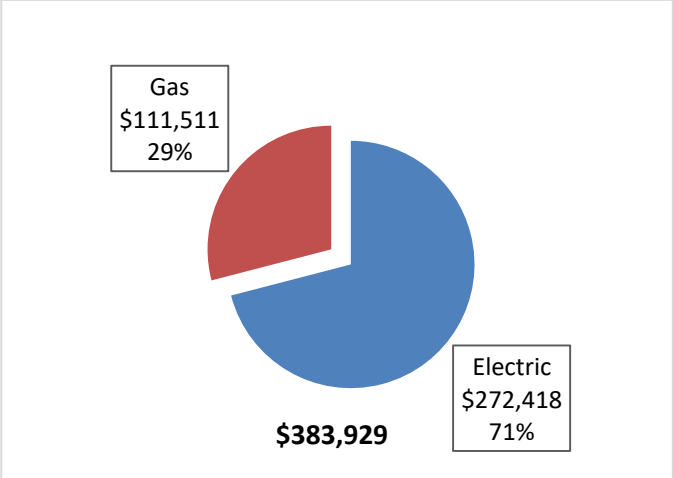
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 8 - Utility Summary

Utility Summary for Lawrence High School		
Fuel	**Usage**	**Cost**
Electricity	2,552,860 kWh	$272,418
Natural Gas	140,021 Therms	$111,511
Total		**$383,929**

The current annual energy cost for this facility is $383,929 as shown in the chart below.

Figure 9 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by PSE&G. The average electric cost over the past 12 months was $0.107/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The facility pays electric demand charges which are about four times higher in the summer months than during the winter. The monthly electricity consumption and peak demand are shown in Figure 10 below.

The high school has bi-directional metering. The utility bills show the flow of electricity which is inclusive of what is generated on site. The meter can measure the flow of electricity in two directions. So, the billed kWh is the net between the electricity provided by the utility company and the solar generated electricity supplied back to the distribution grid. As the onsite generation system produces electricity, the kWh are first used to meet the customer's electric requirements such as lighting and appliances. If more electric energy is produced by the system than the customer needs, the additional kWh are measured, fed into the utility's electric system and utilized by other customers. The monthly electricity billed and peak demand are shown in Figure 11 below.

Figure 10 - Electric Usage & Demand

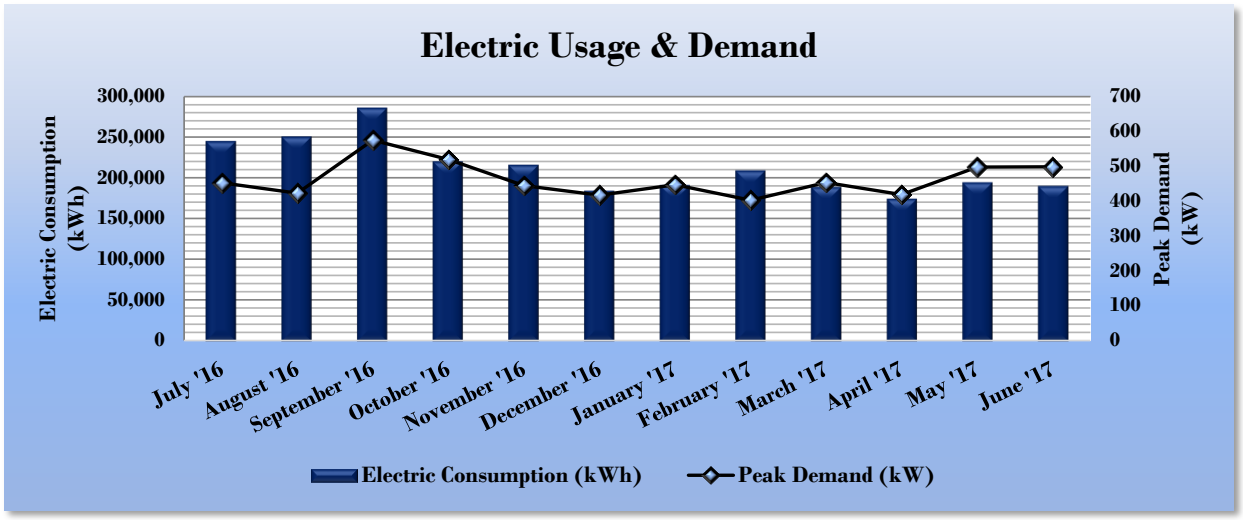


Figure 11 - Electric Usage & Generation

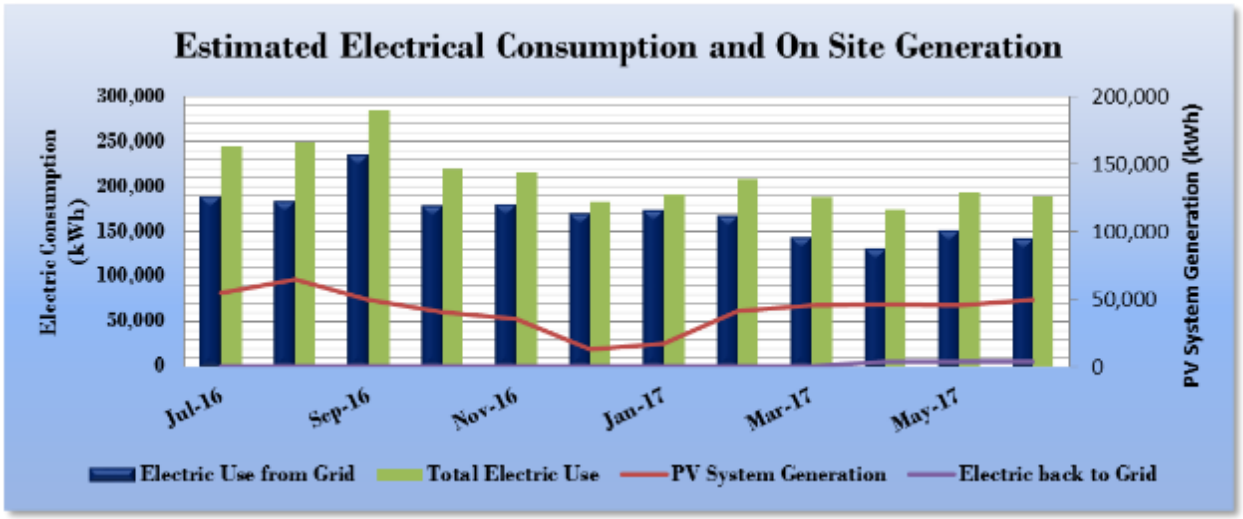


Figure 12 - Electric Usage & Demand

Electric Billing Data for Lawrence High School					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
7/29/16	30	244,719	452	$5,600	$26,114
8/26/16	28	250,014	423	$5,232	$26,679
9/27/16	32	285,433	575	$7,213	$30,459
10/26/16	29	219,587	520	$1,935	$23,432
11/28/16	33	215,720	444	$1,655	$23,020
12/28/16	30	183,785	417	$1,553	$19,612
1/27/17	30	190,877	447	$1,664	$20,369
2/28/17	32	208,825	402	$1,497	$22,284
3/29/17	29	188,617	453	$1,688	$20,127
4/28/17	30	174,353	419	$1,560	$18,605
5/30/17	32	194,060	497	$1,873	$20,708
6/28/17	29	189,876	498	$6,341	$20,262
Totals	**364**	**2,545,866**	**574.6**	**$37,811**	**$271,671**
Annual	**365**	**2,552,860**	**574.6**	**$37,915**	**$272,418**

3.3 Natural Gas Usage

Natural gas is provided by PSE&G. The average gas cost for the past 12 months is $0.796/therm, which is the blended rate used throughout the analyses in this report. Note that gas usage illustrates a substantial amount of summer use, primarily to provide pool heating water via the space heating boiler as discussed. The monthly gas consumption is shown in the chart below.

Figure 13 - Natural Gas Usage

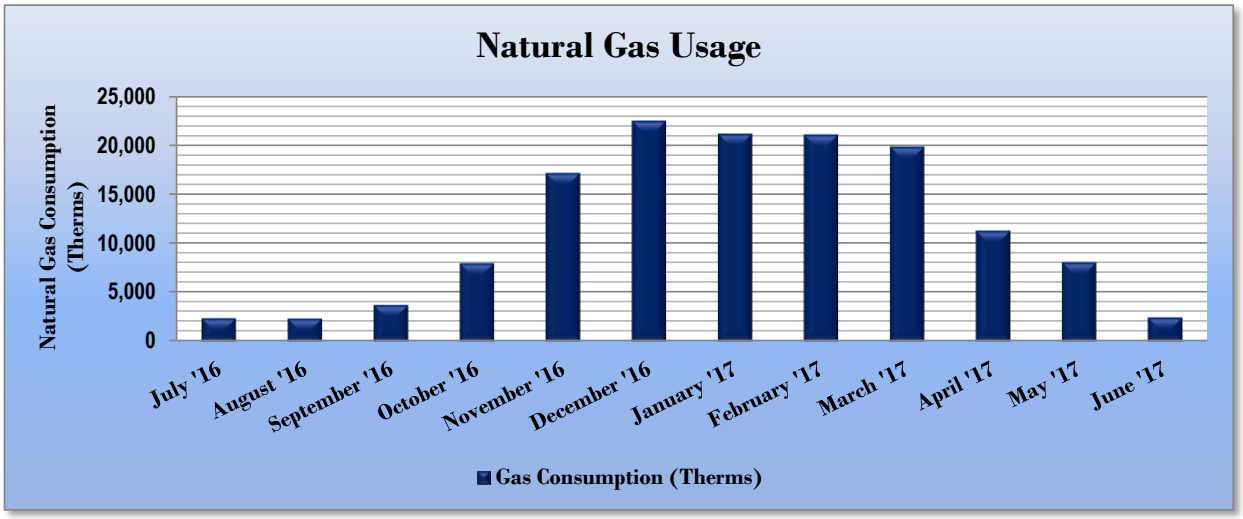


Figure 14 - Natural Gas Usage

Gas Billing Data for Lawrence High School			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
7/28/16	29	2,348	$485
8/26/16	29	2,311	$1,357
9/27/16	32	3,686	$2,105
10/26/16	29	7,958	$4,448
11/28/16	33	17,121	$14,119
12/28/16	30	22,442	$19,116
1/27/17	30	21,146	$20,467
2/28/17	32	21,044	$19,570
3/29/17	29	19,822	$16,785
4/28/17	30	11,266	$6,526
5/30/17	32	8,050	$4,700
6/28/17	29	2,444	$1,528
Totals	**364**	**139,638**	**$111,206**
Annual	**365**	**140,021**	**$111,511**

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 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 15 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Lawrence High School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	175.2	141.4
Site Energy Use Intensity (kBtu/ft^2)	94.6	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 16 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Lawrence High School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	149.1	141.4
Site Energy Use Intensity (kBtu/ft^2)	83.4	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 44**.**

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

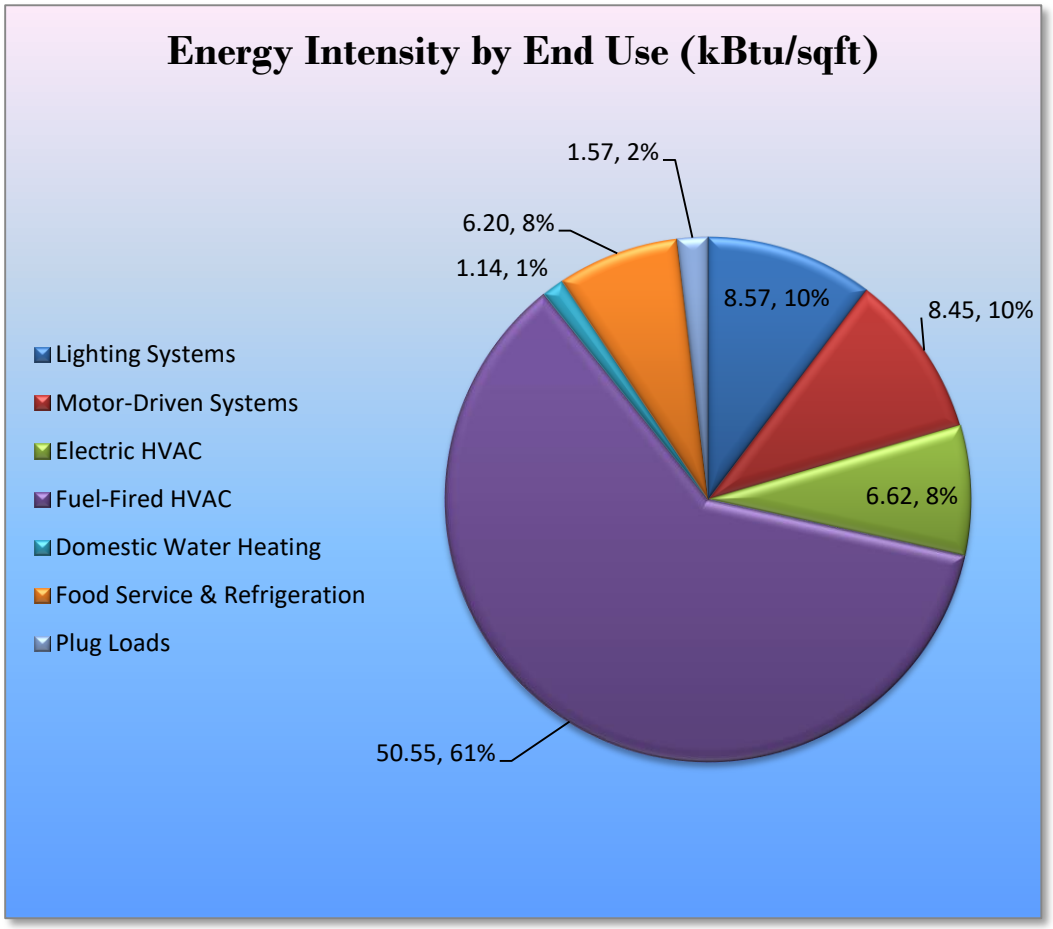
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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

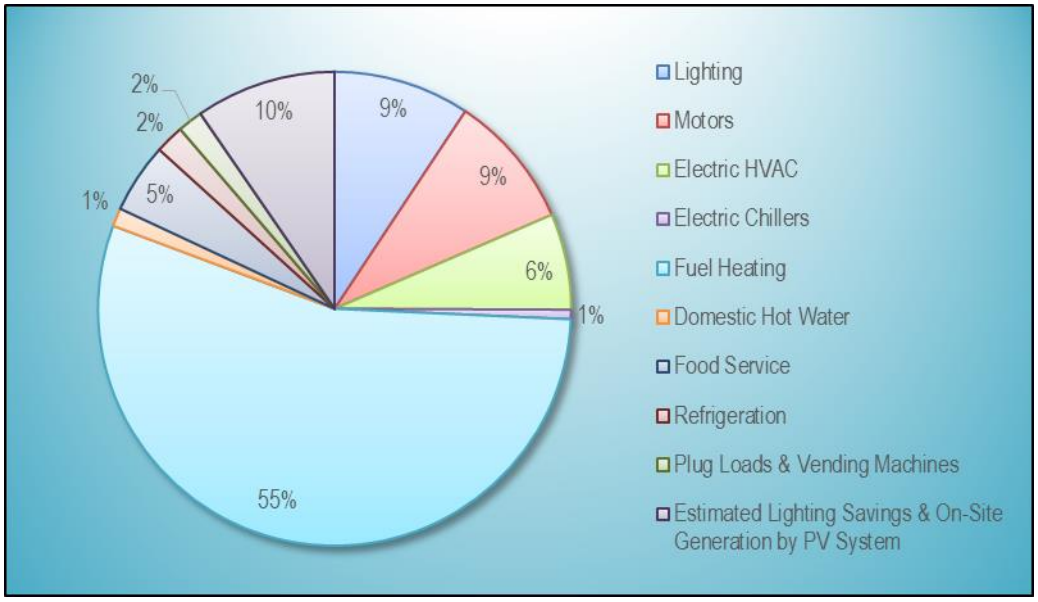
In order to provide a complete overview of energy consumption across building systems, an energy balance was performed at this facility. An energy balance utilizes standard practice engineering methods to evaluate all components of the various electric and fuel-fired systems found in a building to determine 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. The total kBtu reflected in the energy balance chart is the difference between the existing baseline year and what is actually purchased for use on site.

Figure 17 - Energy Balance (% and kBtu/SF)



The total kBtu associated with the chart above is the total energy purchased for use at the building. This does not include the estimated lighting savings from the ongoing LED upgrades or the electric generation by the existing PV System. For a snapshot of energy use at the Lawrence High School which is inclusive of the estimated electricity saved and on-site generation by PV System, see below.

Figure 18 - Energy Balance (% mmBtu per End Use)



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 Lawrence 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 on 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 as High Priority

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

Figure 19 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**305,434**	**60.1**	**0.0**	**$32,593.11**	**$115,823.79**	**$24,665.00**	**$91,158.79**	**2.8**	**307,570**
ECM 1	Install LED Fixtures	9,012	0.9	0.0	$961.66	$15,654.17	$1,605.00	$14,049.17	14.6	9,075
ECM 2	Retrofit Fixtures with LED Lamps	296,422	59.1	0.0	$31,631.45	$100,169.62	$23,060.00	$77,109.62	2.4	298,495
Lighting Control Measures		**10,374**	**1.5**	**0.0**	**$1,107.01**	**$10,858.00**	**$1,215.00**	**$9,643.00**	**8.7**	**10,446**
ECM 3	Install Occupancy Sensor Lighting Controls	9,263	1.3	0.0	$988.50	$9,258.00	$1,075.00	$8,183.00	8.3	9,328
ECM 4	Install High/Low Lighitng Controls	1,111	0.2	0.0	$118.51	$1,600.00	$140.00	$1,460.00	12.3	1,118
Motor Upgrades		**2,716**	**0.5**	**0.0**	**$289.87**	**$14,169.68**	**$0.00**	**$14,169.68**	**48.9**	**2,735**
ECM 5	Premium Efficiency Motors	2,716	0.5	0.0	$289.87	$14,169.68	$0.00	$14,169.68	48.9	2,735
Variable Frequency Drive (VFD) Measures		**129,762**	**40.9**	**0.0**	**$13,847.04**	**$86,236.45**	**$9,400.00**	**$76,836.45**	**5.5**	**130,670**
ECM 6	Install VFDs on Constant Volume (CV) HVAC	93,927	34.0	0.0	$10,022.99	$62,216.35	$9,400.00	$52,816.35	5.3	94,583
ECM 7	Install VFDs on Hot Water Pumps	35,836	6.9	0.0	$3,824.05	$24,020.10	$0.00	$24,020.10	6.3	36,086
Domestic Water Heating Upgrade		**0**	**0.0**	**61.4**	**$488.99**	**$301.14**	**$0.00**	**$301.14**	**0.6**	**7,189**
ECM 8	Install Low-Flow Domestic Hot Water Devices	0	0.0	61.4	$488.99	$301.14	$0.00	$301.14	0.6	7,189
Plug Load Equipment Control - Vending Machine		**6,447**	**0.0**	**0.0**	**$688.00**	**$920.00**	**$200.00**	**$720.00**	**1.0**	**6,492**
ECM 9	Vending Machine Control	6,447	0.0	0.0	$688.00	$920.00	$200.00	$720.00	1.0	6,492
Custom Measures		**25,045**	**0.0**	**1,003.4**	**$10,663.54**	**$83,620.00**	**$0.00**	**$83,620.00**	**7.8**	**142,706**
ECM 10	Building Envelope Weatherization	212	0.0	303.3	$2,437.97	$11,620.00	$0.00	$11,620.00	4.8	35,725
ECM 11	Retro-Commissioning Study & HVAC Improvements	24,834	0.0	700.1	$8,225.57	$72,000.00	$0.00	$72,000.00	8.8	106,981
TOTALS		**479,780**	**102.9**	**1,064.8**	**$59,677.56**	**$311,929.06**	**$35,480.00**	**$276,449.06**	**4.6**	**607,809**

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

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

4.1.1 Lighting Upgrades

Our recommendations for upgrades to existing lighting fixtures are summarized in Figure 20 below.

Figure 20 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**305,434**	**60.1**	**0.0**	**$32,593.11**	**$115,823.79**	**$24,665.00**	**$91,158.79**	**2.8**	**307,570**
ECM 1	Install LED Fixtures	9,012	0.9	0.0	$961.66	$15,654.17	$1,605.00	$14,049.17	14.6	9,075
ECM 2	Retrofit Fixtures with LED Lamps	296,422	59.1	0.0	$31,631.45	$100,169.62	$23,060.00	$77,109.62	2.4	298,495

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

ECM 1: Install LED Fixtures

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0
Exterior	9,012	0.9	0.0	$961.66	$15,654.17	$1,605.00	$14,049.17	14.6	9,075

Measure Description

We recommend replacing building mounted exterior fixtures containing HID lamps with new high performance LED light fixtures. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output. These include exterior building mounted fixtures. Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of traditional HID technology.

ECM 2: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	293,101	58.7	0.0	$31,277.06	$96,501.67	$23,060.00	$73,441.67	2.3	295,151
Exterior	3,321	0.4	0.0	$354.39	$3,667.95	$0.00	$3,667.95	10.4	3,344

Measure Description

We recommend retrofitting existing HID fixtures in the cafeteria and under canopies on the exterior of the building with LED lamps. This measure also includes retrofitting the existing T5HO high bay fixtures in the gymnasiums with LED lamps. We recommend retrofitting incandescent, halogen, compact fluorescent and linear fluorescent fixtures with LED lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed while leaving the fluorescent fixture ballast in place. LED bulbs can be used in existing fixtures as a direct replacement for most other lighting technologies. This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of fluorescent tubes and more than 10 times longer than many incandescent lamps. Furthermore, the upgrade to long life LED equipment reduced the frequency of lifts needed for maintaining light fixtures which are mounted in high ceilings and high on the exterior of the building.

4.1.2 Lighting Control Measures

Our recommendations for lighting control measures are summarized in Figure 21 below.

Figure 21 – Summary of Lighting Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**10,374**	**1.5**	**0.0**	**$1,107.01**	**$10,858.00**	**$1,215.00**	**$9,643.00**	**8.7**	**10,446**
ECM 3	Install Occupancy Sensor Lighting Controls	9,263	1.3	0.0	$988.50	$9,258.00	$1,075.00	$8,183.00	8.3	9,328
ECM 4	Install High/Low Lighitng Controls	1,111	0.2	0.0	$118.51	$1,600.00	$140.00	$1,460.00	12.3	1,118

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 3: Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
9,263	1.3	0.0	$988.50	$9,258.00	$1,075.00	$8,183.00	8.3	9,328

Measure Description

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

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

ECM 4: Install High/Low Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,111	0.2	0.0	$118.51	$1,600.00	$140.00	$1,460.00	12.3	1,118

Measure Description

We recommend installing occupancy sensors to provide dual level lighting control for lighting fixtures in spaces that are infrequently occupied but may require some level of continuous lighting for safety or security reasons. Typical areas for such lighting control are stairwells and interior corridors. Lighting fixtures with these controls operate at default low levels when the area is not occupied to provide minimal lighting to meet security or safety requirements. Sensors detect occupancy using ultrasonic and/or infrared sensors.

The lighting systems are switched to full lighting levels whenever an occupant is detected. Fixtures are automatically switched back to low level after an area has been vacant for a preset period of time. Energy savings results from only providing full lighting levels when it is required.

For this type of measure the occupancy sensors will generally be ceiling or fixture mounted. Sufficient sensor coverage needs to be provided to ensure that lights turn on in each area as an occupant approaches. Additional savings from reduced lighting maintenance may also result from this measure, due to reduced lamp operation.

4.1.3 Motor Upgrades

Our recommendations for motor upgrade measures are summarized in Figure 22 below.

Figure 22 - Summary of Motor Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Motor Upgrades		**2,716**	**0.5**	**0.0**	**$290**	**$14,170**	**$0**	**$14,170**	**48.9**	**2,735**
ECM 5	Premium Efficiency Motors	2,716	0.5	0.0	$290	$14,170	$0	$14,170	48.9	2,735

ECM 5: Premium Efficiency Motors

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
2,716	0.6	0.0	$289.87	$14,169.68	$0.00	$14,169.68	48.9	2,735

Measure Description

We recommend replacing standard efficiency motors with NEMA Premium® efficiency motors. We recommend these to accommodate the need for compatibility with VFDs. Our evaluation assumes that existing motors such as boiler burner motors, hot water circulation pump motors, heating hot water pump motors and domestic hot water supply motors will be replaced with motors of equivalent size and type. Although occasionally additional savings can be achieved by downsizing motors to better meet the motor's current load requirements. The base case motor efficiencies are estimated from nameplate information and our best estimates of motor run hours. Efficiencies of proposed motor upgrades are obtained from the *New Jersey's Clean Energy Program Protocols to Measure Resource Savings (2016)*. Savings are based on the difference between baseline and proposed efficiencies and the assumed annual operating hours.

4.1.4 Variable Frequency Drive Measures

Our recommendations for variable frequency drive (VFD) measures are summarized in Figure 23 below.

Figure 23 – Summary of Variable Frequency Drive ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**129,762**	**40.9**	**0.0**	**$13,847.04**	**$86,236.45**	**$9,400.00**	**$76,836.45**	**5.5**	**130,670**
ECM 6	Install VFDs on Constant Volume (CV) HVAC	93,927	34.0	0.0	$10,022.99	$62,216.35	$9,400.00	$52,816.35	5.3	94,583
ECM 7	Install VFDs on Hot Water Pumps	35,836	6.9	0.0	$3,824.05	$24,020.10	$0.00	$24,020.10	6.3	36,086

ECM 6: Install VFDs on Constant Volume (CV) HVAC

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
93,927	34.0	0.0	$10,022.99	$62,216.35	$9,400.00	$52,816.35	5.3	94,583

Measure Description

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

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

ECM 7: Install VFDs on Hot Water Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
35,836	6.9	0.0	$3,824.05	$24,020.10	$0.00	$24,020.10	6.3	36,086

Measure Description

We recommend installing variable frequency drives (VFD) to control the two 3 HP, two 10 HP and two 15 HP hot water pump motors. This measure requires that a majority of the hot water coils be served by 2-way valves and that a differential pressure sensor is installed in the hot water loop. As the hot water valves close, the differential pressure increases. The VFD modulates pump speed to maintain a differential pressure setpoint. Energy savings results from reducing pump motor speed (and power) as hot water valves close. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

4.1.5 Domestic Hot Water Heating System Upgrades

Our recommendations for domestic water heating system improvements are summarized in Figure 24 below.

Figure 24 - Summary of Domestic Water Heating ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**61.4**	**$488.99**	**$301.14**	**$0.00**	**$301.14**	**0.6**	**7,189**
ECM 8	Install Low-Flow Domestic Hot Water Devices	0	0.0	61.4	$488.99	$301.14	$0.00	$301.14	0.6	7,189

ECM 8: Install Low-Flow DHW Devices

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	61.4	$488.99	$301.14	$0.00	$301.14	0.6	7,189

Measure Description

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

It should be noted that if the showers in the locker rooms are going to be used in the future, the replacement of high flow showerheads with low flow vandal proof showerheads should be considered for implementation at that time.

4.1.6 Plug Load Equipment Control - Vending Machines

Our recommendations for plug load equipment control measures are summarized in Figure 25 below.

Figure 25 - Summary of Plug Load Equipment Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Plug Load Equipment Control - Vending Machine		**6,447**	**0.0**	**0.0**	**$688**	**$920**	**$200**	**$720**	**1.0**	**6,492**
ECM 9	Vending Machine Control	6,447	0.0	0.0	$688	$920	$200	$720	1.0	6,492

ECM 9: Vending Machine Control

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
6,447	0.0	0.0	$688.00	$920.00	$200.00	$720.00	1.0	6,492

Measure Description

Vending machines operate continuously, even during non-business hours. It is recommended to install occupancy sensor controls to reduce the energy use associated with refrigerated vending machines. 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. Our recommendations for custom measures are summarized in Figure 26 below.

Figure 26 - Summary of Custom ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Custom Measures		**25,045**	**0.0**	**1,003.4**	**$10,663.54**	**$83,620.00**	**$0.00**	**$83,620.00**	**7.8**	**142,706**
ECM 10	Building Envelope Weatherization	212	0.0	303.3	$2,437.97	$11,620.00	$0.00	$11,620.00	4.8	35,725
ECM 11	Retro-Commissioning Study & HVAC Improvements	24,834	0.0	700.1	$8,225.57	$72,000.00	$0.00	$72,000.00	8.8	106,981

ECM 10: Building Envelope Weatherization

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
212	0.0	303.3	$2,437.97	$11,620.00	$0.00	$11,620.00	4.8	35,725

Measure Description

We recommend weather-stripping the exterior doors, caulking perimeter of window frames and sealing wall cracks throughout the building. Exterior doors should be properly weather-stripped which may include the installation of a bottom sweep, center sweep and weather-stripping around the perimeter of the door.

Building envelopes that limit air infiltration and that have adequate insulation play a key role in optimizing heating and cooling efficiency, controlling moisture, and providing occupant comfort. Cracks and gaps throughout the building around windows and doors, through utility openings, at the foundation and roof may not seem significant, but their effects add up. Reducing uncontrolled air infiltration through air sealing is a cost-effective way to improve the performance and energy efficiency of your facility. The proper sealing of sources for air infiltration and exfiltration will reduce heat transfer between the building and the environment, reducing the load on the facility's heating and cooling equipment.

ECM 11: Retro-Commissioning Study & HVAC Improvements

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
24,834	0.0	700.1	$8,225.57	$72,000.00	$0.00	$72,000.00	8.8	106,981

Measure Description

Due to the complexity of today's HVAC systems and controls, it is likely for systems to be operating incorrectly or not as efficiently as they could be. Retro-commissioning studies reveal hidden deficiencies and highlight operational & maintenance (O&M) issues that could be avoided, as well as exposes hidden control system problems. There are valuable benefits to retro-commissioning in existing buildings. It is a detailed and specialized process that reviews how an HVAC system is controlled and designed to operate. Applying retro-commissioning to existing facilities includes planning, discovering root causes of inefficiencies, development of a cost-effective project delivery and a focus on optimizing value to the building owner. The study includes functional system testing under various modes, such as varying heating or cooling loads, occupied and unoccupied modes, and varying outside air temperature and space temperatures. This is a systematic process to ensure that the building energy systems perform interactively according to the original design intent and the current operational needs of the facility.

Retro-commissioning is a common practice recommended by the American Society of Heating Refrigeration and Energy (ASHRAE) to be revisited every couple of years. We recommend that an engineering firm who specializes in energy control systems and retro-commissioning be contacted for a detailed evaluation and implementation costs. Facility operations personnel typically work with the engineers to develop goals and objectives. During on site testing, the qualified personnel conducting the study would immediately make any no/low-cost improvements as identified. Furthermore, for any suggested corrective actions which require the purchase of material, a contractor who specializes in that scope of work would be contacted to implement the remaining improvements. For the purposes of this report, the potential energy savings and measure costs were estimated to demonstrate the cost effectiveness of this measure and promote moving forward.

4.2 ECMs Evaluated But Not Recommended as High Priority

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

Figure 27 – Summary of Measures Evaluated, But Not Recommended

Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Electric Unitary HVAC Measures	**59,801**	**39.1**	**0.0**	**$6,381**	**$455,146**	**$20,348**	**$434,798**	**68.1**	**60,219**
Install High Efficiency Electric AC	59,801	39.1	0.0	$6,381	$455,146	$20,348	$434,798	68.1	60,219
Gas Heating (HVAC/Process) Replacement	**0**	**0.0**	**1,600.0**	**$12,742**	**$307,812**	**$11,600**	**$296,212**	**23.2**	**187,337**
Install High Efficiency Hot Water Boilers	0	0.0	1,237.4	$9,854	$233,383	$0	$233,383	23.7	144,881
Install High Efficiency Furnaces	0	0.0	362.6	$2,888	$74,429	$11,600	$62,829	21.8	42,456
HVAC System Improvements	**74,995**	**16.9**	**0.0**	**$8,003**	**$20,750**	**$7,250**	**$13,500**	**1.7**	**75,519**
Install Dual Enthalpy Outside Economizer Control	74,995	16.9	0.0	$8,003	$20,750	$7,250	$13,500	1.7	75,519
Food Service Equipment & Refrigeration Measures	**2,028**	**0.2**	**0.0**	**$216**	**$3,640**	**$0**	**$3,640**	**16.8**	**2,042**
Replace Refrigeration Equipment	2,028	0.2	0.0	$216	$3,640	$0	$3,640	16.8	2,042
Custom Measures	**53,125**	**0.0**	**1,400.2**	**$16,820**	**$364,015**	**$0**	**$364,015**	**21.6**	**217,444**
Computer Power Management Software	3,924	0.0	0.0	$419	$4,015	$0	$4,015	9.6	3,951
Installation of an Energy Management System	49,201	0.0	1,400.2	$16,401	$360,000	$0	$360,000	21.9	213,493
TOTALS	**189,948**	**56.3**	**3,000.2**	**$44,163**	**$1,151,363**	**$39,198**	**$1,112,165**	**25.2**	**542,561**

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

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

Install High Efficiency Air Conditioning Units

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
59,801	39.1	0.0	$6,381.42	$455,145.69	$20,348.00	$434,797.69	68.1	60,219

Measure Description

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

Reasons for not Recommending as a High Priority Measure

The projected payback period for this measure based on the energy savings exceeds the expected useful life of the replacement equipment. The upgrade to high efficiency is not justified by energy savings alone.

Considerations

If the school district moves forward toward implementation of a comprehensive project under the Energy Savings Improvement Program, we would recommend including this measure.

Install High Efficiency Hot Water Boilers

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	1,237.4	$9,854.34	$233,383.08	$0.00	$233,383.08	23.7	144,881

Measure Description

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

Reasons for not Recommending as a High Priority Measure

Based on the protocol for this program, we are only to evaluate non-condensing high efficiency boilers when we cannot verify return water temperatures lower than 130°F. This measure assumes a one for one replacement based on program restrictions. In order to be deemed cost effective, the simple payback period must be 13 years. Therefore, based on the energy and economic results, this measure was evaluated but is not recommended as a high priority measure.

Considerations

If the school district moves forward toward implementation of a comprehensive project under the Energy Savings Improvement Program, we would recommend including this measure.

It should be noted that much higher efficiencies may be achieved if condensing high efficiency boilers are installed. We therefore recommend the following considerations if and when you chose to move forward with a heating system design:

- Install multiple smaller capacity modular boilers to:
  - Increase part load efficiency
  - Increase redundancy/reliability
  - Save on mechanical room space
- Install high efficiency condensing boilers, as long as they may be configured and controlled to operate with return water temperatures lower than 130°F
- Well maintained boilers will typically last more than 25 years

Note that the space heating boiler system is used to provide swimming pool heat. The energy required to heat the swimming pool could be disaggregated from the space heating, however such an analysis is outside the scope of this study. Swimming pool heating systems typically operate at a lower loop temperature than space heating systems and are generally good candidates for condensing boilers.

We recommend further study be conducted concerning the disaggregation of the pool heating in conjunction with boiler replacement.

Install High Efficiency Furnaces

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	362.6	$2,887.69	$74,429.34	$11,600.00	$62,829.34	21.8	42,456

Measure Description

We evaluated replacing existing standard efficiency furnaces with condensing furnaces. Improved combustion technology and heat exchanger design optimize heat recovery from the combustion gases which can significantly improve furnace efficiency. Savings result from improved system efficiency.

Reasons for not Recommending as a High Priority Measure

The projected payback period for this measure based on the energy savings exceeds the expected useful life of the replacement equipment. The upgrade to high efficiency is not justified by energy savings alone.

Considerations

If the school district moves forward toward implementation of a comprehensive project under the Energy Savings Improvement Program, we would recommend including this measure.

Install Dual-Enthalpy Economizers

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
74,995	16.9	0.0	$8,002.75	$20,750.00	$7,250.00	$13,500.00	1.7	75,519

Measure Description

Dual enthalpy economizers are used to control a ventilation system's outside air intake in order to reduce a facility's total cooling load. A dual-enthalpy economizer monitors the air temperature and humidity of both the outside and return air. The control supplies the lowest energy (temperature and humidity) air to the air handling system. When outside air conditions allow, outside air can be used for cooling instead of running the air handling system's compressor. This reduces the demand on the cooling system, lowering its usage hours and saving energy. Savings result from using outside air instead of mechanical cooling when outside air conditions permit.

Reasons for not Recommending as a High Priority Measure

This measure is coupled with another measure as described above. Since we are not recommending to install high efficiency air conditioning units, this measure is therefore also not recommended.

Considerations

If the school district moves forward toward implementation of a comprehensive project under the Energy Savings Improvement Program, we would recommend including this measure. If the district ever moves forward with the installation of high efficiency air conditioning units, we recommend implementing this measure as an add on feature to the proposed equipment.

Replace Refrigeration Equipment

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
2,028	0.2	0.0	$216.36	$3,640.00	$0.00	$3,640.00	16.8	2,042

Measure Description

We evaluated replacing existing older refrigeration chests with new ENERGY STAR® high efficiency equipment. There have been many improvements in refrigeration system equipment, operation, and insulation. The energy savings associated with this measure come from reduced energy usage, due to more efficient technology, and reduced run times.

Reasons for not Recommending as a High Priority Measure

The projected payback period for this measure based on the energy savings exceeds the expected useful life of the replacement equipment. The upgrade to high efficiency is not justified by energy savings alone.

Considerations

If the school district moves forward toward implementation of a comprehensive project under the Energy Savings Improvement Program, we would recommend including this measure.

Computer Power Management Software

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
3,924	0.0	0.0	$418.69	$4,015.00	$0.00	$4,015.00	9.6	3,951

Measure Description

We evaluated the implementation of computer power management software. The computing environment in most school and office facilities includes desktops, which are typically left on overnight, weekends and holidays. Screen savers are commonly confused as a power management strategy. This contributes to excessive electrical energy consumption, which may be avoided by proper management. There are innovative software packages available in the market today that are designed to deliver significant energy saving and provide ongoing tracking measurements. Operational and maintenance benefits are captured through the use of a central power management platform where issues may be diagnosed and problematic devices may be isolated. Energy savings policies may be enforced as well as identifying and eliminating underutilized devices. This measure investigates the potential benefits to implementing computer power management software to better match the energy use to user needs.

Reasons for not Recommending as a High Priority Measure

The projected payback period for this measure based on the energy savings is greater than the cost effective criteria. In order to be deemed cost effective, the simple payback for plug load controls must be below three years.

Installation of an Energy Management 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_2e Emissions Reduction (lbs)
49,201	0.0	1,400.2	$16,401.43	$360,000.00	$0.00	$360,000.00	21.9	213,493

Measure Description

We evaluated the potential with installing an Energy Management System (EMS) as a replacement for existing controls. This would require the upgrade of the existing pneumatic HVAC control system to direct digital control (DDC) technology. The installation of expanding hardware and software for the EMS would increase the efficiency of the building HVAC system operation and provide additional maintenance benefits. Upgrade of controls to optimize the start/stop of all key HVAC equipment and tying in all space temperature controls would minimize wasted energy and simplify operations Schedules could be put in place to limit system operation when the building is closed. Temperature set back controls may be applied to operate systems only to the point necessary. Ventilation and economizer controls and programming would allow air handling units to operate according to room schedules, occupancy and availability for "free cooling" or "free heating."

For the purposes of this report, the potential energy savings and measure costs were estimated to demonstrate the cost effectiveness of this measure and promote moving toward design and construction. Based on our limited evaluation, it does not appear cost effective to install an EMS. However, we recommend that an HVAC contractor who specializes in energy management systems be contacted for a detailed evaluation, recommendations and implementation costs.

Reasons for not Recommending as a High Priority Measure

This measure is not recommended based on the preliminary economic results. The installation of an energy management system cannot be justified by energy savings alone. However, based on the existing level of control we recommend considering this measure for implementation based on other benefits such as improved indoor air quality, controllability and operational and maintenance benefits.

Considerations

If the school district moves forward toward implementation of a comprehensive project under the Energy Savings Improvement Program, we would recommend including this measure.

4.3 Additional Recommendations

List of ECMs Not Evaluated but Recommended for Future Consideration

The following ECMs were not evaluated, but were identified for further investigation

- Pneumatic Control Upgrade to Direct Digital Controls (DDC)
- Disaggregation of Pool Heat from Boiler Space Heating System
- Window AC Unit Plug Controllers
- Fan Coil Unit & Unit Ventilator Upgrades with EC Motors
- Install an Automatic Pool Cover
- Install a Solar Thermal System for Pool Heating
- Ground Mounted PV System Installation in Parking Lots
- CHP System Installation

5 ENERGY EFFICIENT PRACTICES

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

Reduce Air Leakage

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

Close Doors and Windows

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

Develop a Lighting Maintenance Schedule

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

Ensure Lighting Controls Are Operating Properly

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

Perform Routine Motor Maintenance

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

Use Fans to Reduce Cooling Load

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

Ensure Economizers are Functioning Properly

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

Clean Evaporator/Condenser Coils on AC Systems

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

Clean and/or Replace HVAC Filters

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

Check for and Seal Duct Leakage

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

Perform Proper Boiler Maintenance

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

Perform Proper Water Heater Maintenance

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

Plug Load Controls

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

Water Conservation

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

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

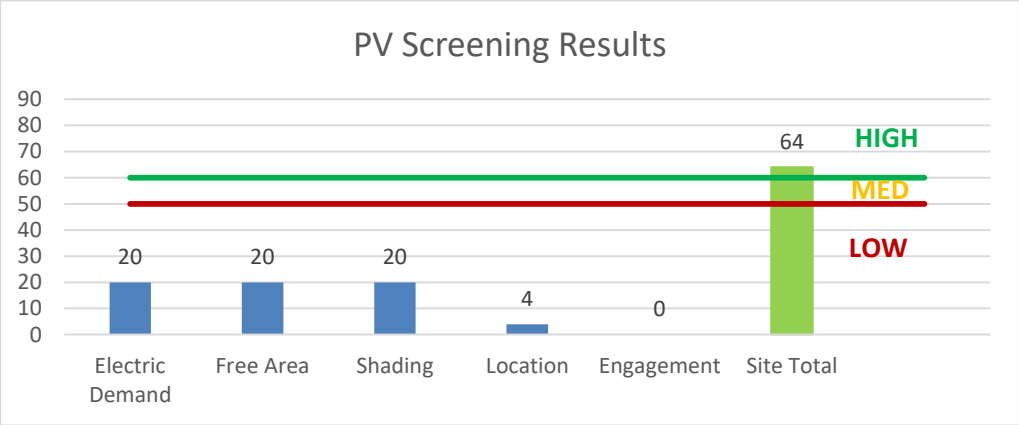
6.1 Photovoltaic

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 over the main parking lot and the lack of shading elements contribute to the high potential for another PV system at the site. A PV array located over the main parking lot may be feasible. If Lawrence High School is interested in pursuing the installation of PV, we recommended a full feasibility study be conducted.

Figure 28 - Photovoltaic Screening



Potential	High	
System Potential	375	kW DC STC
Electric Generation	446,764	kWh/yr
Displaced Cost	$38,870	/yr
Installed Cost	$1,267,500	

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

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

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

6.2 Combined Heat and Power

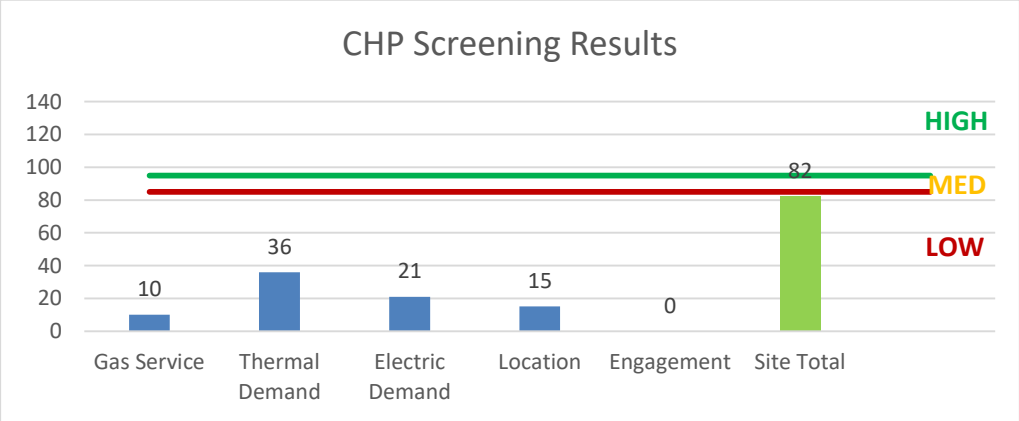
Combined heat and power (CHP) is the on-site generation of electricity along with the recovery of heat energy, which is put to beneficial use. Common technologies for CHP include reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines. Electric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

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

A preliminary screening based on heating and electrical demand, siting, and interconnection shows that the facility has a low potential for installing a cost-effective CHP system. Low or infrequent thermal load, and lack of space near the existing boilers are the most significant factors contributing to the low potential for CHP at the site. In our opinion, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation.

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

Figure 29 - Combined Heat and Power Screening



Please reach out for additional information about the Combined Heat & Power Program if and when interested in a CHP system.

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 (www.pjm.com/markets-and-operations/demand-response/csps.aspx). PJM also posts training materials that are developed for program members interested in specific rules and requirements regarding DR activity (http://www.pjm.com/training/training%20material.aspx), along with a variety of other DR program information.

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

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

Figure 30 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Install LED Fixtures	x			x		
ECM 2	Retrofit Fixtures with LED Lamps	x			x		
ECM 3	Install Occupancy Sensor Lighting Controls	x			x		
ECM 4	Install High/Low Lighitng Controls	x			x		
ECM 5	Premium Efficiency Motors				x		
ECM 6	Install VFDs on Constant Volume (CV) HVAC	x			x		
ECM 7	Install VFDs on Hot Water Pumps				x		
ECM 8	Install Low-Flow Domestic Hot Water Devices				x		
ECM 9	Vending Machine Control	x			x		
ECM 10	Building Envelope Weatherization				x		
ECM 11	Retro-Commissioning Study & HVAC Improvements				x		

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

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

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

8.1 SmartStart

Overview

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

Equipment with Prescriptive Incentives Currently Available:

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

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

Incentives

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

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

How to Participate

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

Detailed program 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 a generally a good option for medium to large sized facilities looking to implement as many measures as possible under a single project in order to achieve deep energy savings. This program has an added benefit of evaluating a broad spectrum of measures that may not otherwise qualify under other programs. Many facilities pursuing an Energy Savings Improvement Program (ESIP) loan also utilize the P4P program.

Please note that the scope of work presented in this audit report does not quite meet the requirements of the P4P program as outlined above. There is a potential for the high school to qualify for the P4P program. However, this requires total source savings for measures to be greater than 15% and limits the contribution lighting savings to 50% of the total source savings. The energy and economic results provided demonstrate that the recommended project including only high priority measures would not meet these requirements, however the total project including all evaluated measures would. Additional opportunities may also be identified by an ESCO moving forward.

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 (www.pjm.com/markets-and-operations/demand-response/csps.aspx). PJM also posts training materials that are developed for program members interested in specific rules and requirements regarding DR activity (http://www.pjm.com/training/training%20material.aspx), along with a variety of other program information.

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

See Section 7 for additional information.

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

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

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

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

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

9.2 Retail Natural Gas Supply Options

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

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

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

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

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	19	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,900	Relamp	No	19	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,900	0.54	3,668	0.0	$391.41	$1,040.68	$285.00	1.93
Kitchen	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.02	148	0.0	$15.79	$36.52	$10.00	1.68
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.02	148	0.0	$15.79	$36.52	$10.00	1.68
Walk-in Coolers	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,900	Relamp	No	7	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,900	0.23	1,554	0.0	$165.83	$383.41	$105.00	1.68
Mechanical Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.02	148	0.0	$15.79	$36.52	$10.00	1.68
Hallway	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.02	148	0.0	$15.79	$36.52	$10.00	1.68
Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.11	748	0.0	$79.83	$262.06	$60.00	2.53
Serving Area	44	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	44	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.95	2,279	0.0	$243.22	$1,606.66	$440.00	4.80
Serving Area	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.09	207	0.0	$22.11	$146.06	$40.00	4.80
Serving Area	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,365	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,365	0.26	622	0.0	$66.33	$438.18	$120.00	4.80
Gym Hallway	4	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	50	4,600	None	No	4	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	50	4,600	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Gym	38	Linear Fluorescent - T5HO: 4' T5HO (54W) - 4L	Occupancy Sensor	234	4,600	Relamp	No	38	LED - Linear Tubes: (4) 4' T5HO (25W) Lamps	Occupancy Sensor	102	4,600	3.29	26,535	0.0	$2,831.53	$4,012.23	$760.00	1.15
Pool Storage	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.13	311	0.0	$33.17	$219.09	$60.00	4.80
Mechanical Room	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.22	1,480	0.0	$157.94	$365.15	$100.00	1.68
Corner Entrance Lobby	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,730	None	No	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,730	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Pool	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,600	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,220	0.66	5,294	0.0	$564.95	$1,956.36	$380.00	2.79
Pool	29	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,600	Relamp	Yes	29	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,220	0.79	6,397	0.0	$682.65	$2,138.94	$430.00	2.50
Locker Room #1	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,600	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,600	0.09	698	0.0	$74.51	$146.06	$40.00	1.42
Locker Room #1	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,730	Relamp	No	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.35	1,658	0.0	$176.89	$584.24	$160.00	2.40
Closets	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.04	296	0.0	$31.59	$73.03	$20.00	1.68
Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.09	207	0.0	$22.11	$146.06	$40.00	4.80
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.02	148	0.0	$15.79	$36.52	$10.00	1.68
Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.01	72	0.0	$7.66	$32.52	$10.00	2.94
Locker Room #2	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,600	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,600	0.09	698	0.0	$74.51	$146.06	$40.00	1.42
Locker Room #2	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	4,600	Relamp	No	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	4,600	0.35	2,793	0.0	$298.06	$584.24	$160.00	1.42

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Closets	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.04	296	0.0	$31.59	$73.03	$20.00	1.68
Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.09	207	0.0	$22.11	$146.06	$40.00	4.80
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.02	148	0.0	$15.79	$36.52	$10.00	1.68
Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.01	72	0.0	$7.66	$32.52	$10.00	2.94
Aux Gym	12	Linear Fluorescent - T5HO: 4' T5HO (54W) - 4L	Occupancy Sensor	234	4,600	Relamp	No	12	LED - Linear Tubes: (4) 4' T5HO (25W) Lamps	Occupancy Sensor	102	4,600	1.04	8,379	0.0	$894.17	$1,267.02	$240.00	1.15
Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,900	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.00	13	0.0	$1.44	$36.52	$10.00	18.47
Restroom	1	Compact Fluorescent: Screw in Lamps	Wall Switch	14	3,900	Relamp	No	1	LED Screw-In Lamps: Screw in Lamps	Wall Switch	10	3,900	0.00	18	0.0	$1.91	$17.23	$0.00	9.00
Auditorium	66	Halogen Incandescent: Screw in Lamps	High/Low Control	150	2,730	Relamp	No	66	LED Screw-In Lamps: Screw in Lamps	High/Low Control	23	2,730	5.49	26,315	0.0	$2,808.12	$1,136.85	$330.00	0.29
Auditorium	14	LED - Fixtures: Downlight Recessed	High/Low Control	14	2,730	None	No	14	LED - Fixtures: Downlight Recessed	High/Low Control	14	2,730	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Stage	12	Incandescent: Screw in Lamps	Wall Switch	200	3,900	Relamp	No	12	LED Screw-In Lamps: Screw in Lamps	Wall Switch	30	3,900	1.34	9,149	0.0	$976.34	$206.70	$60.00	0.15
Stage	126	Halogen Incandescent: Screw in Lamps	High/Low Control	150	2,730	Relamp	No	126	LED Screw-In Lamps: Screw in Lamps	High/Low Control	23	2,730	10.49	50,238	0.0	$5,360.96	$2,170.35	$630.00	0.29
Sound Booth	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,900	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,900	0.06	444	0.0	$47.38	$109.55	$30.00	1.68
Mechanical Room	1	Incandescent: Screw in Lamps	Wall Switch	200	3,900	Relamp	No	1	LED Screw-In Lamps: Screw in Lamps	Wall Switch	30	3,900	0.11	762	0.0	$81.36	$17.23	$5.00	0.15
Mechanical Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.02	148	0.0	$15.79	$36.52	$10.00	1.68
Loading Dock	3	Incandescent: Screw in Lamps	Wall Switch	200	3,900	Relamp	No	3	LED Screw-In Lamps: Screw in Lamps	Wall Switch	30	3,900	0.33	2,287	0.0	$244.08	$51.68	$15.00	0.15
Maintenance Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,900	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,730	0.10	658	0.0	$70.26	$416.06	$75.00	4.85
Cardio Rooms 710 & &12	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	4,600	Relamp	No	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	4,600	0.52	4,190	0.0	$447.08	$876.36	$240.00	1.42
Storage Room 716	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.16	1,122	0.0	$119.75	$489.09	$60.00	3.58
Stairwells B, C & D	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,900	Relamp	No	6	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,900	0.22	1,507	0.0	$160.81	$438.18	$120.00	1.98
Server Room 216	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.08	561	0.0	$59.87	$379.55	$30.00	5.84
Hallway	34	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,730	None	No	34	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,730	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom 202	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom 204	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom 208	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 210	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom 214	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom 224	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom 226	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Work Room 201	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,365	Relamp	No	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,365	0.52	1,243	0.0	$132.67	$876.36	$240.00	4.80
Math Room 203	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.22	518	0.0	$55.28	$365.15	$100.00	4.80
Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.04	296	0.0	$31.59	$73.03	$20.00	1.68
Copy Room 206	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	1,365	None	No	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	1,365	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Office Room 212	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	1,365	None	No	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	1,365	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Office Room 209	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.17	414	0.0	$44.22	$292.12	$80.00	4.80
Classroom 205	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.32	1,243	0.0	$132.67	$547.73	$150.00	3.00
Classroom 207	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.32	1,243	0.0	$132.67	$547.73	$150.00	3.00
Classroom 215	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.32	1,243	0.0	$132.67	$547.73	$150.00	3.00
Classroom 217	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.32	1,243	0.0	$132.67	$547.73	$150.00	3.00
Classroom 219	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.26	995	0.0	$106.13	$438.18	$120.00	3.00
Classroom 221	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.26	995	0.0	$106.13	$438.18	$120.00	3.00
Faculty Restrooms	2	LED - Fixtures: Bath Vanity	Wall Switch	15	3,900	None	No	2	LED - Fixtures: Bath Vanity	Wall Switch	15	3,900	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Custodian Closet	1	Incandescent: Screw in Lamps	Wall Switch	200	3,900	Relamp	No	1	LED Screw-In Lamps: Screw in Lamps	Wall Switch	30	3,900	0.11	762	0.0	$81.36	$17.23	$5.00	0.15
Restrooms	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,730	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.09	414	0.0	$44.22	$146.06	$40.00	2.40
Classroom 223	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom 224	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom 225	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom 227	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom 228	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom 229	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 230	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom 232	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Storage Room 236	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.14	935	0.0	$99.79	$452.58	$50.00	4.03
Stairwell E	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,730	0.11	748	0.0	$79.83	$346.06	$40.00	3.83
1st Floor Stairwells	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,730	0.11	748	0.0	$79.83	$346.06	$40.00	3.83
Hallway	7	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,730	None	No	7	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,730	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom 141	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom 142	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom 143	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom 144	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom 137	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom 138	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom 139	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom 140	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway	17	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	17	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom 135	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.35	1,326	0.0	$141.51	$584.24	$160.00	3.00
Classroom 136	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.35	1,326	0.0	$141.51	$584.24	$160.00	3.00
Classroom 133	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.52	1,989	0.0	$212.27	$876.36	$240.00	3.00
Office Room 134	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.13	497	0.0	$53.07	$219.09	$60.00	3.00
Classroom 132	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.32	1,243	0.0	$132.67	$547.73	$150.00	3.00
Classroom 129	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.32	1,243	0.0	$132.67	$547.73	$150.00	3.00
Computer Lab 131	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.32	1,243	0.0	$132.67	$547.73	$150.00	3.00
Faculty Restrooms	2	LED - Fixtures: Bath Vanity	Wall Switch	15	3,900	None	No	2	LED - Fixtures: Bath Vanity	Wall Switch	15	3,900	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Custodian Closet	1	Incandescent: Screw in Lamps	Wall Switch	200	3,900	Relamp	No	1	LED Screw-In Lamps: Screw in Lamps	Wall Switch	30	3,900	0.11	762	0.0	$81.36	$17.23	$5.00	0.15
Server Room 124	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.06	444	0.0	$47.38	$109.55	$30.00	1.68

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Restrooms	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,730	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.09	414	0.0	$44.22	$146.06	$40.00	2.40
Classroom 122	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.32	1,243	0.0	$132.67	$547.73	$150.00	3.00
Classroom 120	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.32	1,243	0.0	$132.67	$547.73	$150.00	3.00
Classroom 118	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.32	1,243	0.0	$132.67	$547.73	$150.00	3.00
Classroom 127	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.26	995	0.0	$106.13	$438.18	$120.00	3.00
Classroom 125	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.32	1,243	0.0	$132.67	$547.73	$150.00	3.00
Classroom 123	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.32	1,243	0.0	$132.67	$547.73	$150.00	3.00
Classroom 119	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.32	1,243	0.0	$132.67	$547.73	$150.00	3.00
Office Room 121	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.13	497	0.0	$53.07	$219.09	$60.00	3.00
Science Room 116	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.65	2,486	0.0	$265.33	$1,095.45	$300.00	3.00
Copy Room 114	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.04	166	0.0	$17.69	$73.03	$20.00	3.00
Hallway	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	None	No	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,184	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Office 117	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.13	497	0.0	$53.07	$219.09	$60.00	3.00
Classroom 112	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.43	1,658	0.0	$176.89	$730.30	$200.00	3.00
Classroom 102	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.43	1,658	0.0	$176.89	$730.30	$200.00	3.00
Classroom 108	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.43	1,658	0.0	$176.89	$730.30	$200.00	3.00
Classroom 106	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.43	1,658	0.0	$176.89	$730.30	$200.00	3.00
Restroom 115	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,730	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.04	207	0.0	$22.11	$73.03	$20.00	2.40
Faculty Restrooms	2	LED - Fixtures: Bath Vanity	Wall Switch	15	3,900	None	No	2	LED - Fixtures: Bath Vanity	Wall Switch	15	3,900	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Custodian Closet	1	Incandescent: Screw in Lamps	Wall Switch	200	3,900	Relamp	No	1	LED Screw-In Lamps: Screw in Lamps	Wall Switch	30	3,900	0.11	762	0.0	$81.36	$17.23	$5.00	0.15
Restrooms	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,730	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.09	414	0.0	$44.22	$146.06	$40.00	2.40
Clasroom 107	21	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	21	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.45	1,741	0.0	$185.73	$766.82	$210.00	3.00
Prep Rooms 103 & 104	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.13	311	0.0	$33.17	$219.09	$60.00	4.80
Clasroom 101	21	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	21	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.45	1,741	0.0	$185.73	$766.82	$210.00	3.00
Transition Spaces	20	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	20	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Restroom 320	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,730	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.06	311	0.0	$33.17	$109.55	$30.00	2.40
Restroom 316	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,730	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.06	311	0.0	$33.17	$109.55	$30.00	2.40
Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.02	148	0.0	$15.79	$36.52	$10.00	1.68
Computer Lab 314	21	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	21	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.45	1,741	0.0	$185.73	$766.82	$210.00	3.00
School Store 327	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.09	332	0.0	$35.38	$146.06	$40.00	3.00
Copy Room 329	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.06	249	0.0	$26.53	$109.55	$30.00	3.00
Faculty Lounge 331	19	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	19	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.41	1,575	0.0	$168.05	$693.79	$190.00	3.00
Office Room 323	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.09	332	0.0	$35.38	$146.06	$40.00	3.00
Electric Room 325	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.02	52	0.0	$5.53	$36.52	$10.00	4.80
Hallway	9	LED Screw-In Lamps: Plug in Lamps	Occupancy Sensor	14	2,730	None	No	9	LED Screw-In Lamps: Plug in Lamps	Occupancy Sensor	14	2,730	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway	20	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,730	None	No	20	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,730	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Display Cases	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,730	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.06	311	0.0	$33.17	$109.55	$30.00	2.40
Admin Offices 319	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,730	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.17	829	0.0	$88.44	$292.12	$80.00	2.40
Private Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Private Office	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.13	311	0.0	$33.17	$219.09	$60.00	4.80
Private Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Private Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Private Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Science Lab 317	30	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,457	Relamp	No	30	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,457	0.65	2,797	0.0	$298.50	$1,095.45	$300.00	2.66
Science Lab 313	30	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,457	Relamp	No	30	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,457	0.65	2,797	0.0	$298.50	$1,095.45	$300.00	2.66
Science Lab 309	30	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,457	Relamp	No	30	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,457	0.65	2,797	0.0	$298.50	$1,095.45	$300.00	2.66
Science Lab 305	30	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,457	Relamp	No	30	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,457	0.65	2,797	0.0	$298.50	$1,095.45	$300.00	2.66
Art Classroom 312	21	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,457	Relamp	No	21	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,457	0.45	1,958	0.0	$208.95	$766.82	$210.00	2.66
Restroom 310	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.02	148	0.0	$15.79	$36.52	$10.00	1.68
Restroom 308	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.02	148	0.0	$15.79	$36.52	$10.00	1.68

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Faculty Lounge 306	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.55	3,740	0.0	$399.15	$1,000.30	$235.00	1.92
Phone Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.02	148	0.0	$15.79	$36.52	$10.00	1.68
Corner Lobby Hallway	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,457	Relamp	No	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,457	0.52	2,238	0.0	$238.80	$876.36	$240.00	2.66
Hallway	14	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,457	None	No	14	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,457	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,730	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.26	1,243	0.0	$132.67	$438.18	$120.00	2.40
Storage Room 307	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	7	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.15	1,036	0.0	$110.56	$255.61	$70.00	1.68
TV Studio 301	26	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	26	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.56	3,848	0.0	$410.64	$949.39	$260.00	1.68
Control Room 301C	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.22	518	0.0	$55.28	$365.15	$100.00	4.80
Control Room 301B	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.06	155	0.0	$16.58	$109.55	$30.00	4.80
Office Room 301A	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.06	155	0.0	$16.58	$109.55	$30.00	4.80
Control Room 303	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.06	155	0.0	$16.58	$109.55	$30.00	4.80
Art Room 702	40	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,457	Relamp	No	40	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,457	0.87	3,730	0.0	$398.00	$1,460.60	$400.00	2.66
Kiln Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.09	207	0.0	$22.11	$146.06	$40.00	4.80
Storage Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.13	311	0.0	$33.17	$219.09	$60.00	4.80
Art Room 704	40	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,457	Relamp	No	40	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,457	0.87	3,730	0.0	$398.00	$1,460.60	$400.00	2.66
Walkway	7	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,730	None	No	7	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,730	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Main Hallway	26	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,730	None	No	26	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,730	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,730	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.04	207	0.0	$22.11	$73.03	$20.00	2.40
Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,730	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.04	207	0.0	$22.11	$73.03	$20.00	2.40
Entrance Lobby	6	LED Screw-In Lamps: Screw in Lamps	Wall Switch	14	3,900	None	No	6	LED Screw-In Lamps: Screw in Lamps	Wall Switch	14	3,900	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Entrance Lobby	10	Compact Fluorescent: Plug in Lamps	Wall Switch	26	3,900	Relamp	No	10	LED Screw-In Lamps: Plug in Lamps	Wall Switch	18	3,900	0.05	359	0.0	$38.29	$344.50	$0.00	9.00
Entrance Lobby	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,730	0.11	748	0.0	$79.83	$346.06	$40.00	3.83
Vestibule	10	Compact Fluorescent: Plug in Lamps	Wall Switch	26	3,900	Relamp	No	10	LED Screw-In Lamps: Plug in Lamps	Wall Switch	18	3,900	0.05	359	0.0	$38.29	$344.50	$0.00	9.00
Main Office	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	2,730	0.10	698	0.0	$74.47	$489.84	$140.00	4.70
Main Office	8	Compact Fluorescent: Plug in Lamps	Wall Switch	26	3,900	Relamp	No	8	LED Screw-In Lamps: Plug in Lamps	Wall Switch	18	3,900	0.04	287	0.0	$30.63	$275.60	$0.00	9.00

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Main Office	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$478.98	$1,686.36	$345.00	2.80
Conference Room	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.27	1,870	0.0	$199.58	$635.15	$135.00	2.51
Storage Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Entrance	9	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	9	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.09	646	0.0	$68.92	$292.64	$90.00	2.94
Private Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Private Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.09	207	0.0	$22.11	$146.06	$40.00	4.80
Private Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Private Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Private Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Private Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Private Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Private Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Private Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Private Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Conference Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.04	296	0.0	$31.59	$73.03	$20.00	1.68
Conference Room	8	Compact Fluorescent: Plug in Lamps	Wall Switch	26	3,900	Relamp	No	8	LED Screw-In Lamps: Plug in Lamps	Wall Switch	18	3,900	0.04	287	0.0	$30.63	$275.60	$0.00	9.00
Kitchenette	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Hallway	6	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	Yes	6	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	2,730	0.08	568	0.0	$60.59	$395.09	$60.00	5.53
Conference Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.04	296	0.0	$31.59	$73.03	$20.00	1.68
Conference Room	8	Compact Fluorescent: Plug in Lamps	Wall Switch	26	3,900	Relamp	No	8	LED Screw-In Lamps: Plug in Lamps	Wall Switch	18	3,900	0.04	287	0.0	$30.63	$275.60	$0.00	9.00
Private Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Private Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.09	207	0.0	$22.11	$146.06	$40.00	4.80
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,900	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,900	0.03	222	0.0	$23.69	$54.77	$15.00	1.68
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,900	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,900	0.03	222	0.0	$23.69	$54.77	$15.00	1.68
Hallway	36	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,730	None	No	36	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,730	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Weight Room 803	18	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,457	Relamp	No	18	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,457	0.58	2,518	0.0	$268.65	$985.91	$270.00	2.66
Office Room 805	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.06	155	0.0	$16.58	$109.55	$30.00	4.80
Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.09	207	0.0	$22.11	$146.06	$40.00	4.80
Restroom	5	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	5	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.05	359	0.0	$38.29	$162.58	$50.00	2.94
Restroom	5	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	5	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.05	359	0.0	$38.29	$162.58	$50.00	2.94
Locker Room #3	36	LED - Fixtures: Close to Ceiling Mount	Wall Switch	25	3,900	None	No	36	LED - Fixtures: Close to Ceiling Mount	Wall Switch	25	3,900	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Locker Room #3	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.04	296	0.0	$31.59	$73.03	$20.00	1.68
Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.04	296	0.0	$31.59	$73.03	$20.00	1.68
Locker Room #4	36	LED - Fixtures: Close to Ceiling Mount	Wall Switch	25	3,900	None	No	36	LED - Fixtures: Close to Ceiling Mount	Wall Switch	25	3,900	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Locker Room #4	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.04	296	0.0	$31.59	$73.03	$20.00	1.68
Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.04	296	0.0	$31.59	$73.03	$20.00	1.68
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.02	148	0.0	$15.79	$36.52	$10.00	1.68
Restroom	1	Compact Fluorescent: Plug in Lamps	Wall Switch	26	3,900	Relamp	No	1	LED Screw-In Lamps: Plug in Lamps	Wall Switch	18	3,900	0.01	36	0.0	$3.83	$34.45	$0.00	9.00
Curved Lobby Vestibules	5	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	Yes	5	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	2,730	0.07	473	0.0	$50.49	$362.58	$50.00	6.19
Cafeteria	35	LED - Fixtures: Low-Bay	Wall Switch	25	3,900	None	No	35	LED - Fixtures: Low-Bay	Wall Switch	25	3,900	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cafeteria	6	High-Pressure Sodium: (1) 35W Lamp	Wall Switch	46	3,900	LED Retrofit	No	6	LED Screw-In Lamps: Retrofit LED	Wall Switch	14	3,900	0.13	861	0.0	$91.89	$1,200.00	$0.00	13.06
Cafeteria	19	High-Pressure Sodium: (1) 50W Lamp	Wall Switch	66	3,900	LED Retrofit	No	19	LED Screw-In Lamps: Retrofit LED	Wall Switch	20	3,900	0.57	3,920	0.0	$418.29	$5,700.00	$0.00	13.63
Cafeteria	30	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	30	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.31	2,153	0.0	$229.73	$975.45	$300.00	2.94
Cafeteria	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Storage 321A	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.08	561	0.0	$59.87	$379.55	$30.00	5.84
Hallway	25	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,730	None	No	25	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	2,730	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Music Room 403	25	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,457	Relamp	No	25	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,457	0.81	3,497	0.0	$373.13	$1,369.31	$375.00	2.66
Music Room 403	20	Compact Fluorescent: Plug in Lamps	Occupancy Sensor	26	2,457	Relamp	No	20	LED Screw-In Lamps: Plug in Lamps	Occupancy Sensor	18	2,457	0.10	452	0.0	$48.24	$689.00	$0.00	14.28
Private Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,365	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,365	0.06	155	0.0	$16.58	$109.55	$30.00	4.80
Private Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,365	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,365	0.06	155	0.0	$16.58	$109.55	$30.00	4.80

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Practice Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,365	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,365	0.13	311	0.0	$33.17	$219.09	$60.00	4.80
Practice Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,365	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,365	0.13	311	0.0	$33.17	$219.09	$60.00	4.80
Practice Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,365	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,365	0.13	311	0.0	$33.17	$219.09	$60.00	4.80
Band Room 401	25	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,457	Relamp	No	25	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,457	0.81	3,497	0.0	$373.13	$1,369.31	$375.00	2.66
Band Room 401	20	Compact Fluorescent: Plug in Lamps	Occupancy Sensor	26	2,457	Relamp	No	20	LED Screw-In Lamps: Plug in Lamps	Occupancy Sensor	18	2,457	0.10	452	0.0	$48.24	$689.00	$0.00	14.28
Control Room	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	114	1,365	Relamp	No	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,365	0.18	440	0.0	$46.90	$365.15	$100.00	5.65
Practice Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	114	1,365	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,365	0.07	176	0.0	$18.76	$146.06	$40.00	5.65
Practice Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	114	1,365	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,365	0.07	176	0.0	$18.76	$146.06	$40.00	5.65
Storage	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.22	518	0.0	$55.28	$365.15	$100.00	4.80
Hallway	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,730	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.06	311	0.0	$33.17	$109.55	$30.00	2.40
Vestibule	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,730	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.04	207	0.0	$22.11	$73.03	$20.00	2.40
Storage	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.15	363	0.0	$38.69	$255.61	$70.00	4.80
Private Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.02	52	0.0	$5.53	$36.52	$10.00	4.80
Private Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Private Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.02	52	0.0	$5.53	$36.52	$10.00	4.80
Private Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.02	52	0.0	$5.53	$36.52	$10.00	4.80
Electric Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Classroom 410	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,730	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.17	829	0.0	$88.44	$292.12	$80.00	2.40
Conference Room	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,457	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,457	0.17	746	0.0	$79.60	$292.12	$80.00	2.66
Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.09	207	0.0	$22.11	$146.06	$40.00	4.80
Restroom	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.08	561	0.0	$59.87	$379.55	$65.00	5.25
Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.04	296	0.0	$31.59	$73.03	$20.00	1.68
Library Entrance	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,900	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,730	0.16	1,122	0.0	$119.75	$489.09	$95.00	3.29
Library	12	LED Screw-In Lamps: Screw in Lamps	Wall Switch	14	3,900	None	No	12	LED Screw-In Lamps: Screw in Lamps	Wall Switch	14	3,900	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Library	24	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	50	3,900	None	No	24	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	50	3,900	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Library	9	LED - Fixtures: Close to Ceiling Mount	Wall Switch	16	3,900	None	No	9	LED - Fixtures: Close to Ceiling Mount	Wall Switch	16	3,900	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Library Stacks	64	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	64	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	1.75	11,970	0.0	$1,277.28	$3,956.96	$850.00	2.43
Library	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.36	2,431	0.0	$259.45	$744.70	$165.00	2.23
Library	19	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	19	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.20	1,363	0.0	$145.49	$617.79	$190.00	2.94
Library	8	LED - Fixtures: Close to Ceiling Mount	Wall Switch	16	3,900	None	No	8	LED - Fixtures: Close to Ceiling Mount	Wall Switch	16	3,900	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Library	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.11	748	0.0	$79.83	$416.06	$75.00	4.27
Library	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,900	Relamp	No	12	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,900	0.44	3,014	0.0	$321.62	$876.36	$240.00	1.98
2nd Floor Library	18	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	114	2,730	Relamp	No	18	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,730	0.66	3,165	0.0	$337.70	$1,314.54	$360.00	2.83
Mechanical Rooms	4	Compact Fluorescent: Screw in Lamps	Wall Switch	23	3,900	Relamp	No	4	LED Screw-In Lamps: Screw in Lamps	Wall Switch	16	3,900	0.02	126	0.0	$13.40	$68.90	$0.00	5.14
Media Center Hallway	8	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	2,730	Relamp	Yes	8	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	1,911	0.11	530	0.0	$56.55	$460.12	$80.00	6.72
Office Room 007	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,900	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,730	0.08	561	0.0	$59.87	$225.55	$50.00	2.93
Loading Dorck 008	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,900	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,730	0.16	1,122	0.0	$119.75	$489.09	$95.00	3.29
Hallway	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.03	215	0.0	$22.97	$97.55	$30.00	2.94
Hallway	1	Compact Fluorescent: Plug in Lamps	Wall Switch	26	3,900	Relamp	No	1	LED Screw-In Lamps: Plug in Lamps	Wall Switch	18	3,900	0.01	36	0.0	$3.83	$34.45	$0.00	9.00
Copy Room 006	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.04	296	0.0	$31.59	$73.03	$20.00	1.68
Restroom 004	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,730	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.04	207	0.0	$22.11	$73.03	$20.00	2.40
Restroom 005	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,730	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.04	207	0.0	$22.11	$73.03	$20.00	2.40
Office Area	12	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	1,365	Relamp	No	12	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,365	0.13	301	0.0	$32.16	$390.18	$120.00	8.40
Lounge	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,900	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,730	0.08	561	0.0	$59.87	$225.55	$50.00	2.93
Conference Room 002	6	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,900	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.05	315	0.0	$33.60	$489.09	$95.00	11.73
Conference Room 002	16	Compact Fluorescent: Plug in Lamps	Wall Switch	14	3,900	Relamp	No	16	LED Screw-In Lamps: Plug in Lamps	Wall Switch	10	3,900	0.04	287	0.0	$30.63	$551.20	$0.00	18.00
Stairwell A	4	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	50	3,900	None	No	4	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	50	3,900	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Office 009	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.22	518	0.0	$55.28	$365.15	$100.00	4.80
Office 010	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.26	622	0.0	$66.33	$438.18	$120.00	4.80

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Tech 011	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,365	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,365	0.26	622	0.0	$66.33	$438.18	$120.00	4.80
Storage 012	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,900	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,730	0.37	2,525	0.0	$269.43	$762.95	$170.00	2.20
Electric Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,900	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,900	0.13	888	0.0	$94.76	$219.09	$60.00	1.68
Hallway	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,730	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.11	518	0.0	$55.28	$182.58	$50.00	2.40
Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Server Room 014	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.02	148	0.0	$15.79	$36.52	$10.00	1.68
Office 015	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.02	148	0.0	$15.79	$36.52	$10.00	1.68
Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Water Room	2	Compact Fluorescent: Screw in Lamps	Wall Switch	26	3,900	Relamp	No	2	LED Screw-In Lamps: Screw in Lamps	Wall Switch	18	3,900	0.01	72	0.0	$7.66	$34.45	$0.00	4.50
Office 017	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Office 018	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Office 018	1	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	1,365	None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	50	1,365	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Office 019	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Office 020	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,365	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,365	0.10	233	0.0	$24.88	$164.32	$45.00	4.80
Office 021	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,365	Relamp	No	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,365	0.16	389	0.0	$41.46	$273.86	$75.00	4.80
Hallway	11	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	Yes	11	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	2,730	0.15	1,041	0.0	$111.08	$557.67	$110.00	4.03
Hallway	11	Compact Fluorescent: Plug in Lamps	Wall Switch	26	3,900	Relamp	No	11	LED Screw-In Lamps: Plug in Lamps	Wall Switch	18	3,900	0.06	395	0.0	$42.12	$378.95	$0.00	9.00
Classroom 718	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,730	Relamp	No	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.43	2,072	0.0	$221.11	$730.30	$200.00	2.40
Storage 703	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,365	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,365	0.26	622	0.0	$66.33	$438.18	$120.00	4.80
Classroom 720	22	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,730	Relamp	No	22	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.48	2,279	0.0	$243.22	$803.33	$220.00	2.40
Food Lab 722	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,730	Relamp	No	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.43	2,072	0.0	$221.11	$730.30	$200.00	2.40
Classrom 709	28	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,730	Relamp	No	28	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.61	2,901	0.0	$309.56	$1,022.42	$280.00	2.40
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,900	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,900	0.03	222	0.0	$23.69	$54.77	$15.00	1.68
Storage Room 711	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,900	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,900	0.03	222	0.0	$23.69	$54.77	$15.00	1.68
Garage 705	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.27	1,870	0.0	$199.58	$905.15	$170.00	3.68

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Drama Room 504	28	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,457	Relamp	No	28	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,457	0.91	3,916	0.0	$417.90	$1,533.63	$420.00	2.66
Nurse's Office 502	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,457	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,457	0.32	1,399	0.0	$149.25	$547.73	$150.00	2.66
Nurse's Office 502	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	2,457	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,457	0.04	164	0.0	$17.49	$144.92	$0.00	8.29
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.02	148	0.0	$15.79	$36.52	$10.00	1.68
Exam Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	114	1,365	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,365	0.07	176	0.0	$18.76	$146.06	$40.00	5.65
Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.09	207	0.0	$22.11	$146.06	$40.00	4.80
Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,365	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,365	0.04	104	0.0	$11.06	$73.03	$20.00	4.80
Building Mounted	2	Compact Fluorescent: Plug in Lamps	None	46	6,000	Relamp	No	2	LED Screw-In Lamps: Plug in Lamps	None	32	6,000	0.02	193	0.0	$20.62	$68.90	$0.00	3.34
Building Mounted	2	LED Screw-In Lamps: Plug in Lamps	None	26	3,900	None	No	2	LED Screw-In Lamps: Plug in Lamps	None	26	3,900	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Under Canopy	12	Metal Halide: (1) 32W Lamp	None	43	3,900	LED Retrofit	No	12	LED Screw-In Lamps: Retrofit LED	None	13	3,900	0.24	1,615	0.0	$172.30	$2,400.00	$0.00	13.93
Under Canopy	1	Metal Halide: (1) 32W Lamp	None	43	3,900	LED Retrofit	No	1	LED Screw-In Lamps: Retrofit LED	None	13	3,900	0.02	135	0.0	$14.36	$200.00	$0.00	13.93
Under Canopy	13	Compact Fluorescent: Plug in Lamps	None	26	3,900	Relamp	No	13	LED Screw-In Lamps: Plug in Lamps	None	18	3,900	0.07	466	0.0	$49.77	$447.85	$0.00	9.00
Building Mounted	8	Metal Halide: (1) 100W Lamp	None	128	5,475	Fixture Replacement	No	8	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	None	38	5,475	0.47	4,533	0.0	$483.75	$7,727.72	$800.00	14.32
Building Mounted	8	Metal Halide: (1) 100W Lamp	None	128	5,475	Fixture Replacement	No	8	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	None	38	5,475	0.47	4,533	0.0	$483.75	$7,727.72	$800.00	14.32
Building Mounted	16	Compact Fluorescent: Plug in Lamps	None	46	5,475	Relamp	No	16	LED Screw-In Lamps: Plug in Lamps	None	32	5,475	0.15	1,410	0.0	$150.50	$551.20	$0.00	3.66
Building Mounted	1	LED - Fixtures: Other	None	78	5,475	None	No	1	LED - Fixtures: Other	None	78	5,475	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Building Mounted	1	Metal Halide: (1) 250W Lamp	None	295	5,475	Fixture Replacement	No	1	LED - Fixtures: Other	None	89	5,475	0.14	1,297	0.0	$138.41	$198.72	$5.00	1.40
Pole Mounted	14	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	None	48	4,380	None	No	14	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	None	48	4,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Pole Mounted	11	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	None	96	4,380	None	No	11	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	None	96	4,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Motor Inventory & Recommendations

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Boiler Exhuast	3	Exhaust Fan	3.0	87.5%	No	2,745	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Boiler Burner	2	Other	3.0	82.5%	No	2,745	Yes	86.5%	No		0.10	517	0.0	$55.12	$1,502.40	$0.00	27.26
Boiler Room	Boiler Burner	1	Other	2.0	80.0%	No	2,745	Yes	85.5%	No		0.05	247	0.0	$26.36	$617.10	$0.00	23.41
Boiler Room	Boiler Feed Water	3	Boiler Feed Water Pump	3.0	86.0%	No	2,745	Yes	89.5%	No		0.12	629	0.0	$67.07	$2,414.52	$0.00	36.00
Boiler Room	Hot Water Circ Pump - Feeds Pool	1	Water Supply Pump	3.0	77.0%	No	2,745	Yes	86.5%	No		0.12	657	0.0	$70.13	$751.20	$0.00	10.71
Boiler Room	Library and 2nd Floor	2	Heating Hot Water Pump	3.0	89.5%	No	2,745	Yes	89.5%	Yes	2	0.75	5,972	0.0	$637.25	$7,624.98	$0.00	11.97
Boiler Room	Domestic Hot Water Pumps	1	Water Supply Pump	3.0	86.0%	No	2,745	Yes	89.5%	No		0.04	210	0.0	$22.36	$804.84	$0.00	36.00
Boiler Room	Air Compressor for Pneumatic Controls	2	Air Compressor	3.0	89.5%	No	2,479	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Hot Water Supply	2	Heating Hot Water Pump	10.0	89.5%	No	1,696	Yes	91.7%	Yes	2	2.59	12,458	0.0	$1,329.39	$10,303.00	$0.00	7.75
Boiler Room	Hot Water Supply	2	Heating Hot Water Pump	15.0	92.4%	No	1,696	Yes	92.4%	Yes	2	3.65	17,864	0.0	$1,906.26	$14,171.74	$0.00	7.43
Boiler Room	Domestic Hot Water Circulator	1	Water Supply Pump	0.3	74.0%	No	2,745	No	74.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Glycol Pumps	2	Other	3.0	86.0%	No	2,745	No	86.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Building Exhaust	16	Exhaust Fan	0.3	74.0%	No	4,000	No	74.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Building Exhaust	8	Exhaust Fan	0.5	74.0%	No	4,000	No	74.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	HVs Serving Gym	2	Supply Fan	10.0	86.5%	No	1,696	No	86.5%	Yes	2	5.80	10,419	0.0	$1,111.77	$7,615.90	$1,600.00	5.41
Roof	MUAs Serving Kitchen	2	Supply Fan	5.0	86.5%	No	1,373	No	86.5%	Yes	2	2.90	4,217	0.0	$449.98	$6,551.70	$800.00	12.78
Roof	MUAs Serving Kitchen	2	Exhaust Fan	3.0	89.5%	No	1,373	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Power Ventilator for Pool	2	Exhaust Fan	3.0	88.0%	No	1,373	No	88.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	HV Serving Pool	1	Supply Fan	7.5	89.0%	No	1,696	No	89.0%	Yes	1	2.11	3,797	0.0	$405.20	$3,606.80	$600.00	7.42
Roof	HV Serving Pool	1	Return Fan	5.0	86.5%	No	1,373	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	MU-1,2,3,4	4	Supply Fan	0.8	74.0%	No	1,373	No	74.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Elevator	Elevator	3	Other	30.0	91.0%	No	73	No	91.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Domestic Hot Water Circulator	2	Water Supply Pump	0.1	74.0%	No	2,745	No	74.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	Exhaust Hood	2	Kitchen Hood Exhaust Fan	0.3	74.0%	No	2,625	No	74.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top Units	Supply Fans during Heating Season	17	Supply Fan	2.0	85.0%	No	2,745	No	85.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top Units	Supply Fans during Heating Season	1	Supply Fan	2.0	86.0%	No	2,745	No	86.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top Units	Supply Fans during Heating Season	8	Supply Fan	5.0	86.0%	No	2,745	No	86.0%	Yes	8	11.66	33,931	0.0	$3,620.81	$26,206.80	$3,200.00	6.35
Roof Top Units	Supply Fans during Heating Season	4	Supply Fan	7.5	86.0%	No	3,391	No	86.0%	Yes	4	8.74	31,437	0.0	$3,354.69	$14,427.20	$2,400.00	3.59
Roof Top Units	Supply Fans during Heating Season	1	Supply Fan	10.0	89.0%	No	3,391	No	89.0%	Yes	1	2.82	10,126	0.0	$1,080.54	$3,807.95	$800.00	2.78
Unitary HVAC	Unitary HVAC	150	Supply Fan	0.1	74.0%	No	2,745	No	74.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Unitary HVAC	Unitary HVAC	100	Supply Fan	0.3	74.0%	No	2,745	No	74.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Unitary HVAC	Unitary HVAC	50	Supply Fan	0.5	74.0%	No	2,745	No	74.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof near the Gym	ERUs Serving Gym	2	Packaged AC	20.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	CU-1	1	Split-System Air-Source HP	45.00	500.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	CU-2	1	Split-System AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof above classrooms near Pool	"RTU-1"	1	Packaged AC	15.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU-2	1	Packaged AC	5.00		Yes	1	Packaged AC	5.00		14.00		Yes	1.39	3,196	0.0	$341.00	$11,844.80	$710.00	32.65
Roof	RTU-3	1	Packaged AC	6.00		Yes	1	Packaged AC	6.00		13.00		Yes	1.43	3,182	0.0	$339.57	$11,442.63	$688.00	31.67
Roof	RTU-4	1	Packaged AC	6.00		Yes	1	Packaged AC	6.00		13.00		Yes	1.43	3,182	0.0	$339.57	$11,442.63	$688.00	31.67
Roof	RTU-5	1	Packaged AC	4.00		Yes	1	Packaged AC	4.00		14.00		Yes	1.11	2,556	0.0	$272.80	$9,575.84	$618.00	32.84
Roof	RTU-6	1	Packaged AC	13.00		Yes	1	Packaged AC	13.00		11.50		Yes	2.61	6,446	0.0	$687.89	$19,020.05	$1,277.00	25.79
Roof	RTU-7	1	Packaged AC	8.00		Yes	1	Packaged AC	8.00		13.00		Yes	1.90	4,243	0.0	$452.76	$15,006.85	$834.00	31.30
Roof	RTU-8	1	Packaged AC	4.00		Yes	1	Packaged AC	4.00		14.00		Yes	1.11	2,556	0.0	$272.80	$9,575.84	$618.00	32.84
Roof	RTU-9	1	Packaged AC	6.00		Yes	1	Packaged AC	6.00		13.00		Yes	1.43	3,182	0.0	$339.57	$11,442.63	$688.00	31.67
Roof above the Library & Music Rooms	RTU-1	1	Packaged AC	8.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof near the Kitchen	RTU-10	1	Packaged AC	25.00		Yes	1	Packaged AC	25.00		10.50		Yes	4.26	11,685	0.0	$1,246.90	$43,284.98	$2,225.00	32.93
Roof	RTU-11	1	Packaged AC	4.00		Yes	1	Packaged AC	4.00		14.00		Yes	1.11	2,556	0.0	$272.80	$9,575.84	$618.00	32.84
Roof	RTU-12	1	Packaged AC	8.00		Yes	1	Packaged AC	8.00		13.00		Yes	1.90	4,243	0.0	$452.76	$15,006.85	$834.00	31.30
Roof	RTU-13	1	Packaged AC	6.00		Yes	1	Packaged AC	6.00		13.00		Yes	1.43	3,182	0.0	$339.57	$11,442.63	$688.00	31.67
Roof	Condensing Unit	1	Split-System AC	1.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Condensing Unit	1	Split-System AC	3.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Condensing Unit	1	Split-System AC	3.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	"CU-1"	1	Split-System Air-Source HP	8.00	103.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	"CU-2"	1	Split-System Air-Source HP	8.00	103.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Server Room	1	Split-System AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Condensing Unit	5	Split-System AC	3.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Condensing Unit	2	Split-System AC	3.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
2nd Floor Roof	Server Room	2	Split-System AC	3.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Black Membrane Roof	RTU-32	1	Packaged AC	16.00		Yes	1	Packaged AC	16.00		11.50		Yes	3.21	7,934	0.0	$846.63	$23,201.60	$1,514.00	25.62
Black Membrane Roof	RTU-31	1	Packaged AC	16.00		Yes	1	Packaged AC	16.00		11.50		Yes	3.21	7,934	0.0	$846.63	$23,201.60	$1,514.00	25.62
Black Membrane Roof	RTU-30	1	Packaged AC	26.00		Yes	1	Packaged AC	26.00		10.50		Yes	4.43	12,152	0.0	$1,296.78	$44,972.37	$2,304.00	32.90
Black Membrane Roof	RTU-29	1	Packaged AC	26.00		Yes	1	Packaged AC	26.00		10.50		Yes	4.43	12,152	0.0	$1,296.78	$44,972.37	$2,304.00	32.90
Black Membrane Roof	RTU-28	1	Packaged AC	3.00		Yes	1	Packaged AC	3.00		14.00		Yes	0.83	1,917	0.0	$204.60	$7,306.88	$526.00	33.14
Black Membrane Roof	RTU-25	1	Packaged AC	5.00		Yes	1	Packaged AC	5.00		14.00		Yes	1.39	3,196	0.0	$341.00	$11,844.80	$710.00	32.65
Black Membrane Roof	RTU-24	1	Packaged AC	5.00		Yes	1	Packaged AC	5.00		14.00		Yes	1.39	3,196	0.0	$341.00	$11,844.80	$710.00	32.65
Black Membrane Roof	RTU-23	1	Packaged AC	8.00		Yes	1	Packaged AC	8.00		13.00		Yes	1.90	4,243	0.0	$452.76	$15,006.85	$834.00	31.30
Black Membrane Roof	RTU-22	1	Packaged AC	6.00		Yes	1	Packaged AC	6.00		13.00		Yes	1.43	3,182	0.0	$339.57	$11,442.63	$688.00	31.67
Black Membrane Roof	RTU-21	1	Packaged AC	8.00		Yes	1	Packaged AC	8.00		13.00		Yes	1.90	4,243	0.0	$452.76	$15,006.85	$834.00	31.30
Black Membrane Roof	RTU-20	1	Packaged AC	5.00		Yes	1	Packaged AC	5.00		14.00		Yes	1.39	3,196	0.0	$341.00	$11,844.80	$710.00	32.65
Black Membrane Roof	RTU-19	1	Packaged AC	5.00		Yes	1	Packaged AC	5.00		14.00		Yes	1.39	3,196	0.0	$341.00	$11,844.80	$710.00	32.65
Black Membrane Roof	RTU-18	1	Packaged AC	6.00		Yes	1	Packaged AC	6.00		13.00		Yes	1.43	3,182	0.0	$339.57	$11,442.63	$688.00	31.67
Black Membrane Roof	RTU-17	1	Packaged AC	8.00		Yes	1	Packaged AC	8.00		13.00		Yes	1.90	4,243	0.0	$452.76	$15,006.85	$834.00	31.30

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Black Membrane Roof	RTU-16	1	Packaged AC	6.00		Yes	1	Packaged AC	6.00		13.00		Yes	1.43	3,182	0.0	$339.57	$11,442.63	$688.00	31.67
Black Membrane Roof	RTU-15	1	Packaged AC	5.00		Yes	1	Packaged AC	5.00		14.00		Yes	1.39	3,196	0.0	$341.00	$11,844.80	$710.00	32.65
Black Membrane Roof	RTU-14	1	Packaged AC	8.00		Yes	1	Packaged AC	8.00		13.00		Yes	1.90	4,243	0.0	$452.76	$15,006.85	$834.00	31.30
Offices & Classrooms	New Window AC Units	5	Window AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Offices & Classrooms	Old Window AC Units	4	Window AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Offices & Classrooms	Portable AC Units	5	Window AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric Chiller Inventory & Recommendations

		Existing Conditions			Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Chiller Quantity	System Type	Cooling Capacity per Unit (Tons)	Install High Efficiency Chillers?	Chiller Quantity	System Type	Constant/ Variable Speed	Cooling Capacity (Tons)	Full Load Efficiency (kW/Ton)	IPLV Efficiency (kW/Ton)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Outside	2 Floors of Classrooms	1	Air-Cooled Centrifugal Chiller	60.00	No							0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Hydronic Heating	1	Non-Condensing Hot Water Boiler	4,540.00	Yes	1	Non-Condensing Hot Water Boiler	4,540.00	85.00%	Ec	0.00	0	733.3	$5,839.61	$77,794.36	$0.00	13.32
Boiler Room	Hydronic Heating	1	Non-Condensing Hot Water Boiler	4,540.00	Yes	1	Non-Condensing Hot Water Boiler	4,540.00	85.00%	Ec	0.00	0	366.6	$2,919.80	$77,794.36	$0.00	26.64
Boiler Room	Pool Water Heating	1	Non-Condensing Hot Water Boiler	4,540.00	Yes	1	Non-Condensing Hot Water Boiler	4,540.00	85.00%	Ec	0.00	0	137.5	$1,094.93	$77,794.36	$0.00	71.05
Roof	HV-1 Serving the Gym	1	Furnace	160.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	MUAs Serving the Kitchen	2	Furnace	200.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	HV-2 Serving the Aux Gyms	1	Furnace	120.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	MU-1,2,3,4	4	Furnace	120.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Roof Top Units	17	Furnace	73.00	Yes	17	Furnace	73.00	95.00%	AFUE	0.00	0	137.0	$1,090.91	$28,117.75	$6,800.00	19.54
Roof	Roof Top Units	1	Furnace	120.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Roof Top Units	8	Furnace	146.00	Yes	8	Furnace	146.00	95.00%	AFUE	0.00	0	128.9	$1,026.74	$26,463.77	$3,200.00	22.66
Roof	Roof Top Units	4	Furnace	219.00	Yes	4	Furnace	219.00	95.00%	AFUE	0.00	0	96.7	$770.05	$19,847.82	$1,600.00	23.70
Roof	Roof Top Units	1	Furnace	283.50	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

DHW Inventory & Recommendations

		Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Domestic Hot Water	2	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Kitchen	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Low-Flow Device Recommendations

	Recommedation Inputs				Energy Impact & Financial Analysis						
Location	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Restrooms	34	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	49.7	$395.85	$243.78	$0.00	0.62
Locker Rooms	8	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	11.7	$93.14	$57.36	$0.00	0.62

Reach-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions		Proposed Conditions					Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Energy Efficient Doors?	Install Door Heater Control?	Install Aluminum Night Covers?	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	2	Medium Temp Freezer (0F to 30F)	No	No	No	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions		Proposed Conditions			Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Evaporator Fan Control?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Low Temp Freezer (-35F to -5F)	No	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Medium Temp Freezer (0F to 30F)	No	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
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

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	2	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	2	Stand-Up Refrigerator, Glass Door (≤15 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Refrigerator Chest	No	Yes	0.12	1,020	0.0	$108.86	$1,554.00	$0.00	14.27
Kitchen	1	Refrigerator Chest	No	Yes	0.12	1,007	0.0	$107.50	$2,086.00	$0.00	19.40

Commercial Ice Maker Inventory & Recommendations

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Ice Maker Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Ice Making Head (<450 lbs/day), Batch	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Cooking Equipment Inventory & Recommendations

	Existing Conditions			Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	High Efficiency Equipement?	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	2	Gas Convection Oven (Half Size)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Gas Rack Oven (Double)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Gas Griddle (4 Feet Width)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	2	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 Steamer	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	2	Insulated Food Holding Cabinet (1/2 Size)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	4	Insulated Food Holding Cabinet (1/2 Size)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Electric Fryer	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Dishwasher Inventory & Recommendations

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

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
High School	101	Desktop Computer	120.0	
High School	7	Coffee Maker	400.0	
High School	4	Toaster	850.0	
High School	7	Refrigerator	700.0	
High School	12	Microwave	1,100.0	
High School	41	Fan	100.0	
High School	64	TV	150.0	
High School	33	Projector	200.0	
High School	4	Laptop Cart	1,200.0	
High School	3	Smart Board	316.0	
High School	2	Mini Fridge	260.0	
High School	25	Speaker	250.0	
High School	36	Printer	40.0	
High School	16	Large Xerox- Type Printers	515.0	
High School	8	Large Floor Fans	550.0	
High School	3	Electric Heaters	1,500.0	
High School	1	Misc. Sound Equipment	2,500.0	
High School	3	Scoreboard	500.0	
High School	7	Net/Hoops	248.7	
High School	2	Tredmills	1,500.0	
High School	4	Destratification Fans	200.0	
High School	2	Kiln for Art Classroom	14,300.0	
Kitchen	2	Coffee Maker	1,800.0	
Kitchen	2	Fan	100.0	
Kitchen	1	Microwave	1,200.0	
Kitchen	1	Large Blender	900.0	

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Corner Lobby	1	Non-Refrigerated	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cafeteria	3	Refrigerated	Yes	0.00	4,836	0.0	$516.00	$690.00	$150.00	1.05
Cafeteria	1	Non-Refrigerated	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Faculty Lounge	1	Refrigerated	Yes	0.00	1,612	0.0	$172.00	$230.00	$50.00	1.05
Faculty Lounge	1	Non-Refrigerated	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Custom Recommendations

Building Envelope Weatherization

Existing Conditions			Proposed Conditions		Energy Impact & Financial Analysis					
Annual Electric HVAC Energy Use (kWh)	*Annual Heating Gas Use (mmBtu)*	*Annual Heating Oil Use (mmBtu)*	Assumed % Electric HVAC Savings	Assumed % Fuel HVAC Savings	Total Annual kWh Savings	Total Annual Gas mmBtu Savings	Total Annual Fuel mmBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Simple Payback Period (Years)
423,801	12,132	0	0.1%	2.5%	212	303	0	$2,438	$11,620	4.77

	qty	$/unit	est. costs
Weather-strip Exterior Double Doors	17	100	$ 1,700
Weather-strip Exterior Single Doors		60	$ -
Caulk the Perimeter of Windows and Wall Cracks	2480	4	$ 9,920
		Total Estimated Costs	**$ 11,620**

Computer Power Management Software

# of Desktops	Normal Running Mode					Idle Running Mode					Suspended/Off Mode				
101	*Mon - Fri 8AM-5PM*	*Mon - Fri 5PM-8AM*	*Weekends & Holidays*	Energy Rate (W)*	Weekly Run Hours	Mon - Fri 8AM-5PM	Mon - Fri 5PM-8AM	*Weekends & Holidays*	*Energy Rate (W)**	*Weekly Run Hours*	Mon - Fri 8AM-5PM	Mon - Fri 5PM-8AM	Weekends & Holidays	Energy Rate (W)*	*Weekly Run Hours*
Existing Conditions	25%	5%	0%	120	**14**	5%	5%	5%	80	**8**	70%	90%	95%	5	**146**
Proposed Conditions	25%	0%	0%	120	**10**	0%	0%	0%	80	**0**	75%	100%	100%	5	**158**

Usage per Device			Energy Impact & Financial Analysis					
Weeks of Use	Annual kWh Usage	*Diversity Factor***	Total Annual kWh Savings	Total Annual Energy Cost Savings	*Cost per Desktop*	*Add'l Hardware Cost*	Total Installation Cost	Simple Payback Period (Years)
44	136	90%	3,924	$419	$15.00	$2,500.0	$4,015	9.59
44	92							

Retro-Commissioning Study & HVAC Improvements

Existing Conditions				Proposed Conditions			Energy Impact & Financial Analysis					
Annual Electric HVAC Energy Use (kWh)	*Annual Heating Gas Use (mmBtu)*	*Annual Heating Oil Use (mmBtu)*	*Annual Motor HVAC Energy Use (kWh)*	Assumed % Cooling Savings	Assumed % Heating Savings	Assumed % Motor Savings	Total Annual kWh Savings	Total Annual Gas mmBtu Savings	Total Annual Fuel mmBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Simple Payback Period (Years)
423,801	14,002.1	0.0	594,331	3%	5%	2%	24,601	700	0	$8,201	$72,000	8.78

Equations: (Based on Industry Standards)
Average Cost for retro-commissioining studies and control improvements is $0.30/sqft
Energy savings range between 5% and 20% with a typical payback of two years or less
Based on a comprehensive study by the Environmental Protection Agency, the value of energy savings range from $0.11 and $0.72/sqft
This should include the following; Check ductwork insulation, Check Valve and Damper Operation, Economizer Controls, Temperature and Humidity Sensors, CO2 Sensors, etc.
The HVAC systems should have proper temperature set backs and operate according to occupancy schedules.
Air-handling units should be equipped with outdoor air damper controls and CO2 sensors to provide demand control ventilation.

Installation of an Energy Management System

Existing Conditions				Proposed Conditions			Energy Impact & Financial Analysis					
Annual Electric HVAC Energy Use (kWh)	*Annual Heating Gas Use (mmBtu)*	*Annual Heating Oil Use (mmBtu)*	*Annual Motor HVAC Energy Use (kWh)*	Assumed % Cooling Savings	Assumed % Heating Savings	Assumed % Motor Savings	Total Annual kWh Savings	Total Annual Gas mmBtu Savings	Total Annual Fuel mmBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Simple Payback Period (Years)
423,801	14,002.1	0.0	594,331	6%	10%	4%	49,201	1,400	0	$16,401	$360,000	21.95

Equations: (Based on Industry Standards)
Average Cost for EMS installation is $1.50/sqft
Energy savings range between 10% and 30%

Notes:
Inconsistent Temperature Readings

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

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ENERGY STAR® Score[1]

Lawrence High School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 240,000
Built: 1987

For Year Ending: July 31, 2017
Date Generated: September 24, 2018

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
Lawrence High School 2525 Princeton Pike Lawrenceville, New Jersey 08648	Lawrence Township BOE 2565 Princeton Pike Lawrenceville, NJ 08648 (609) 671-5418	Thomas Eldridge 2565 Princeton Pike Lawrenceville, NJ 08648 (609) 671-5418 teldridge@LTPS.org

Property ID: 6441256

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
101.1 kBtu/ft²

Source EUI
156.3 kBtu/ft²

Annual Energy by Fuel	
Electric - Solar (kBtu)	1,526,780 (6%)
Electric - Grid (kBtu)	6,923,197 (28%)
Natural Gas (kBtu)	15,805,569 (65%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	96.5
National Median Source EUI (kBtu/ft²)	149.3
% Diff from National Median Source EUI	5%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	1,541

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)