Local Government Energy Audit Report

Gloucester City High School

January 12, 2021

Prepared for:
Gloucester City Public Schools
1300 Market Street
Gloucester, NJ 08030

Prepared by:
TRC
900 Route 9 North
Woodbridge, NJ 07095

Disclaimer

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information about financial incentives that may be available. Most energy conservation measures have received preliminary analysis of feasibility that identifies expected ranges of savings and costs. This level of analysis is usually considered sufficient to establish a basis for further discussion and to help prioritize energy measures.

TRC reviewed the energy conservation measures and estimates of energy savings for technical accuracy. Actual, achieved energy savings depend on behavioral factors and other uncontrollable variables and, therefore, estimates of final energy savings are not guaranteed. TRC and the New Jersey Board of Public Utilities (NJBPU) shall in no event be liable should the actual energy savings vary.

TRC bases estimated material and labor costs primarily on RS Means cost manuals as well as on our experience at similar facilities. This approach is based on standard cost estimating manuals and is vendor neutral. Cost estimates include material and labor pricing associated with one for one equipment replacements. Cost estimates do not include demolition or removal of hazardous waste. The actual implementation costs for energy savings projects are anticipated to be significantly higher based on the specific conditions at your site(s). We strongly recommend that you work with your design engineer or contractor to develop actual project costs for your specific scope of work for the installation of high efficiency equipment. We encourage you to obtain multiple estimates when considering measure installations. Actual installation costs can vary widely based on selected products and installers. TRC and NJBPU do not guarantee cost estimates and shall in no event be held liable should actual installed costs vary from these material and labor 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. Please review all available program incentives and eligibility requirements prior to selecting and installing any energy conservation measures.

The customer and their respective contractor(s) are responsible to implement energy conservation measures in complete conformance with all applicable local, state and federal requirements.

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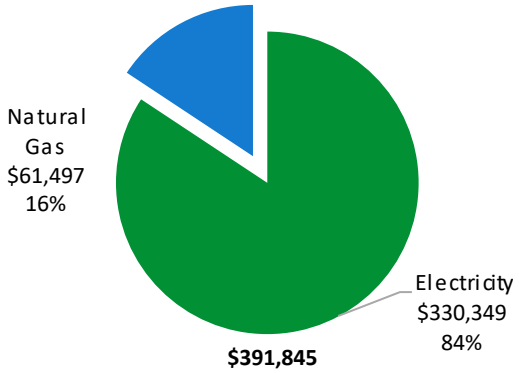
1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for Gloucester City High School. This report provides you with information about your facility's energy use, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help make changes in your facility. TRC conducted this study as part of a comprehensive effort to assist New Jersey school districts and local governments in controlling their energy costs and to help protect our environment by reducing statewide energy consumption.

BUILDING PERFORMANCE REPORT

Annual Utilities	Costs: $391,845 Electricity: 2,587,586 kWh Natural Gas: 74,096 Therms	
ENERGY STAR® Benchmarking Score	26 *(1-100 scale)*	This building performs at or below the national average. This report contains suggestions about how to improve building performance and reduce energy costs.

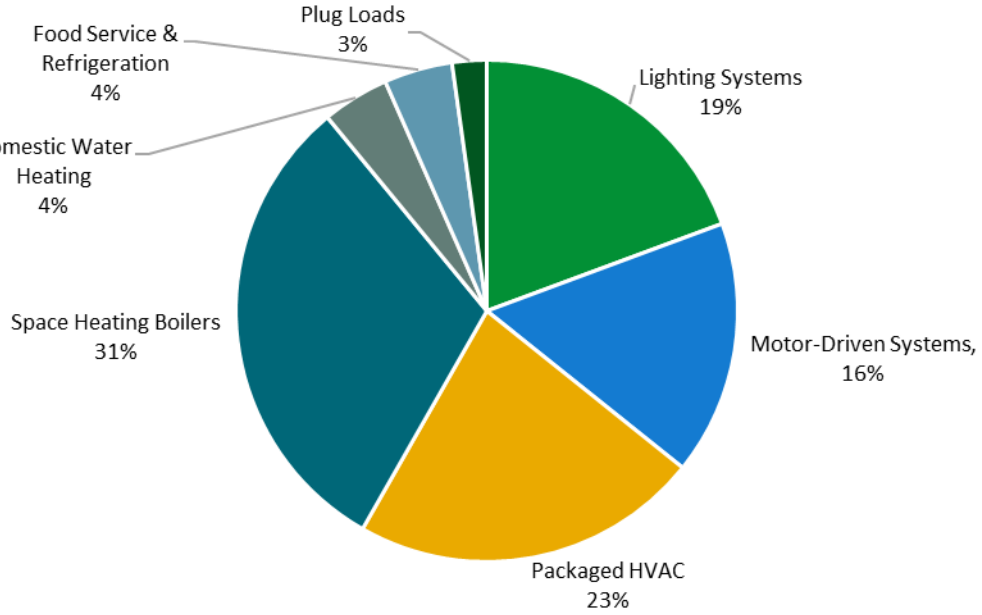


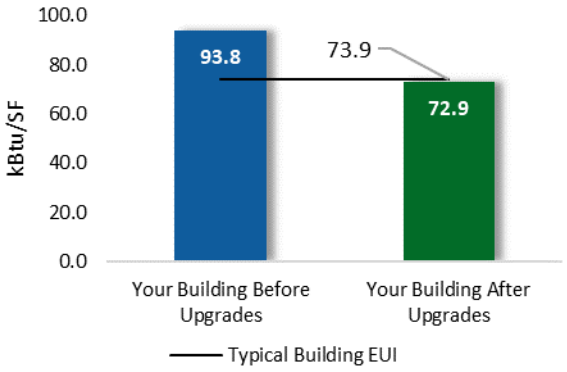
Figure 1 - Energy Use by System

POTENTIAL IMPROVEMENTS

This energy audit considered a range of potential energy improvements in your building. Costs and savings will vary between improvements. Presented below are two potential scopes of work for your consideration.

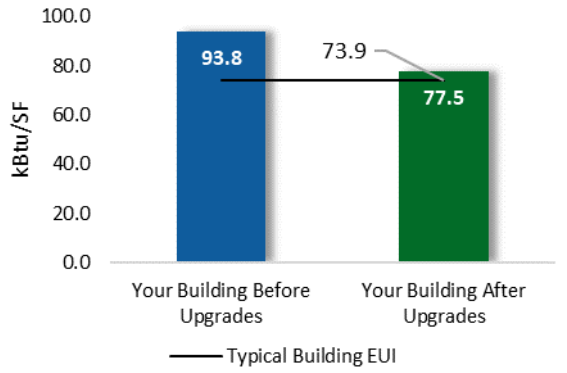
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$1,171,866
Potential Rebates & Incentives[1]	$155,621
Annual Cost Savings	$134,168
Annual Energy Savings	Electricity: 1,041,562 kWh Natural Gas: 1,440 Therms
Greenhouse Gas Emission Savings	533 Tons
Simple Payback	7.6 Years
Site Energy Savings (all utilities)	23%



Scenario 2: Cost Effective Package[2]

Installation Cost	$378,733
Potential Rebates & Incentives	$91,263
Annual Cost Savings	$109,187
Annual Energy Savings	Electricity: 856,298 kWh Natural Gas: -161 Therms
Greenhouse Gas Emission Savings	430 Tons
Simple Payback	2.6 Years
Site Energy Savings (all utilities)	18%



On-site Generation Potential

Photovoltaic	High
Combined Heat and Power	None

[1] Incentives are based on current SmartStart Prescriptive incentives. Other Program incentives may apply.

[2] A cost-effective measure is defined as one where the simple payback does not exceed two-thirds of the expected proposed equipment useful life. Simple payback is based on the net measure cost after potential incentives.

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**499,683**	**70.8**	**-93**	**$63,021**	**$182,422**	**$48,632**	**$133,790**	**2.1**	**492,289**
ECM 1	Install LED Fixtures	Yes	136,857	13.1	-18	$17,323	$102,177	$15,580	$86,597	5.0	135,712
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	2,382	0.4	0	$300	$912	$190	$722	2.4	2,340
ECM 3	Retrofit Fixtures with LED Lamps	Yes	360,445	57.2	-75	$45,398	$79,333	$32,862	$46,471	1.0	354,237
Lighting Control Measures			**114,567**	**17.7**	**-24**	**$14,428**	**$53,662**	**$14,490**	**$39,172**	**2.7**	**112,563**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	114,567	17.7	-24	$14,428	$53,662	$14,490	$39,172	2.7	112,563
Variable Frequency Drive (VFD) Measures			**301,265**	**61.2**	**0**	**$38,462**	**$492,791**	**$32,100**	**$460,691**	**12.0**	**303,371**
ECM 5	Install VFDs on Constant Volume (CV) Fans	Yes	159,277	29.2	0	$20,334	$93,335	$22,500	$70,835	3.5	160,390
ECM 6	Install VFDs on Chilled Water Pumps	No	77,058	22.2	0	$9,838	$221,746	$0	$221,746	22.5	77,596
ECM 7	Install VFDs on Heating Water Pumps	No	42,178	3.8	0	$5,385	$167,164	$5,200	$161,964	30.1	42,473
ECM 8	Install Boiler Draft Fan VFDs	Yes	22,753	6.0	0	$2,905	$10,546	$4,400	$6,146	2.1	22,912
Unitary HVAC Measures			**63,065**	**52.6**	**73**	**$8,655**	**$365,566**	**$54,910**	**$310,657**	**35.9**	**72,016**
ECM 9	Install High Efficiency Air Conditioning Units	No	63,065	52.6	73	$8,655	$365,566	$54,910	$310,657	35.9	72,016
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**21**	**$174**	**$7,587**	**$1,000**	**$6,587**	**37.9**	**2,450**
ECM 10	Install High Efficiency Furnaces	No	0	0.0	21	$174	$7,587	$1,000	$6,587	37.9	2,450
HVAC System Improvements			**56,369**	**0.0**	**44**	**$7,561**	**$35,437**	**$56**	**$35,381**	**4.7**	**61,900**
ECM 11	Implement Demand Control Ventilation (DCV)	Yes	56,369	0.0	36	$7,496	$35,345	$0	$35,345	4.7	60,990
ECM 12	Install Pipe Insulation	Yes	0	0.0	8	$65	$92	$56	$36	0.6	910
Domestic Water Heating Upgrade			**0**	**0.0**	**123**	**$1,025**	**$26,493**	**$3,243**	**$23,249**	**22.7**	**14,457**
ECM 13	Install High Efficiency Gas-Fired Water Heater	No	0	0.0	67	$552	$26,048	$2,799	$23,249	42.1	7,791
ECM 14	Install Low-Flow DHW Devices	Yes	0	0.0	57	$473	$445	$445	$0	0.0	6,666
Food Service & Refrigeration Measures			**6,612**	**0.5**	**0**	**$844**	**$7,908**	**$1,190**	**$6,718**	**8.0**	**6,659**
ECM 15	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	2,097	0.3	0	$268	$2,426	$640	$1,786	6.7	2,112
ECM 16	Refrigeration Controls	No	2,964	0.1	0	$378	$5,022	$450	$4,572	12.1	2,985
ECM 17	Vending Machine Control	Yes	1,551	0.2	0	$198	$460	$100	$360	1.8	1,562
TOTALS (COST EFFECTIVE MEASURES)			**856,298**	**124.1**	**-16**	**$109,187**	**$378,733**	**$91,263**	**$287,471**	**2.6**	**860,395**
TOTALS (ALL MEASURES)			**1,041,562**	**202.7**	**144**	**$134,168**	**$1,171,866**	**$155,621**	**$1,016,246**	**7.6**	**1,065,705**

* - All incentives presented in this table are based on NJ SmartStart 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).

Figure 2 – Evaluated Energy Improvements

For more detail on each evaluated energy improvement and a break out of cost-effective improvements, see **Section 4: Energy Conservation Measures**.

1.1 Planning Your Project

Careful planning makes for a successful energy project. When considering this scope of work, you will have some decisions to make, such as:

How will the project be funded and/or financed?

Is it best to pursue individual ECMs, groups of ECMs, or use a comprehensive approach where all ECMs are installed together?

Are there other facility improvements that should happen at the same time?

Pick Your Installation Approach

New Jersey's Clean Energy Programs give you the flexibility to do a little or a lot. Rebates, incentives, and financing are available to help reduce both your installation costs and your energy bills. If you are planning to take advantage of these programs, make sure to review incentive program guidelines before proceeding. This is important because in most cases you will need to submit applications for the incentives before purchasing materials or starting installation.

The potential ECMs identified for this building likely qualify for multiple incentive and funding programs. Based on current program rules and requirements, your measures are likely to qualify for the following programs:

Energy Conservation Measure		SmartStart	Direct Install	Pay For Performance
ECM 1	Install LED Fixtures	x		
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	x		
ECM 3	Retrofit Fixtures with LED Lamps	x		
ECM 4	Install Occupancy Sensor Lighting Controls	x		
ECM 5	Install VFDs on Constant Volume (CV) Fans	x		
ECM 6	Install VFDs on Chilled Water Pumps			
ECM 7	Install VFDs on Heating Water Pumps	x		
ECM 8	Install Boiler Draft Fan VFDs	x		
ECM 9	Install High Efficiency Air Conditioning Units	x		
ECM 10	Install High Efficiency Furnaces	x		
ECM 11	Implement Demand Control Ventilation (DCV)			
ECM 12	Install Pipe Insulation	x		
ECM 13	Install High Efficiency Gas-Fired Water Heater	x		
ECM 14	Install Low-Flow DHW Devices	x		
ECM 15	Refrigerator/Freezer Case Electrically Commutated Motors	x		
ECM 16	Refrigeration Controls	x		
ECM 17	Vending Machine Control	x		

Figure 3 – Funding Options

New Jersey's Clean Energy Programs At-A-Glance

	SmartStart Flexibility to install at your own pace	**Direct Install** Turnkey installation	**Pay for Performance** Whole building upgrades
Who should use it?	Buildings installing individual measures or small group of measures.	Small to mid-size facilities that can bundle multiple measures together. Average peak demand should be below 200 kW. Not suitable for significant building shell issues.	Mid to large size facilities looking to implement as many measures as possible at one time. Peak demand should be over 200 kW.
How does it work?	Use in-house staff or your preferred contractor.	Pre-approved contractors pass savings along to you via reduced material and labor costs.	Whole-building approach to energy upgrades designed to reduce energy use by at least 15%. The more you save, the higher the incentives.
What are the Incentives?	Fixed incentives for specific energy efficiency measures.	Incentives pay up to 70% of eligible costs, up to $125,000 per project. You pay the remaining 30% directly to the contractor.	Up to 25% of installation cost, calculated based on level of energy savings per square foot.
How do I participate?	Submit an application for the specific equipment to be installed.	Contact a participating contractor in your region.	Contact a pre-qualified Partner to develop your Energy Reduction Plan and set your energy savings targets.

Take the next step by visiting **www.njcleanenergy.com** for program details, applications, and to contact a qualified contractor.

Individual Measures with SmartStart

For facilities wishing 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, you can use internal resources or an outside firm or contractor to perform the final design of the ECM(s) and install the equipment. Program pre-approval is required for some SmartStart incentives, so only after receiving pre-approval should you proceed with ECM installation.

Turnkey Installation with Direct Install

The Direct Install program provides turnkey installation of multiple measures through an authorized network of participating contractors. This program can provide substantially higher incentives than SmartStart, up to 70 percent of the cost of selected measures. Direct Install contractors will assess and verify individual measure eligibility, and, in most cases, they perform the installation work. The Direct Install program is available to sites with an average peak demand of less than 200 kW.

Whole Building Approach with Pay for Performance

Pay for Performance can be a good option for medium to large sized facilities to achieve deep energy savings. Pay for Performance allows you to install as many measures as possible under a single project as well as address measures that may not qualify for other programs. Many facilities pursuing an Energy Savings Improvement Program (ESIP) loan also use this program. Pay for Performance works for larger customers with a peak demand over 200 kW. The minimum installed scope of work must include at least two unique measures resulting in at least 15 percent energy savings, where lighting cannot make up the majority of the savings.

More Options from Around the State

Financing and Planning Support with the Energy Savings Improvement Program (ESIP)

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the 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. You have already taken the first step as an LGEA customer, because this report is required to participate in ESIP.

Resiliency with Return on Investment through Combined Heat & Power (CHP)

The CHP program provides incentives for combined heat and power (aka cogeneration) and waste heat to power projects. Combined heat and power systems generate power on-site and recover heat from the generation system to meet on-site thermal loads. Waste heat to power systems use waste heat to generate power. You will work with a qualified developer who will design a system that meets your building's heating and cooling needs.

Ongoing Electric Savings with Demand Response

The Demand Response Energy Aggregator program reduces 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. By enabling commercial facilities to reduce electric demand 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 demand response (DR) programs. Program participation is voluntary, and facilities receive payments regardless of whether they are called upon to curtail their load during times of peak demand.

2 EXISTING CONDITIONS

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Gloucester City High School. This report provides information on how your facility uses energy, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help you implement the ECMs. This report also contains valuable information on financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing ECMs.

TRC conducted this study as part of a comprehensive effort to assist New Jersey educational and local government facilities in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

2.1 Site Overview

On October 2, 2020, TRC performed an energy audit at Gloucester City High School located in Gloucester, New Jersey. TRC met with Keith Locker to review the facility operations and help focus our investigation on specific energy-using systems.

Gloucester City High School is a one-story, 172,000 square foot building built in 1960. Spaces include classrooms, conference rooms, fitness rooms, gymnasium, kitchen, library, dining areas, prep rooms, corridors, offices, mechanical spaces, and storage areas.

The facility also has an 880-kW solar array located in the parking lot of the facility.

2.2 Building Occupancy

The facility is occupied year-round, with weekend occupancy limited to events. Typical weekday occupancy is 122 staff and 560 students.

Summer occupancy includes a summer day camp and continuing maintenance activities.

Please note that the schedule below reflects pre-COVID-19 period. Due to COVID-19, the equipment is currently set to operate continuously for increased ventilation. The school expects to return to regular operating hours.

Building Name	Weekday/Weekend	Operating Schedule
Gloucester City High School (School)	Weekday	8:00 AM - 3:00 PM
	Weekend	Closed, unless for events
	Summer	8:00 AM - 3:00 PM
Gloucester City High School (Custodial)	Weekday	4:00 AM - 10:00 PM
	Weekend	Closed, unless for events
	Summer	7:00 AM - 5:30 PM

Figure 4 - Building Occupancy Schedule

2.3 Building Envelope

Building walls are concrete block over structural steel with a brick façade throughout. The roof is mostly flat and mostly covered with rubber roofing membrane. Some sections of the roof are inclined metal frames with corrugated roofing sheets. The walls and roof are in good condition.

Most of the windows are operable double glazed and have metal frames. The glass-to-frame seals are in good condition. Exterior doors are metal and glass with aluminum frames and are in good condition. Degraded window and door seals increase drafts and outside air infiltration.

Building Envelope

Roof

2.4 Lighting Systems

The primary interior lighting system uses fluorescent fixtures, including 32-Watt 4-foot linear T8, 17-Watt 2-foot linear T8, 30-Watt 3-foot linear T12, 59-Watt 8-foot linear T8, U-Bend T12, and U-Bend T8 fluorescent lamps. Several fixtures throughout use LED, compact fluorescent lamps (CFL), or incandescent lamps, typically ranging between 10-Watts and 100-Watts. The theatre has many halogen incandescent spotlights that range between 300-Watts and 500-Watts. The gym in the new wing has several 400-Watt metal halide (MH) lamp fixtures.

Most exit signs use LED sources.

Fixtures are configured with a variety of lamp types in different lengths as needed to suit area lighting requirements. Fixtures are accordingly recessed, ceiling mount, wall mount, or suspended.

Most fixtures are in fair condition. Interior lighting levels were generally sufficient.

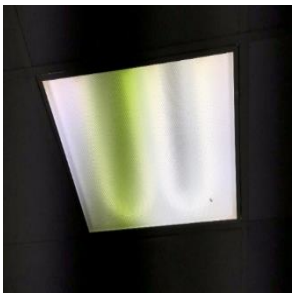
Most interior lighting fixtures are controlled manually while a few fixtures in some of the classrooms and offices are controlled by occupancy sensors. The lighting in the hallways are controlled by a timeclock.

Classroom Lighting Fixtures

Gym Lighting Fixtures

Linear T8 Fixtures

CFL Lamp Fixture



U-Bend Fluorescent Lamp Fixture

Exit Sign

Exterior fixtures include wall mounted and pole mounted area lights with incandescent and high-pressure sodium (HPS), and canopy mounted LED fixtures of varying wattages.

Most exterior light fixtures are all controlled by timeclocks and a few wall mounted fixtures being controlled by photocells. The lighting fixtures in the baseball and football fields are controlled by individual breakers.

Pole Mounted HPS Fixture

Pole Mounted Parking Lot Lighting

Wall Mounted Fixture

Field Lighting Fixtures

2.5 Air Handling Systems

Packaged Units

Most of the building is served by multiple packaged roof top units with DX cooling and natural gas-fired furnaces for heating. These units are listed below:

Unit	Area(s)/System(s) Served	Cooling Capacity per Unit (Tons)	Heating System	Heating Capacity Output per Unit (MBh)
CU-17/RTU17	Gym Foyer	12.5	Natural Gas Furnace	276.5
CU-20/RTU20	Gym Foyer	10.0	Natural Gas Furnace	276.5
RTU-10	Auditorium	50.0	Natural Gas Furnace	324
RTU-12	Old Gym Boys Side	20.1	Natural Gas Furnace	324
RTU-13	Old Gym Girls Side	20.1	Natural Gas Furnace	324
RTU-14 and 15	New Gym	25.1	Natural Gas Furnace	324
RTU-16	Both Locker Rooms New Gym	26.2	Natural Gas Furnace	200
RTU-18	Boys Locker Room Old Gym	26.2	Natural Gas Furnace	240
RTU-19	Girls Locker Room	26.2	Natural Gas Furnace	280
RTU-21A	Cafeteria	17.6	Natural Gas Furnace	284
RTU-21B	Cafeteria	17.6	Natural Gas Furnace	284
RTU-21C	Cafeteria	17.6	Natural Gas Furnace	284
RTU-22	Kitchen	7.7	Natural Gas Furnace	96
RTU-23	Teachers' Lounge	3.0	Natural Gas Furnace	96
RTU-8	Media Center Desk	7.7	Natural Gas Furnace	96
RTU-7	Media Center	7.7	Natural Gas Furnace	96
RTU-9	Media Center Classrooms	17.6	Natural Gas Furnace	203
RTU-20	Gym Lobby	10.0	Natural Gas Furnace	200

Refer to Appendix A for detailed information about each unit.

Packaged RTU

Air Handling Units (AHUs)

Most of the hallways in the building are conditioned by dedicated packaged air-handling units which are equipped with a supply fan and hot water coils. These units are listed below:

Unit	Area Served	SF Rating (HP)
RTU-1	B wing Exit	0.5
RTU-11	C wing hallway	0.5
RTU-26	E wing hallway	0.5
RTU-2	B wing hallway	0.5
RTU-24	D wing hallway	1.5
RTU-25	A wing hallway	1.5
RTU-3	C wing hallway exit	1.5
RTU-4	C wing hallway	1.5
RTU-5	A wing hallway	1.5
RTU-6	A wing hallway	1.5

Most offices, classrooms, and other small areas are served by fan-coil units equipped with chilled water coils for cooling and hot water coils for heating. These units are located above the ceiling and were inaccessible during the audit. The supply fan motors for all these units are estimated to be fractional horsepower fan motors. The cooling is provided by the chiller plant and the heating source is provided by the hot water boilers. There are approximately 95 fan coil units throughout the building.

Refer to Appendix A for detailed information about each unit.

Rooftop AHU

Rooftop AHU

Fan-Coil Unit

Unitary Electric HVAC Equipment

There are various areas throughout the building that are conditioned by unitary electric HVAC equipment. These include split air conditioning (AC) systems in the ROTC office, prep lab, and server room. Classrooms E2 and E6 and the teachers' lounge are served by window AC units. These are all standard efficiency units that are nearing their end of useful life. Cooling capacities range between 1 ton and 5 tons with energy efficiency ratings (EER) ranging between 11 EER and 10.8 EER. These systems are mainly controlled by remote control units located within the space.

Split System AC Condensing Unit

Window AC Unit

Unitary Heating Equipment

The kitchen is served by a make-up air unit with a built-in natural gas furnace to serve its heating load. The main electric room is served by a 3.3 kW electric resistance heater to serve its heating load. Many areas inside the building also have radiators that are served by heating hot water. All equipment is in fair condition.

2.6 Heating Hot Water Systems

Two Smith 8,024 MBh hot water boilers serve the building heating load. The burners are modulating and are each equipped with a constant speed 10-hp combustion air fan. Each boiler has a nominal efficiency of 80 percent. The boilers are configured in a lead-lag control scheme. Both boilers are required under high load conditions. Installed in 2007, they are in good condition.

The hydronic distribution system is a 4-pipe heating and cooling system.

The boilers are configured in a constant flow primary distribution with two 20 hp constant speed hot water pumps operating with a lead-lag control scheme. The boilers provide hot water to radiators, fan coil units, makeup air unit, and air handling units throughout the building.

Hot Water Boilers

2.7 Chilled Water Systems

The chiller plant consists of two, 250-ton, Trane air-cooled screw chillers. The chillers are configured in a primary only distribution loop with two 60-hp constant flow chilled water pumps.

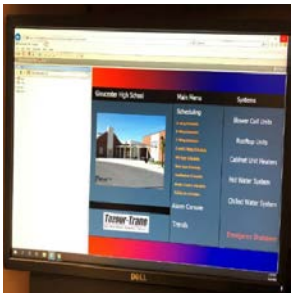
The chiller plant supplies chilled water to all fan coil units throughout the building and is controlled by the building energy management system (EMS).

The chiller plant is old but is well maintained.

Air-Cooled Chillers

2.8 Building Energy Management Systems (EMS)

A Tozour-Trane EMS controls the HVAC equipment, boilers, chillers, air handlers, and package units. The EMS provides equipment scheduling control and monitors and controls space temperatures, supply air temperatures, humidity, heating water loop temperatures, and chilled water loop temperatures.



EMS Screenshot

2.9 Domestic Hot Water

Hot water is produced by an 80-gallon, 399.9 MBh gas-fired storage water heater with an 80% efficiency rating, and two, 100 gallon 199.9 MBH gas-fired storage water heaters with 80% efficiency ratings.

The domestic hot water pipes are insulated except for a part of the piping above a heater that was left uninsulated. The insulation is in good condition.

DHW Heater in Mechanical Room

DHW Heaters near Locker Rooms

2.10 Food Service Equipment

The kitchen has a mix of gas and electric equipment that is used to prepare breakfast and lunch for students and staff. Most cooking is done using a conventional gas-fired oven. Bulk prepared foods are held in several electric holding cabinets. Equipment is not high efficiency and is in good condition.

Visit https://www.energystar.gov/products/commercial_food_service_equipment for the latest information on high efficiency food service equipment.

Food Holding Cabinet

Gas-Fired Ovens

2.11 Refrigeration

The kitchen has several stand-up refrigerators with either solid or glass doors and two reach-in coolers. There are also two freezer chests. All equipment is standard and in good condition.

The two walk-in coolers have an estimated 0.5-ton and 1-ton compressor, respectively. The 1-ton (approx.) cooler has two 1/15 hp fan evaporators and the 0.5-ton cooler has one 1/15 hp fan evaporator. These units do not appear to have any controls.

The walk-in medium temperature freezer has an approximate 2-ton compressor and five 1/15 hp fan evaporators. This unit has a 1,000-Watt defrost heater. This unit does not appear to have any controls.

Visit https://www.energystar.gov/products/commercial_food_service_equipment for the latest information on high efficiency food service equipment.

Solid Door Refrigerator

Glass-Door Refrigerator

Walk-In Cooler

Walk-In Medium-Temperature Freezer

2.12 Plug Load & Vending Machines

The location is doing a great job managing their electrical plug loads. This report makes additional suggestions for ECMs in this area as well as Energy Efficient Best Practices.

There are 135 computer workstations throughout the facility. Plug loads throughout the building include general café and office equipment. There are classroom typical loads such as projectors, printers, and fans.

There are several residential-style refrigerators throughout the building that are used to store perishables. These vary in condition and efficiency.

There is a single refrigerated glass-fronted vending machine and one non-refrigerated vending machines. Vending machines are not equipped with occupancy-based controls.

Computers

Vending Machines

Television

Photocopier

2.13 Water-Using Systems

There are 25 restrooms with toilets, urinals, and sinks. Faucet flow rates are either 0.5 gallons per minute (gpm) or 2.2 gpm.

2.14 On-Site Generation

Gloucester City High School has an 880-kW photovoltaic (PV) array with 2,976 panels that was installed in 2019.

Gloucester City High School has a diesel-fired emergency generator that is used in the event of a power outage, and serves critical services (lighting, elevator, heating - boiler and pumps); and is only used for emergency needs.

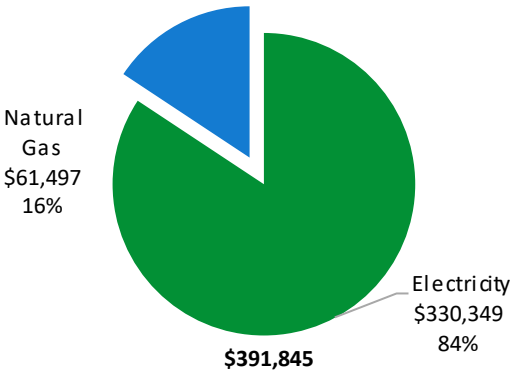
Solar Array Above Parking Lot

Diesel Generator

3 Energy Use and Costs

Twelve months of utility billing data are used to develop annual energy consumption and cost data. This information creates a profile of the annual energy consumption and energy costs.

Utility Summary		
Fuel	**Usage**	**Cost**
Electricity	2,587,586 kWh	$330,349
Natural Gas	74,096 Therms	$61,497
Total		**$391,845**



An energy balance identifies and quantifies energy use in your various building systems. This can highlight areas with the most potential for improvement. This energy balance was developed using calculated energy use for each of the end uses noted in the figure.

The energy auditor collects information regarding equipment operating hours, capacity, efficiency, and other operational parameters from facility staff, drawings, and on-site observations. This information is used as the inputs to calculate the existing conditions energy use for the site. The calculated energy use is then compared to the historical energy use and the initial inputs are revised, as necessary, to balance the calculated energy use to the historical energy use.

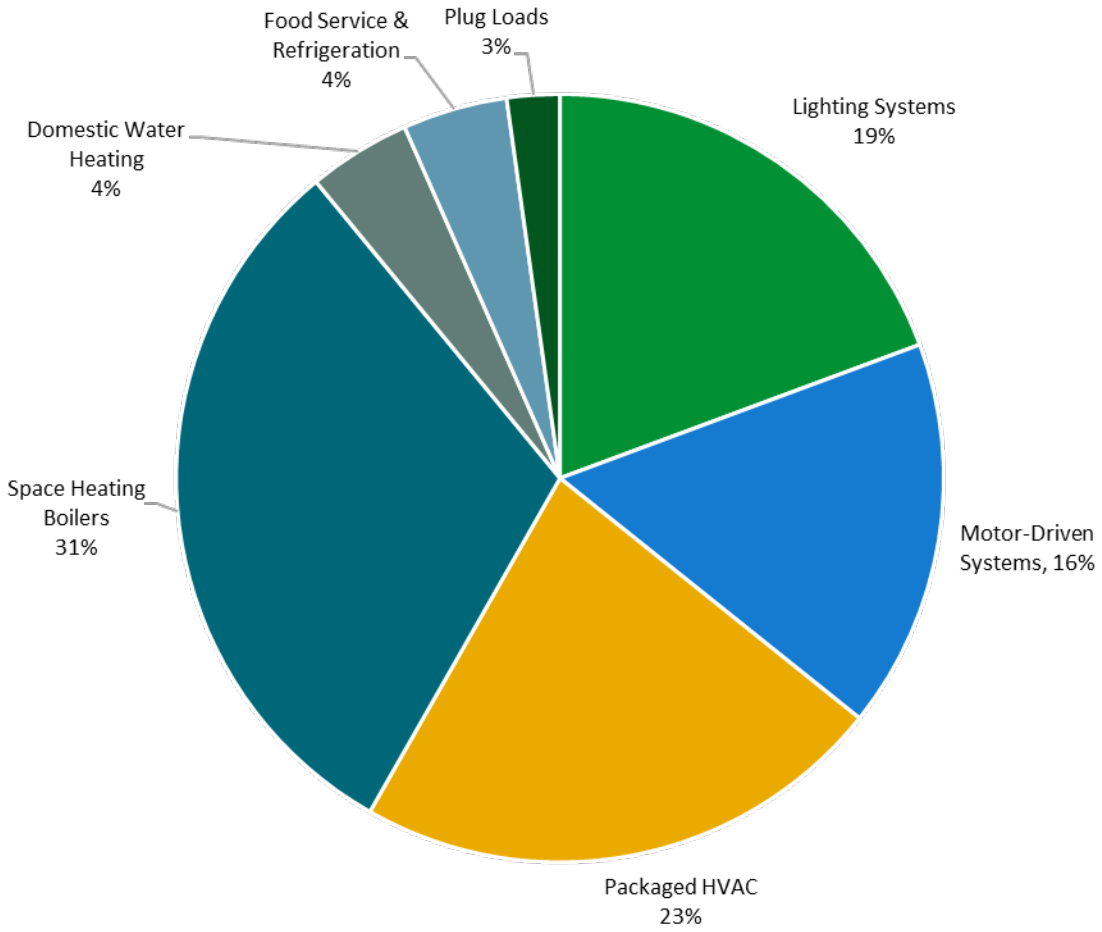
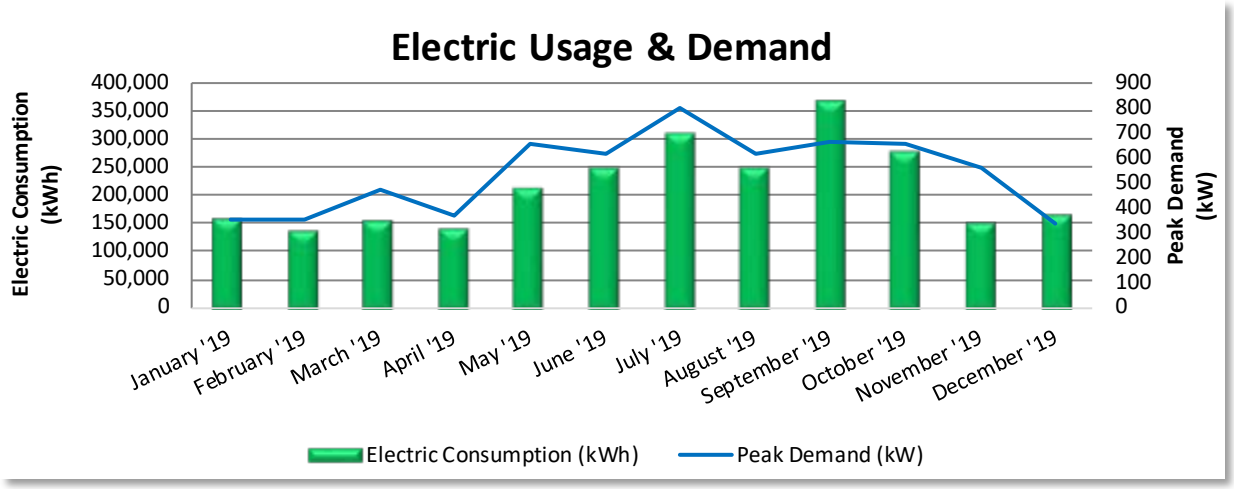


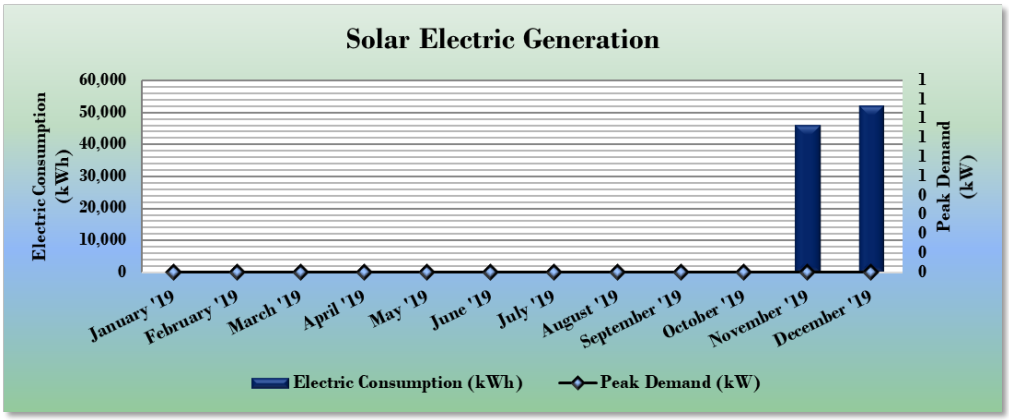
Figure 5 - Energy Balance

3.1 Electricity

PSE&G delivers electricity under rate class Large Power & Lighting (LPLS), with electric production provided by Plymouth Rock Energy, a third-party supplier.



Electric Billing Data					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
1/30/19	30	158,892	351	$1,317	$18,425
3/1/19	30	138,781	352	$1,319	$18,089
4/1/19	31	155,978	473	$1,774	$18,798
5/1/19	30	143,913	368	$1,378	$17,889
5/31/19	30	214,442	657	$2,461	$26,718
6/28/19	28	250,705	617	$7,811	$35,346
7/31/19	33	311,369	797	$10,099	$42,226
8/29/19	29	249,567	615	$7,791	$32,522
9/30/19	32	364,823	668	$8,465	$40,562
10/29/19	29	277,809	654	$5,720	$35,050
11/27/19	29	154,476	557	$2,096	$22,065
12/31/19	34	166,831	339	$1,275	$22,658
Totals	**365**	**2,587,586**	**797**	**$51,507**	**$330,349**
Annual	**365**	**2,587,586**	**797**	**$51,507**	**$330,349**

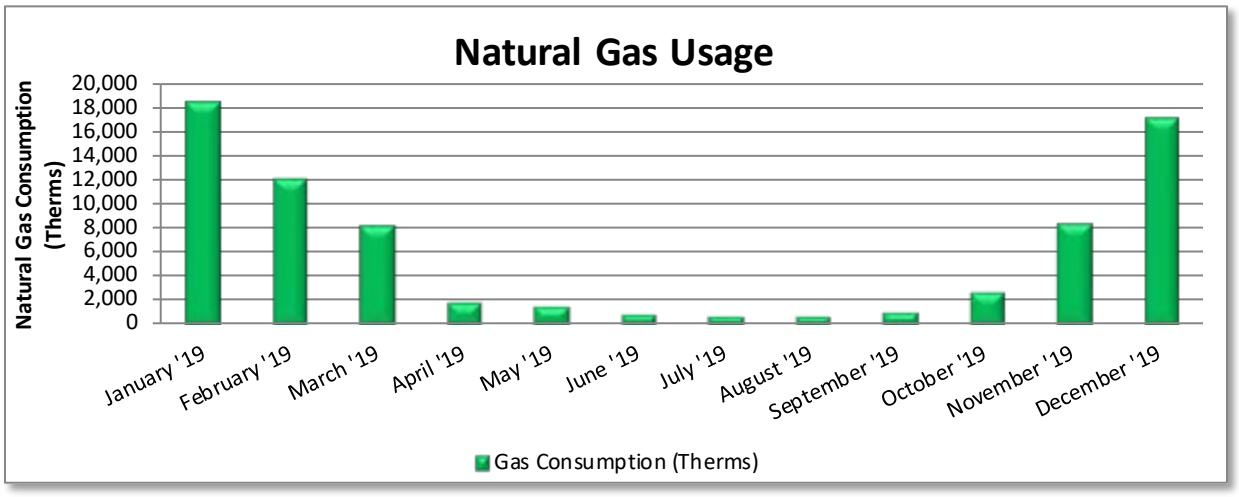


Notes:

- Peak demand of 797 kW occurred in July 2019.
- Average demand over the past 12 months was 537 kW.
- The average electric cost over the past 12 months was $0.128/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges. This report uses this blended rate to estimate energy cost savings.
- On-site generation is through a PPA and the site purchases the generated electricity from Conductive Power. The solar panels were installed in late 2019. Some of the electricity generated on-site is used on-site and the remainder is exported to the grid.

3.2 Natural Gas

PSE&G delivers natural gas under rate class LVG & HTG, with natural gas supply provided by East Coast Power, a third-party supplier.



Gas Billing Data			
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**
2/6/19	28	18,476	$16,227
3/8/19	30	12,018	$10,317
4/9/19	32	8,325	$5,308
5/9/19	30	1,911	$1,409
6/10/19	32	1,587	$1,194
7/10/19	30	821	$762
8/7/19	28	766	$701
9/6/19	30	820	$717
10/7/19	31	1,064	$866
11/5/19	29	2,732	$3,382
12/6/19	31	8,356	$7,072
1/8/20	33	17,016	$13,373
Totals	**364**	**73,893**	**$61,328**
Annual	**365**	**74,096**	**$61,497**

Notes:

- The average gas cost for the past 12 months is $0.830/therm, which is the blended rate used throughout the analysis.

3.3 Benchmarking

Your building was benchmarked using the United States Environmental Protection Agency's (EPA) *Portfolio Manager®* software. Benchmarking compares your building's energy use to that of similar buildings across the country, while neutralizing variations due to location, occupancy and operating hours. Some building types can be scored with a 1-100 ranking of a building's energy performance relative to the national building market. A score of 50 represents the national average and a score of 100 is best.

This ENERGY STAR® benchmarking score provides a comprehensive snapshot of your building's energy performance. It assesses the building's physical assets, operations, and occupant behavior, which is compiled into a quick and easy-to-understand score.

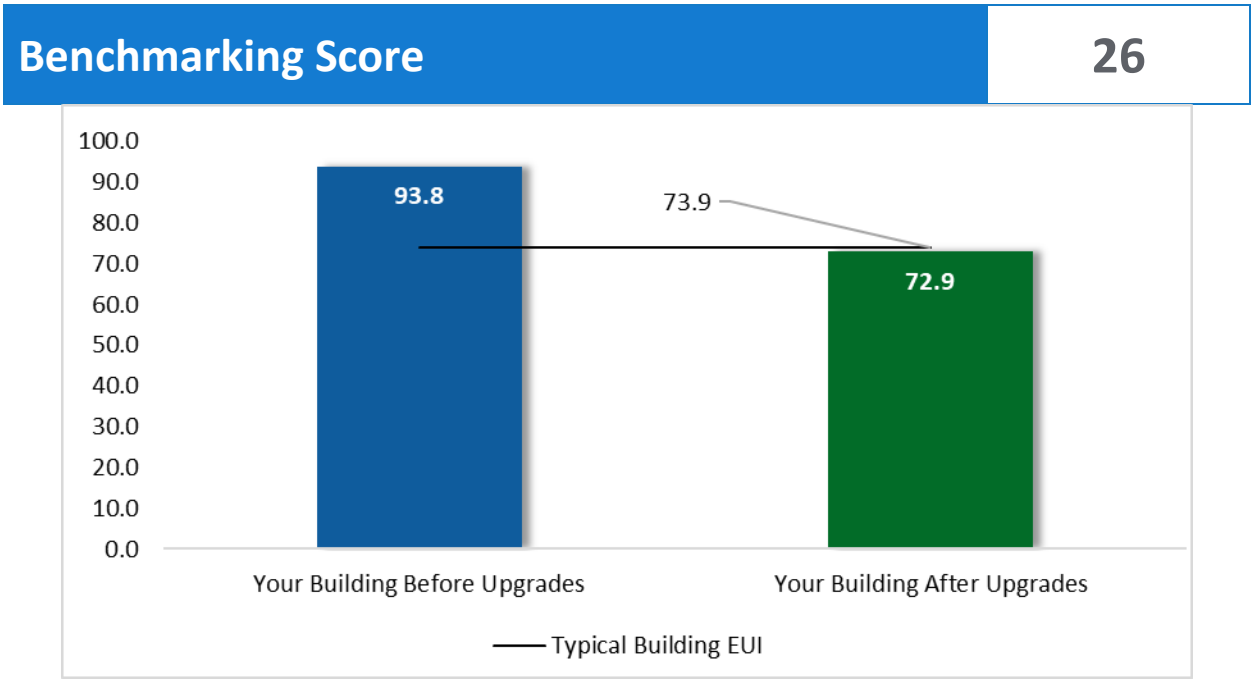


Figure 6 - Energy Use Intensity Comparison[3]

This building performs at, or below the national average. This report contains suggestions about how to improve building performance and reduce energy costs.

Energy use intensity (EUI) measures energy consumption per square foot and is the standard metric for comparing buildings' energy performance. A lower EUI means better performance and less energy consumed. A number of factors can cause a building to vary from the "typical" energy usage. Local weather conditions, building age and insulation levels, equipment efficiency, daily occupancy hours, changes in occupancy throughout the year, equipment operating hours, and occupant behavior all contribute to a building's energy use and the benchmarking score.

[3] Based on all evaluated ECMs

Tracking Your Energy Performance

Keeping track of your energy use on a monthly basis is one of the best ways to keep energy costs in check. Update your utility information in Portfolio Manager® regularly, so that you can keep track of your building's performance.

We have created a Portfolio Manager® account for your facility and we have already entered the monthly utility data shown above for you. Account login information for your account will be sent via email.

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.

For more information on ENERGY STAR® and Portfolio Manager®, visit their website[4].

[4] https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

4 Energy Conservation Measures

The goal of this audit report is to identify and evaluate potential energy efficiency improvements, provide information about the cost effectiveness of those improvements, and recognize potential financial incentives from NJBPU. Most energy conservation measures have received preliminary analysis of feasibility which identifies expected ranges of savings and costs. This level of analysis is typically sufficient to demonstrate project cost-effectiveness and help prioritize energy measures.

Calculations of energy use and savings are based on the current version of the *New Jersey's Clean Energy Program Protocols to Measure Resource Savings*, which is approved by the NJBPU. Further analysis or investigation may be required to calculate more precise savings based on specific circumstances.

Operation and maintenance costs for the proposed new equipment will generally be lower than the current costs for the existing equipment—especially if the existing equipment is at or past its normal useful life. We have conservatively assumed there to be no impact on overall maintenance costs over the life of the equipment.

Financial incentives are based on the current NJCEP prescriptive SmartStart program. A higher level of investigation may be necessary to support any SmartStart Custom, Pay for Performance, or Direct Install incentive applications. Some measures and proposed upgrades may be eligible for higher incentives than those shown below through other NJCEP programs described in a following section of this report.

For a detailed list of the locations and recommended energy conservation measures for all inventoried equipment, see **Appendix A: Equipment Inventory & Recommendations.**

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**499,683**	**70.8**	**-93**	**$63,021**	**$182,422**	**$48,632**	**$133,790**	**2.1**	**492,289**
ECM 1	Install LED Fixtures	Yes	136,857	13.1	-18	$17,323	$102,177	$15,580	$86,597	5.0	135,712
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	2,382	0.4	0	$300	$912	$190	$722	2.4	2,340
ECM 3	Retrofit Fixtures with LED Lamps	Yes	360,445	57.2	-75	$45,398	$79,333	$32,862	$46,471	1.0	354,237
Lighting Control Measures			**114,567**	**17.7**	**-24**	**$14,428**	**$53,662**	**$14,490**	**$39,172**	**2.7**	**112,563**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	114,567	17.7	-24	$14,428	$53,662	$14,490	$39,172	2.7	112,563
Variable Frequency Drive (VFD) Measures			**301,265**	**61.2**	**0**	**$38,462**	**$492,791**	**$32,100**	**$460,691**	**12.0**	**303,371**
ECM 5	Install VFDs on Constant Volume (CV) Fans	Yes	159,277	29.2	0	$20,334	$93,335	$22,500	$70,835	3.5	160,390
ECM 6	Install VFDs on Chilled Water Pumps	No	77,058	22.2	0	$9,838	$221,746	$0	$221,746	22.5	77,596
ECM 7	Install VFDs on Heating Water Pumps	No	42,178	3.8	0	$5,385	$167,164	$5,200	$161,964	30.1	42,473
ECM 8	Install Boiler Draft Fan VFDs	Yes	22,753	6.0	0	$2,905	$10,546	$4,400	$6,146	2.1	22,912
Unitary HVAC Measures			**63,065**	**52.6**	**73**	**$8,655**	**$365,566**	**$54,910**	**$310,657**	**35.9**	**72,016**
ECM 9	Install High Efficiency Air Conditioning Units	No	63,065	52.6	73	$8,655	$365,566	$54,910	$310,657	35.9	72,016
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**21**	**$174**	**$7,587**	**$1,000**	**$6,587**	**37.9**	**2,450**
ECM 10	Install High Efficiency Furnaces	No	0	0.0	21	$174	$7,587	$1,000	$6,587	37.9	2,450
HVAC System Improvements			**56,369**	**0.0**	**44**	**$7,561**	**$35,437**	**$56**	**$35,381**	**4.7**	**61,900**
ECM 11	Implement Demand Control Ventilation (DCV)	Yes	56,369	0.0	36	$7,496	$35,345	$0	$35,345	4.7	60,990
ECM 12	Install Pipe Insulation	Yes	0	0.0	8	$65	$92	$56	$36	0.6	910
Domestic Water Heating Upgrade			**0**	**0.0**	**123**	**$1,025**	**$26,493**	**$3,243**	**$23,249**	**22.7**	**14,457**
ECM 13	Install High Efficiency Gas-Fired Water Heater	No	0	0.0	67	$552	$26,048	$2,799	$23,249	42.1	7,791
ECM 14	Install Low-Flow DHW Devices	Yes	0	0.0	57	$473	$445	$445	$0	0.0	6,666
Food Service & Refrigeration Measures			**6,612**	**0.5**	**0**	**$844**	**$7,908**	**$1,190**	**$6,718**	**8.0**	**6,659**
ECM 15	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	2,097	0.3	0	$268	$2,426	$640	$1,786	6.7	2,112
ECM 16	Refrigeration Controls	No	2,964	0.1	0	$378	$5,022	$450	$4,572	12.1	2,985
ECM 17	Vending Machine Control	Yes	1,551	0.2	0	$198	$460	$100	$360	1.8	1,562
TOTALS			**1,041,562**	**202.7**	**144**	**$134,168**	**$1,171,866**	**$155,621**	**$1,016,246**	**7.6**	**1,065,705**

* - All incentives presented in this table are based on NJ SmartStart 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).

Figure 7 – All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**499,683**	**70.8**	**-93**	**$63,021**	**$182,422**	**$48,632**	**$133,790**	**2.1**	**492,289**
ECM 1	Install LED Fixtures	136,857	13.1	-18	$17,323	$102,177	$15,580	$86,597	5.0	135,712
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	2,382	0.4	0	$300	$912	$190	$722	2.4	2,340
ECM 3	Retrofit Fixtures with LED Lamps	360,445	57.2	-75	$45,398	$79,333	$32,862	$46,471	1.0	354,237
Lighting Control Measures		**114,567**	**17.7**	**-24**	**$14,428**	**$53,662**	**$14,490**	**$39,172**	**2.7**	**112,563**
ECM 4	Install Occupancy Sensor Lighting Controls	114,567	17.7	-24	$14,428	$53,662	$14,490	$39,172	2.7	112,563
Variable Frequency Drive (VFD) Measures		**182,029**	**35.2**	**0**	**$23,239**	**$103,881**	**$26,900**	**$76,981**	**3.3**	**183,302**
ECM 5	Install VFDs on Constant Volume (CV) Fans	159,277	29.2	0	$20,334	$93,335	$22,500	$70,835	3.5	160,390
ECM 8	Install Boiler Draft Fan VFDs	22,753	6.0	0	$2,905	$10,546	$4,400	$6,146	2.1	22,912
HVAC System Improvements		**56,369**	**0.0**	**44**	**$7,561**	**$35,437**	**$56**	**$35,381**	**4.7**	**61,900**
ECM 11	Implement Demand Control Ventilation (DCV)	56,369	0.0	36	$7,496	$35,345	$0	$35,345	4.7	60,990
ECM 12	Install Pipe Insulation	0	0.0	8	$65	$92	$56	$36	0.6	910
Domestic Water Heating Upgrade		**0**	**0.0**	**57**	**$473**	**$445**	**$445**	**$0**	**0.0**	**6,666**
ECM 14	Install Low-Flow DHW Devices	0	0.0	57	$473	$445	$445	$0	0.0	6,666
Food Service & Refrigeration Measures		**3,648**	**0.4**	**0**	**$466**	**$2,886**	**$740**	**$2,146**	**4.6**	**3,674**
ECM 15	Refrigerator/Freezer Case Electrically Commutated Motors	2,097	0.3	0	$268	$2,426	$640	$1,786	6.7	2,112
ECM 17	Vending Machine Control	1,551	0.2	0	$198	$460	$100	$360	1.8	1,562
TOTALS		**856,298**	**124.1**	**-16**	**$109,187**	**$378,733**	**$91,263**	**$287,471**	**2.6**	**860,395**

* - All incentives presented in this table are based on NJ SmartStart 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).

Figure 8 – Cost Effective ECMs

4.1 Lighting

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**499,683**	**70.8**	**-93**	**$63,021**	**$182,422**	**$48,632**	**$133,790**	**2.1**	**492,289**
ECM 1	Install LED Fixtures	136,857	13.1	-18	$17,323	$102,177	$15,580	$86,597	5.0	135,712
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	2,382	0.4	0	$300	$912	$190	$722	2.4	2,340
ECM 3	Retrofit Fixtures with LED Lamps	360,445	57.2	-75	$45,398	$79,333	$32,862	$46,471	1.0	354,237

When considering lighting upgrades, we suggest using a comprehensive design approach that simultaneously upgrades lighting fixtures and controls to maximize energy savings and improve occupant lighting. Comprehensive design will also consider appropriate lighting levels for different space types to make sure that the right amount of light is delivered where needed. If conversion to LED light sources are proposed, we suggest converting all of a specific lighting type (e.g., linear fluorescent) to LED lamps to minimize the number of lamp types in use at the facility, which should help reduce future maintenance costs.

ECM 1: Install LED Fixtures

Replace existing fixtures containing high intensity discharge (HID) lamps with new LED light fixtures. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

In some cases, HID fixtures can be retrofit with screw-based LED lamps. Replacing an existing HID fixture with a new LED fixture will generally provide better overall lighting optics; however, replacing the HID lamp with a LED screw-in lamp is typically a less expensive retrofit. We recommend you work with your lighting contractor to determine which retrofit solution is best suited to your needs and will be compatible with the existing fixtures.

Maintenance savings may also be achieved since LED lamps last longer than other light sources and therefore do not need to be replaced as often.

Affected building areas: gymnasium, exterior courtyard, football stand lighting, football field lighting, and exterior pole mounted lighting.

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Retrofit fluorescent fixtures by removing the fluorescent tubes and ballasts and replacing them with LED tubes and LED drivers (if necessary), which are designed to be used in retrofitted fluorescent fixtures.

The measure uses the existing fixture housing but replaces the electric components with more efficient lighting technology which use less power than other lighting technologies but provides equivalent lighting output. Maintenance savings may also be achieved since LED tubes last longer than fluorescent tubes and therefore do not need to be replaced as often.

Affected building areas: all areas with fluorescent fixtures with T12 tubes, including A Wing hallway, Janitorial 6, kitchen walk-in freezer, and a few restrooms.

ECM 3: Retrofit Fixtures with LED Lamps

Replace linear fluorescent (T5 & T8) lamps, U-bend fluorescent T8 lamps, halogen incandescent lamps, incandescent lamps and compact fluorescent (CFL) lamps with LED lamps. Many LED tubes are direct replacements for existing fluorescent tubes and can be installed while leaving the fluorescent fixture ballast in place. LED lamps 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. Maintenance savings may also be available, as longer-lasting LEDs lamps will not need to be replaced as often as the existing lamps.

Affected building areas: all areas with fluorescent fixtures with T8 tubes, T5 tubes, U-bend T8 fluorescent lamps, halogen incandescent lamps, incandescent lamps, and CFL lamps.

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**114,567**	**17.7**	**-24**	**$14,428**	**$53,662**	**$14,490**	**$39,172**	**2.7**	**112,563**
ECM 4	Install Occupancy Sensor Lighting Controls	114,567	17.7	-24	$14,428	$53,662	$14,490	$39,172	2.7	112,563

Lighting controls reduce energy use by turning off or lowering lighting fixture power levels when not in use. A comprehensive approach to lighting design should upgrade the lighting fixtures and the controls together for maximum energy savings and improved lighting for occupants.

ECM 4: Install Occupancy Sensor Lighting Controls

Install occupancy sensors to control lighting fixtures in areas that are frequently unoccupied, even for short periods. For most spaces, we recommend that lighting controls use dual technology sensors, which reduce the possibility of lights turning off unexpectedly.

Occupancy sensors detect occupancy using ultrasonic and/or infrared sensors. When an occupant enters the space, the lighting fixtures switch to full lighting levels. Most occupancy sensor lighting controls allow users to manually turn fixtures on/off, as needed. Some controls can also provide dimming options.

Occupancy sensors can be mounted on the wall at existing switch locations, mounted on the ceiling, or in remote locations. In general, wall switch replacement sensors are best suited to single occupant offices and other small rooms. Ceiling-mounted or remote mounted sensors are used in large spaces, locations without local switching, and where wall switches are not in the line-of-sight of the main work area.

This measure provides energy savings by reducing the lighting operating hours.

Affected building areas: classrooms, offices, conference rooms, copy room, dining area, gymnasium, library, janitorial, kitchen, music room, locker rooms, lounges, restrooms, storage rooms, and theatre.

4.3 Variable Frequency Drives (VFD)

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**301,265**	**61.2**	**0**	**$38,462**	**$492,791**	**$32,100**	**$460,691**	**12.0**	**303,371**
ECM 5	Install VFDs on Constant Volume (CV) Fans	159,277	29.2	0	$20,334	$93,335	$22,500	$70,835	3.5	160,390
ECM 6	Install VFDs on Chilled Water Pumps	77,058	22.2	0	$9,838	$221,746	$0	$221,746	22.5	77,596
ECM 7	Install VFDs on Heating Water Pumps	42,178	3.8	0	$5,385	$167,164	$5,200	$161,964	30.1	42,473
ECM 8	Install Boiler Draft Fan VFDs	22,753	6.0	0	$2,905	$10,546	$4,400	$6,146	2.1	22,912

Variable frequency drives control motors for fans, pumps, and process equipment based on the actual output required of the driven equipment. Energy savings result from more efficient control of motor energy usage when equipment operates at partial load. The magnitude of energy savings depends on the estimated amount of time that the motor would operate at partial load. For equipment with proposed VFDs, we have included replacing the controlled motor with a new inverter duty rated motor to conservatively account for the cost of an inverter duty rated motor.

ECM 5: Install VFDs on Constant Volume (CV) Fans

Install VFDs to control constant volume fan motor speeds. This converts a constant-volume, single-zone air handling system into a variable-air-volume (VAV) system. 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 signal the VFD to adjust fan speed to maintain the appropriate temperature in the zone, while maintaining a constant supply air temperature.

For air handlers with direct expansion (DX) cooling systems, the minimum air flow across the cooling coil required to prevent the coil from freezing must be determined during the final project design. The control system programming should maintain the minimum air flow whenever the compressor is operating. Prior to implementation, verify minimum fan speed in cooling mode with the manufacturer. Note that savings will vary depending on the operating characteristics of each AHU.

Energy savings result from reducing the fan speed (and power) when conditions allow for reduced air flow.

Affected air handlers: 23 RTUs including RTU-10 auditorium, RTU-12 old gym boys side, RTU-13 old gym girls side, RTU-14 and 15 new gym, RTU-16 both locker rooms for new gym, RTU-18 boys locker room old gym, RTU-19 girls locker room, RTU-21A Cafeteria, RTU-21B Cafeteria, RTU-21C Cafeteria, RTU-22 kitchen, RTU-23 teachers' lounge, RTU-24 D wing hallway, RTU-25 A wing hallway, RTU-3 C wing hallway exit, RTU-4 C wing hallway, RTU-5 A wing hallway, RTU-6 A wing hallway, RTU-8 media center desk, RTU-7 Media center, RTU-9 Media center classrooms, and RTU-20.

ECM 6: Install VFDs on Chilled Water Pumps

We evaluated installing VFDs to control chilled water pumps. Two-way valves must serve the chilled water coils being served and the chilled water loop must have a differential pressure sensor installed. If three-way valves or a bypass leg are used in the chilled water distribution they will need to be modified when this measure is implemented. As the chilled water valves close, the differential pressure increases, and the VFD modulates the pump speed to maintain a differential pressure setpoint.

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

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

Affected pumps: CHW pumps.

ECM 7: Install VFDs on Heating Water Pumps

We evaluated installing variable frequency drives (VFD) to control heating water pumps. Two-way valves must serve the hot water coils and the hot water loop must have a differential pressure sensor installed. If three-way valves or a bypass leg are used in the hot water distribution they will need to be modified when this measure is implemented. As the hot water valves close, the differential pressure increases and the VFD modulates the pump speed to maintain a differential pressure setpoint.

Energy savings result 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.

Affected pumps: HHW pumps.

ECM 8: Install Boiler Draft Fan VFDs

Replace existing volume control devices on boiler draft fans, such as inlet vanes or dampers, with VFDs. Inlet vanes or dampers are an inefficient means of controlling the air volume compared to VFDs. The existing volume control device will be removed or permanently disabled, and the control signal will be redirected to the VFD to determine proper fan motor speed.

Energy savings result from reducing the draft fan speed (and power) when conditions allow for reduced combustion air flow.

Additional maintenance savings may result from this measure. VFDs are solid state electronic devices, which generally requires less maintenance than mechanical air volume control devices.

4.4 Unitary HVAC

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Unitary HVAC Measures		**63,065**	**52.6**	**73**	**$8,655**	**$365,566**	**$54,910**	**$310,657**	**35.9**	**72,016**
ECM 9	Install High Efficiency Air Conditioning Units	63,065	52.6	73	$8,655	$365,566	$54,910	$310,657	35.9	72,016

Replacing the unitary HVAC units has a long payback period and may not be justifiable based simply on energy considerations. However, most of the units at this facility are nearing or have reached the end of their normal useful life. Typically, the marginal cost of purchasing a high efficiency unit can be justified by the marginal savings from the improved efficiency. When the packaged RTUs and split system AC units are eventually replaced, consider purchasing equipment that exceeds the minimum efficiency required by building codes.

ECM 9: Install High Efficiency Air Conditioning Units

We evaluated replacing standard efficiency packaged air conditioning units and split system air conditioning units with high efficiency units. Some of the replacement units will incorporate efficient gas furnaces. 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 and heating load and the estimated annual operating hours.

Affected units: all RTUs and split system AC units that have reached the end of its useful life.

4.5 Gas-Fired Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**21**	**$174**	**$7,587**	**$1,000**	**$6,587**	**37.9**	**2,450**
ECM 10	Install High Efficiency Furnaces	0	0.0	21	$174	$7,587	$1,000	$6,587	37.9	2,450

ECM 10: Install High Efficiency Furnaces

We evaluated replacing 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.

Note: these units produce acidic condensate that requires proper drainage.

Affected units: MAU-1 (kitchen).

4.6 HVAC Improvements

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
HVAC System Improvements		**56,369**	**0.0**	**44**	**$7,561**	**$35,437**	**$56**	**$35,381**	**4.7**	**61,900**
ECM 11	Implement Demand Control Ventilation (DCV)	56,369	0.0	36	$7,496	$35,345	$0	$35,345	4.7	60,990
ECM 12	Install Pipe Insulation	0	0.0	8	$65	$92	$56	$36	0.6	910

ECM 11: Implement Demand Control Ventilation (DCV)

Demand control ventilation (DCV) monitors the indoor air's carbon dioxide (CO_2) content to measure room occupancy. This data is used to regulate the amount of outdoor air provided to the space for ventilation.

Standard ventilation systems often provide outside air based on a space's estimated maximum occupancy but not actual occupancy. During low occupancy periods, the space may then be over ventilated. This wastes energy through heating and cooling the excess outside air flow. DCV reduces unnecessary outdoor air intake by regulating ventilation based on actual occupancy levels. DCV is most suited for facilities where occupancy levels vary significantly from hour to hour and day to day.

Energy savings associated with DCV are based on hours of operation, space occupancy, outside air reduction, and other factors. Energy savings results from eliminating unnecessary ventilation and space conditioning.

Affected building areas: RTU-11 & 12 - old gym boys & girls, RTU-14 and 15 new gym, RTU-16 both locker rooms for new gym, RTU-18 boys locker room old gym, RTU-19 girls locker room , CU-17/RTU17 - gym foyer, CU-20/RTU20 - gym foyer, RTU-7 & 8 - media center, RTU-23 teachers' lounge and RTU-22 kitchen.

ECM 12: Install Pipe Insulation

Install insulation on heating water and domestic hot water system piping. Distribution system losses are dependent on system fluid temperature, the size of the distribution system, and the level of insulation of the piping. Significant energy savings can be achieved when insulation has not been well maintained. When the insulation is exposed to water, when the insulation has been removed from some areas of the pipe, or when valves have not been properly insulated system efficiency can be significantly reduced. This measure saves energy by reducing heat transfer in the distribution system.

Affected Systems: hot water piping on roof next to an RTU and domestic hot water piping above the DHW heater in the mechanical room.

4.7 Domestic Water Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**123**	**$1,025**	**$26,493**	**$3,243**	**$23,249**	**22.7**	**14,457**
ECM 13	Install High Efficiency Gas-Fired Water Heater	0	0.0	67	$552	$26,048	$2,799	$23,249	42.1	7,791
ECM 14	Install Low-Flow DHW Devices	0	0.0	57	$473	$445	$445	$0	0.0	6,666

ECM 13: Install High Efficiency Gas-Fired Water Heater

We evaluated replacing the existing tank water heater with a high efficiency condensing tank water heater. Energy savings result from the increased efficiency of the unit, which uses less gas to heat water, and fewer operating hours to maintain the tank water temperature.

Affected Systems: DHW heaters in Storage G7 serving gym locker rooms

ECM 14: Install Low-Flow DHW Devices

Install low-flow devices to reduce overall hot water demand. The following low flow devices are recommended to reduce hot water usage:

Device	Flow Rate
Faucet aerators (lavatory)	0.5 gpm
Faucet aerator (kitchen)	1.5 gpm
Showerhead	2.0 gpm
Pre-rinse spray valve (kitchen)	1.28 gpm

Low-flow devices reduce the overall water flow from the fixture, while still providing adequate pressure for washing.

Additional cost savings may result from reduced water usage.

4.8 Food Service & Refrigeration Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Food Service & Refrigeration Measures		**6,612**	**0.5**	**0**	**$844**	**$7,908**	**$1,190**	**$6,718**	**8.0**	**6,659**
ECM 15	Refrigerator/Freezer Case Electrically Commutated Motors	2,097	0.3	0	$268	$2,426	$640	$1,786	6.7	2,112
ECM 16	Refrigeration Controls	2,964	0.1	0	$378	$5,022	$450	$4,572	12.1	2,985
ECM 17	Vending Machine Control	1,551	0.2	0	$198	$460	$100	$360	1.8	1,562

ECM 15: Refrigerator/Freezer Case Electrically Commutated Motors

Replace shaded pole or permanent split capacitor (PSC) motors with electronically commutated (EC) motors in walk-in coolers and freezers. Fractional horsepower EC motors are significantly more efficient than mechanically commutated, brushed motors, particularly at low speeds or partial load. By using variable-speed technology, EC motors can optimize fan usage. Because these motors are brushless and use DC power, losses due to friction and phase shifting are eliminated.

Savings for this measure consider both the increased efficiency of the motor as well as the reduction in refrigeration load due to motor heat loss.

ECM 16: Refrigeration Controls

We evaluated installing additional controls to optimize the operation of walk-in coolers and freezers.

Many walk-in coolers and freezers have evaporator fans that run continuously. The measure adds a control system feature to automatically shut off evaporator fans when not needed.

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

ECM 17: Vending Machine Control

Vending machines operate continuously, even during unoccupied hours. Install occupancy sensor controls to reduce energy use. These controls power down vending machines when the vending machine area has been vacant for some time, and they power up the machines at necessary regular intervals or when the surrounding area is occupied. Energy savings are dependent on the vending machine and activity level in the area surrounding the machines.

4.9 Measures for Future Consideration

There are additional opportunities for improvement that Gloucester City Public Schools may wish to consider. These potential upgrades typically require further analysis, involve substantial capital investment and/or include significant system reconfiguration. These measures are therefore beyond the scope of this energy audit. These measures are described here to support a whole building approach to energy efficiency and sustainability.

Gloucester City Public Schools may wish to consider the Energy Savings Improvement Program (ESIP) or other whole building approach. With interest in implementing comprehensive, largescale and/or complex system wide projects, these measures may be pursued during development of a future energy savings plan. We recommend that you work with your energy service company (ESCO) and/or design team to:

- evaluate these measures further
- develop firm costs
- determine measure savings
- prepare detailed implementation plans.

Other modernization or capital improvement funds may be leveraged for these types of refurbishments. As you plan for capital upgrades, be sure to consider the energy impact of the building systems and controls being specified.

Retro-Commissioning Study

Due to the complexity of today's HVAC systems and controls a thorough analysis and rebalance of heating, ventilation, and cooling systems should periodically be conducted. There are indications at this site that systems may be not be operating correctly or as efficiently as they could be. One important tool available to building operators to ensure proper system operation is retro-commissioning.

Retro-commissioning is a common practice recommended by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) to be implemented every few years. We recommend that you contact a reputable engineering firm that specializes in energy control systems and retro-commissioning. Ask them to propose a scope of work and an outline of the procedures and processes to be implemented, including a schedule and the roles of all responsible parties.

Once goals and responsibilities are established, the objective of the investigation process is to understand how the building is currently operating, identify the issues, and determine the most cost-effective way to improve performance. The retro-commissioning agent will review building documentation, interview building occupants, and inspect and test the equipment. Information is then compiled into a report and shared with facility staff, who will select which recommendations to implement after reviewing the findings.

The implementation phase puts the selected processes into place. Typical measures may include sensor calibration, equipment schedule changes, damper linkage repair and similar relatively low-cost adjustments – although more expensive sophisticated programming and building control system upgrades may be warranted. Approved measures may be implemented by the agent, the building staff, or by subcontractors. Typically, a combination of these individuals makes up the retro-commissioning team.

After the approved measures are implemented, the team will verify that the changes are working as expected. Baseline and post-case measurements will allow building staff to monitor equipment and ensure that the benefits are maintained.

Replace Smooth V-Belts with Notched or Synchronous Belts

This measure is for the replacement of smooth V-belts in non-residential package and split HVAC systems with notched V-belts or for the installation of new equipment with synchronous belts instead of smooth V-belts. Typically, there is a V-belt between the motor and the supply air fan and/or return air fan in larger package and split HVAC systems.

In general, there are two styles of grooved V-belts; notched and synchronous. The U.S. Department of Energy (DOE) compares these two types as follows[5]:

Characteristic	Notched V-Belts	Synchronous Belts
Description	A notched belt has grooves or notches that run perpendicular to the belt's length, which reduces the bending resistance of the belt.	They are also called cogged, timing, positive-drive, or high-torque drive belts, and are "toothed".
Pulleys/Sprockets	Can use the same pulleys as cross-section standard V-belts	Require the installation of mating grooved sprockets.
Typical Efficiency	Run cooler, last longer, and are about 2% more efficient than standard V-belts.	Operate with a consistent efficiency of 98% and maintain their efficiency over a wide load range.
Constraints	Have a sharp reduction in efficiency at high torque due to increased slippage.	Noisier than V-belts, less suited for use on shock-loaded applications, and transfer more vibration due to their stiffness.
Other Benefits	Lower cost than synchronous belts, overall.	Require minimal maintenance and re-tensioning. Operate in wet and oily environments, and run slip-free

The DOE offers the following suggested actions with respect to investigating the applicability of notched or synchronous V belts:

- Conduct a survey of belt-driven equipment. Gather application and operating-hour data. Then determine the cost effectiveness of replacing existing V-belts with notched belts or synchronous belts and sprockets.
- Consider synchronous belts for all new installations; the price premium is minimal due to the avoidance of conventional pulley costs.
- Consider having a power transmission specialist determine the energy and cost savings potential from retrofitting all V-belt drives with synchronous belts. Synchronous belts rely on tooth grip instead of friction to efficiently transfer power and provide a constant speed ratio.
- Install notched belts where the retrofit of a synchronous belt is not cost effective.

[5] https://www.nrel.gov/docs/fy13osti/56012.pdf US DOE Motor Systems Tip Sheet #5

5 Energy Efficient Best Practices

A whole building maintenance plan will extend equipment life; improve occupant comfort, health, and safety; and reduce energy and maintenance costs.

Operation and maintenance (O&M) plans enhance the operational efficiency of HVAC and other energy intensive systems and could save between 5 to 20 percent of the energy usage in your building without substantial capital investment. A successful plan includes your records of energy usage trends and costs, building equipment lists, current maintenance practices, planned capital upgrades, and incorporates your ideas for improved building operation. Your plan will address goals for energy-efficient operation, provide detail on how to reach the goals, and will outline procedures for measuring and reporting whether goals have been achieved.

You may already be doing some of these things— see our list below for potential additions to your maintenance plan. Be sure to consult with qualified equipment specialists for details on proper maintenance and system operation.

Energy Tracking with ENERGY STAR® Portfolio Manager®

You've heard it before - you can't manage what you don't measure. ENERGY STAR® Portfolio Manager® is an online tool that you can use to measure and track energy and water consumption, as well as greenhouse gas emissions[6]. Your account has already been established. Now you can continue to keep tabs on your energy performance every month.

Doors and Windows

Close exterior doors and windows in heated and cooled areas. Leaving doors and windows open leads to a loss of heat during the winter and chilled air during the summer. Reducing air changes per hour (ACH) can lead to increased occupant comfort as well as heating and cooling savings, especially when combined with proper HVAC controls and adequate ventilation.

Lighting Maintenance

Clean lamps, reflectors and lenses of dirt, dust, oil, and smoke buildup every six to twelve months. Light levels decrease over time due to lamp aging, lamp and ballast failure, and buildup of dirt and dust. Together, this can reduce total light output by up to 60% while still drawing full power.

In addition to routine cleaning, developing a maintenance schedule can ensure that maintenance is performed regularly, and it can reduce the overall cost of fixture re-lamping and re-ballasting. Group re-lamping and re-ballasting maintains lighting levels and minimizes the number of site visits by a lighting technician or contractor, decreasing the overall cost of maintenance.

[6] https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager.

Lighting Controls

As part of a lighting maintenance schedule, test lighting controls to ensure proper functioning. For occupancy sensors, this requires triggering the sensor and verifying that the sensor's timer settings are correct. For daylight and photocell sensors, maintenance involves cleaning sensor lenses and confirming that setpoints and sensitivity are configured properly. Adjust exterior lighting time clock controls seasonally as needed to match your lighting requirements.

Motor Maintenance

Motors have many moving parts. As these parts degrade over time, the efficiency of the motor is reduced. Routine maintenance prevents damage to motor components. Routine maintenance should include 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.

Thermostat Schedules and Temperature Resets

Use thermostat setback temperatures and schedules to reduce heating and cooling energy use during periods of low or no occupancy. Thermostats should be programmed for a setback of 5°F-10°F during low occupancy hours (reduce heating setpoints and increase cooling setpoints). Cooling load can be reduced by increasing the facility's occupied setpoint temperature. In general, during the cooling season, thermostats should be set as high as possible without sacrificing occupant comfort.

Economizer Maintenance

Economizers can significantly reduce cooling system load. A malfunctioning economizer can increase the amount of heating and mechanical cooling required by introducing excess amounts of cold or hot outside air. Common economizer malfunctions include broken outdoor thermostat or enthalpy control, or dampers that are stuck or improperly adjusted.

Periodic inspection and maintenance will keep economizers working in sync with the heating and cooling system. This maintenance should be part of annual system maintenance, and it 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.

Chiller Maintenance

Service chillers regularly to keep them operating properly. Chillers are responsible for a substantial portion of a commercial building's overall energy usage and when they do not work well, there is usually a noticeable increase in energy bills and increased occupant complaints. Regular diagnostics and service can save five to ten percent of the cost of operating your chiller. If you already have a maintenance contract in place, your existing service company should be able to provide these services.

AC System Evaporator/Condenser Coil Cleaning

Dirty evaporator and condenser coils restrict air flow and restrict heat transfer. This increases the loads on the evaporator and condenser fan and decreases overall cooling system performance. Keeping the coils clean allows the fans and cooling system to operate more efficiently.

HVAC Filter Cleaning and Replacement

Air filters should be checked regularly (often monthly) and cleaned or replaced when appropriate. Air filters reduce indoor air pollution, increase occupant comfort, and help keep equipment operating efficiently. If the building has a building management system, consider installing a differential pressure switch across filters to send an alarm about premature fouling or overdue filter replacement. Over time, filters become less and less effective as particulate buildup increases. Dirty filters also restrict air flow through the air conditioning or heat pump system, which increases the load on the distribution fans.

Boiler Maintenance

Many boiler problems develop slowly over time, so regular inspection and maintenance is essential to keeping the heating system running efficiently and preventing expensive repairs. Annual tune-ups should include a combustion analysis to analyze the exhaust from the boilers and to ensure the boiler is operating safely and efficiently. Boilers should be cleaned according to the manufacturer's instructions to remove soot and scale from the boiler tubes to improve heat transfer.

Furnace Maintenance

Preventative maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. Following the manufacturer's instructions, a yearly tune-up should: check for gas / carbon monoxide leaks; change the air and fuel filters; check components for cracks, corrosion, dirt, or debris build-up; ensure the ignition system is working properly; test and adjust operation and safety controls; inspect electrical connections; and lubricate motors and bearings.

Optimize HVAC Equipment Schedules

Energy Management Systems (EMS) typically provide advanced controls for building HVAC systems, including chillers, boilers, air handling units, rooftop units and exhaust fans. The EMS monitors and reports operational status, schedules equipment 'start' and 'stop' times, locks out equipment operation based on outside air or space temperature, and often optimizes damper and valve operation based on complex algorithms. These EMS features, when in proper adjustment, can improve comfort for building occupants and save substantial energy.

Know your EMS scheduling capabilities. Regularly monitor HVAC equipment operating schedules and match them to building operating hours in order to eliminate unnecessary equipment operation and save energy. Monitoring should be performed often at sites with frequently changing usage patterns – daily in some cases. We recommend using the 'Optimal Start' feature of the EMS, if available, to optimize the building warmup sequence. Most EMS scheduling programs provide for "Holiday" schedules which can be used during reduced use or shutdown periods. Finally, many systems are equipped with a one-time override function which can be used to provide additional space conditioning due to a one-time, special event. When available this override feature should be used rather than changing the base operating schedule.

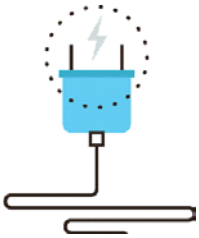
Water Heater Maintenance

The lower the supply water temperature that is used for hand washing sinks, the less energy is needed to heat the water. Reducing the temperature results in energy savings and the change is often unnoticeable to users. Be sure to review the domestic water temperature requirements for sterilizers and dishwashers as you investigate reducing the supply water temperature.

Also, preventative maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. At least once a year, follow manufacturer instructions to 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. Annual checks should include checks for:

- Leaks or heavy corrosion on the pipes and valves.
- 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 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 more than three years old, have a technician inspect the sacrificial anode annually.

Plug Load Controls



Reducing plug loads is a common way to decrease your electrical use. Limiting the energy use of plug loads can include increasing occupant awareness, removing under-used equipment, installing hardware controls, and using software controls. Consider enabling the most aggressive power settings on existing devices or install load sensing or occupancy sensing (advanced) power strips[7]. Your local utility may offer incentives or rebates for this equipment.

[7] For additional information refer to "Assessing and Reducing Plug and Process Loads in Office Buildings" http://www.nrel.gov/docs/fy13osti/54175.pdf, or "Plug Load Best Practices Guide" http://www.advancedbuildings.net/plug-load-best-practices-guide-offices.

Water Conservation

Installing dual flush or low-flow toilets and low-flow/waterless urinals are ways to reduce water use. The EPA WaterSense® ratings for urinals is 0.5 gallons per flush (gpf) and for flush valve toilets is 1.28 gpf (this is lower than the current 1.6 gpf federal standard).

For more information regarding water conservation go to the EPA's WaterSense® website[8] or download a copy of EPA's "WaterSense® at Work: Best Management Practices for Commercial and Institutional Facilities"[9] to get ideas for creating a water management plan and best practices for a wide range of water using systems.

Water conservation devices that do not reduce hot water consumption will not provide energy savings at the site level, but they may significantly affect your water and sewer usage costs. 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.

If the facility has detached buildings with a master water meter for the entire campus, check for unnatural wet areas in the lawn or water seeping in the foundation at water pipe penetrations through the foundation. Periodically check overnight meter readings when the facility is unoccupied, and there is no other scheduled water usage.

Manage irrigation systems to use water more effectively outside the building. Adjust spray patterns so that water lands on intended lawns and plantings and not on pavement and walls. Consider installing an evapotranspiration irrigation controller that will prevent over-watering.

Procurement Strategies

Purchasing efficient products reduces energy costs without compromising quality. Consider modifying your procurement policies and language to require ENERGY STAR® or WaterSense® products where available.

[8] https://www.epa.gov/watersense.

[9] https://www.epa.gov/watersense/watersense-work-0.

6 On-site Generation

You don't have to look far in New Jersey to see one of the thousands of solar electric systems providing clean power to homes, businesses, schools, and government buildings. On-site generation includes both renewable (e.g., solar, wind) and non-renewable (e.g., fuel cells) technologies that generate power to meet all or a portion of the facility's electric energy needs. Also referred to as distributed generation, these systems contribute to greenhouse gas (GHG) emission reductions, demand reductions and reduced customer electricity purchases, which results in improved electric grid reliability through better use of transmission and distribution systems.

Preliminary screenings were performed to determine if an on-site generation measure could be a cost-effective solution for your facility. Before deciding to install an on-site generation system, we recommend conducting a feasibility study to analyze 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.

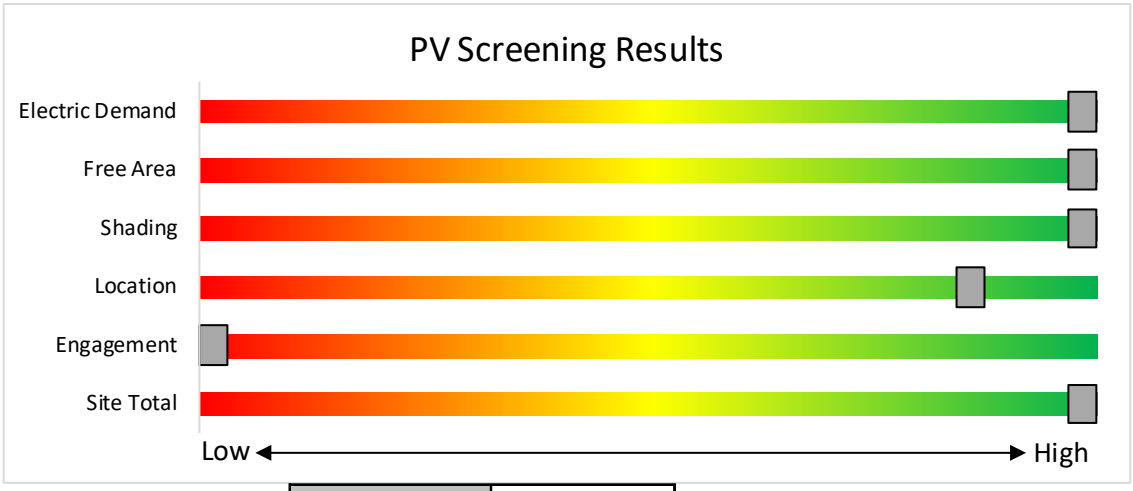
6.1 Solar Photovoltaic

Photovoltaic (PV) panels convert sunlight into electricity. Individual panels are combined into an array that produces direct current (DC) electricity. The DC current is converted to alternating current (AC) through an inverter. The inverter is then connected to the building's electrical distribution system.

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

The amount of free area, ease of installation (location), and the lack of shading elements contribute to the **high** potential. A PV array located on the roof may be feasible. If you are interested in pursuing the installation of PV, we recommend conducting a full feasibility study.

The graphic below displays the results of the PV potential screening conducted as a part of this audit. The position of each slider indicates the potential (potential increases to the right) that each factor contributes to the overall site potential.



Potential	High	
System Potential	339	kW DC STC
Electric Generation	403,874	kWh/yr
Displaced Cost	$51,560	/yr
Installed Cost	$969,500	

Figure 9 - Photovoltaic Screening

Transition Incentive (TI) Program

The TI program is a bridge between the Legacy SREC Program and a to-be determined Successor Incentive Program. The program 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 prior to the start of construction to establish the project's eligibility to earn TRECs (Transition Incentive Renewable Energy Certificates). The Transition Incentive is structured as a factorized renewable energy certificate. The factors allow the TI Program to provide differentiated financial incentives for different types of solar installation.

Get more information about solar power in New Jersey or find a qualified solar installer who can help you decide if solar is right for your building:

Transition Incentive (TI) Program: https://www.njcleanenergy.com/renewable-energy/programs/transition-incentive-program

- **Basic Info on Solar PV in NJ**: www.njcleanenergy.com/whysolar.
- **NJ Solar Market FAQs**: www.njcleanenergy.com/renewable-energy/program-updates-and-background-information/solar-transition/solar-market-faqs.
- **Approved Solar Installers in the NJ Market**: 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) generates electricity at the facility and puts waste heat energy to good use. Common types of CHP systems are reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines.

CHP systems typically produce a portion of the electric power used on-site, with the balance of electric power needs supplied by the local utility company. The heat is used to supplement (or replace) existing boilers and provide space heating and/or domestic hot water heating. Waste heat can also be routed through absorption chillers for space cooling.

The key criteria used for screening is the amount of time that the CHP system would operate at full load and the facility's ability to use the recovered heat. Facilities with a continuous need 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 no potential for installing a cost-effective CHP system.

Based on a preliminary analysis, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation. The lack of gas service, low or infrequent thermal load, and lack of space for siting the equipment are the most significant factors contributing to the lack of CHP potential.

The graphic below displays the results of the CHP potential screening conducted as a part of this audit. The position of each slider indicates the potential (potential increases to the right) that each factor contributes to the overall site potential.

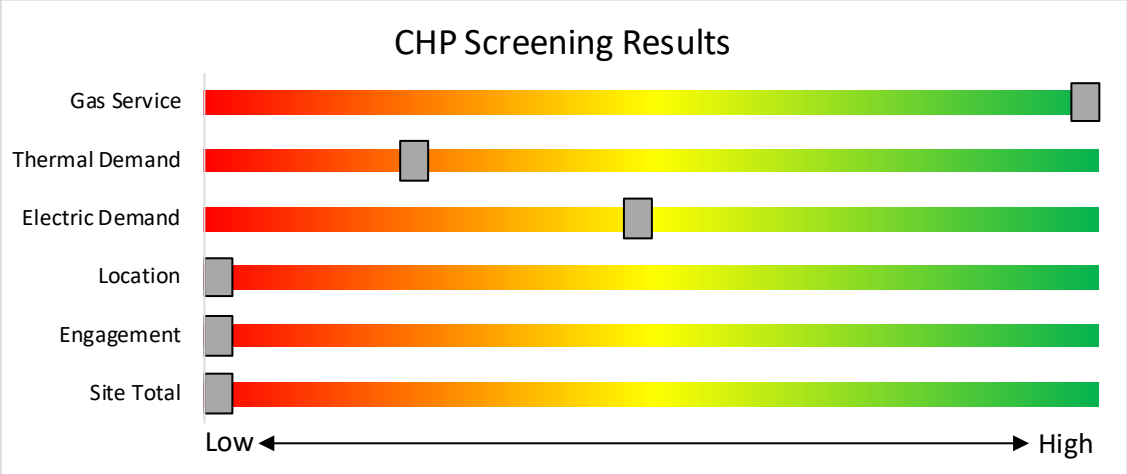


Figure 10 - Combined Heat and Power Screening

Find a qualified firm that specializes in commercial CHP cost assessment and installation: http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/.

7 PROJECT FUNDING AND INCENTIVES

Ready to improve your building's performance? New Jersey's Clean Energy Programs can help. Pick the program that works best for you. Incentive programs that may apply to this facility are identified in the Executive Summary. This section provides an overview of currently available New Jersey Clean Energy Programs.

	SmartStart *Flexibility to install at your own pace*	**Direct Install** *Turnkey installation*	**Pay for Performance** *Whole building upgrades*
Who should use it?	Buildings installing individual measures or small group of measures.	Small to mid-size facilities that can bundle multiple measures together. Average peak demand should be below 200 kW. Not suitable for significant building shell issues.	Mid to large size facilities looking to implement as many measures as possible at one time. Peak demand should be over 200 kW.
How does it work?	Use in-house staff or your preferred contractor.	Pre-approved contractors pass savings along to you via reduced material and labor costs.	Whole-building approach to energy upgrades designed to reduce energy use by at least 15%. The more you save, the higher the incentives.
What are the Incentives?	Fixed incentives for specific energy efficiency measures.	Incentives pay up to 70% of eligible costs, up to $125,000 per project. You pay the remaining 30% directly to the contractor.	Up to 25% of installation cost, calculated based on level of energy savings per square foot.
How do I participate?	Submit an application for the specific equipment to be installed.	Contact a participating contractor in your region.	Contact a pre-qualified Partner to develop your Energy Reduction Plan and set your energy savings targets.
Take the next step by visiting **www.njcleanenergy.com** for program details, applications, and to contact a qualified contractor.			

7.1 SmartStart

SmartStart offers incentives for installing prescriptive and custom energy efficiency measures at your facility. This program provides an effective mechanism for securing incentives for energy efficiency measures installed individually or as part of a package of energy upgrades. This program serves most common equipment types and sizes.

SmartStart routinely adds, removes, or modifies incentives from year-to-year for various energy-efficient 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

Incentives

The SmartStart Prescriptive program provides fixed incentives for specific energy efficiency measures. Prescriptive incentives vary by equipment type.

SmartStart Custom provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentives. Custom incentives are calculated at $0.16/kWh and $1.60/therm based on estimated annual savings. Incentives are 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

Submit an application for the specific equipment to be installed. Many applications are designed as rebates, although others require application approval prior to installation. You can work with your preferred contractor or use internal staff to install measures.

Visit www.njcleanenergy.com/SSB for a detailed program description, instructions for applying, and applications.

7.2 Direct Install

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

Based on the site building and utility data provided, the facility does not meet the requirements of the current DI program.

Incentives

The program pays up to 70 percent of the total installed cost of eligible measures, up to $125,000 per project. Each entity is limited to incentives up to $250,000 per fiscal year.

How to Participate

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

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

7.3 Pay for Performance - Existing Buildings

Pay for Performance works for larger customers with a peak demand over 200 kW. The minimum installed scope of work must include at least two unique measures that results in at least 15 percent source energy savings, and 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 to achieve deep energy savings. This program has an added benefit of addressing measures that may not qualify for other programs. Many facilities pursuing an Energy Savings Improvement Program loan also use this program.

The scope of work presented in this audit report does not quite meet the requirements of the current P4P program. However, due to the size of the facility and existing conditions, should additional measures be identified at a later point in time, for example through further evaluation or the Energy Savings Improvement Program process, this facility could potentially meet the requirements necessary to participate in the P4P program.

Incentives

Incentives are 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

Contact one of the pre-approved consultants and contractors (“Partners”). Under direct contract to you, they will help further evaluate the measures identified in this report through development of the energy reduction plan), assist you in implementing selected measures, and verify actual savings one year after the installation. Your Partner will also help you apply for incentives.

Approval of the final scope of work is required by the program prior to installation. Installation can be done by the contractor of your choice (some P4P Partners are also contractors) or by internal staff, but the Partner remains involved throughout construction to ensure compliance with the program requirements.

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

7.4 Combined Heat and Power

The Combined Heat & Power (CHP) program provides incentives for eligible CHP or waste heat to power (WHP) projects. Eligible CHP or WHP projects must achieve an annual system efficiency of at least 65% (lower heating value, or LHV), based on total energy input and total utilized energy output. Mechanical energy may be included in the efficiency evaluation.

Incentives

Eligible Technologies	Size (Installed Rated Capacity)[1]	Incentive ($/kW)	% of Total Cost Cap per Project[3]	$ Cap per Project[3]
Powered by non-renewable or renewable fuel source[4]	≤500 kW	$2,000	30-40%[2]	$2 million
Gas Internal Combustion Engine	>500 kW - 1 MW	$1,000		
Gas Combustion Turbine	> 1 MW - 3 MW	$550	30%	$3 million
Microturbine Fuel Cells with Heat Recovery	>3 MW	$350		
Waste Heat to Power*	<1 MW	$1,000	30%	$2 million
	> 1MW	$500		$3 million

*Waste Heat to Power: Powered by non-renewable fuel source, heat recovery or other mechanical recovery from existing equipment utilizing new electric generation equipment (e.g. steam turbine).

Check the NJCEP website for details on program availability, current incentive levels, and requirements.

How to Participate

You work with a qualified developer or consulting firm to complete the CHP application. Once the application is approved the project can be installed. Information about the CHP program can be found at www.njcleanenergy.com/CHP.

7.5 Energy Savings Improvement Program

The Energy Savings Improvement Program (ESIP) serves New Jersey's government agencies by financing energy projects. An ESIP is a type of performance contract, whereby school districts, counties, municipalities, housing authorities and other public and state entities enter into contracts to help finance building energy upgrades. Annual payments are lower than the savings projected from the ECMs, ensuring that ESIP projects are cash flow positive for the life of the contract.

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 described above can also be used to help further reduce the total project cost of eligible measures.

How to Participate

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 used 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. Carefully consider all alternatives to develop an approach that best meets your needs. A detailed program description and application can be found at www.njcleanenergy.com/ESIP.

ESIP is a program delivered directly by the NJBPU and is not an NJCEP incentive program. As mentioned above, you can use NJCEP incentive programs to help further reduce costs when developing the energy savings plan. Refer to the ESIP guidelines at the link above for further information and guidance on next steps.

7.6 Transition Incentive (TI) Program

The TI program is a bridge between the Legacy SREC Program and a to-be determined Successor Incentive Program. The program 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 prior to the start of construction to establish the project's eligibility to earn TRECs (Transition Incentive Renewable Energy Certificates). The Transition Incentive is structured as a factorized renewable energy certificate. The factors allow the TI Program to provide differentiated financial incentives for different types of solar installations. NJBPU calculates the value of a Transition Renewable Energy Certificate (TREC) by multiplying the base compensation rate ($152/MWh) by the project's assigned factor (i.e. $152 x 0.85 = $129.20/MWh). The TREC factors are defined based on the chart below:

Project Type	Factor
Subsection (t): landfill, brownfield, areas of historic fill	1.00
Grid supply (Subsection (r)) rooftop	1.00
Net metered non-residential rooftop and carport	1.00
Community solar	0.85
Grid supply (Subsection (r)) ground mount	0.60
Net metered residential ground mount	0.60
Net metered residential rooftop and carport	0.60
Net metered non-residential ground mount	0.60

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 TRECs.

Eligible projects may generate TRECs for 15 years following the commencement of commercial operations (also referred to as the "Transition Incentive Qualification Life"). After 15 years, projects may be eligible for a NJ Class I REC.

TRECs will be used by the identified compliance entities to satisfy a compliance obligation tied to a new Transition Incentive Renewable Portfolio Standard ("TI-RPS"), which will exist in parallel with, and completely separate from, the existing Solar RPS for Legacy SRECs. The TI-RPS is a carve-out of the current Class I RPS requirement. The creation of TRECs is based upon metered generation supplied to PJM-EIS General Attribute Tracking System ("GATS") by the owners of eligible facilities or their agents. GATS would create one TREC for each MWh of energy produced from a qualified facility.

TRECs will be purchased monthly by a TREC Administrator who will allocate the TRECs to the Load Serving Entities (BGS Providers and Third-Party Suppliers) annually based on their market share of retail electricity sold during the relevant Energy Year.

Solar projects help the State of New Jersey reach renewable energy goals outlined in the state's Energy Master Plan. The Transition Incentive Program online portal is now open to new applications effective May 1, 2020. There are instructions on "How and When to Transfer my SRP Registration to the Transition Incentive Program". If you are considering installing solar photovoltaics on your building, visit the following link for more information:

https://www.njcleanenergy.com/renewable-energy/programs/transition-incentive-program

8 PROJECT DEVELOPMENT

Energy conservation measures (ECMs) have been identified for your site and their energy and economic analyses are provided within this LGEA report. The next steps with project development are to set goals and create a comprehensive project plan. The graphic below provides an overview of the process flow for a typical energy efficiency or renewable energy project. We recommend implementing as many ECMs as possible prior to undertaking a feasibility study for a renewable project. The cyclical nature of this process flow demonstrates the ongoing work required to continually improve building energy efficiency over time. If your building(s) scope of work is relatively simple to implement or small in scope, the measurement and verification (M&V) step may not be required. It should be noted through a typical project cycle, there will be changes in costs based on specific scopes of work, contractor selections, design considerations, construction, etc. The estimated costs provided throughout this LGEA report demonstrate the unburdened turn-key material and labor cost only. There will be contingencies and additional costs at the time of implementation. We recommend comprehensive project planning includes the review of multiple bids for project work, incorporate potential operational & maintenance (O&M) cost savings and maximize your incentive potential.

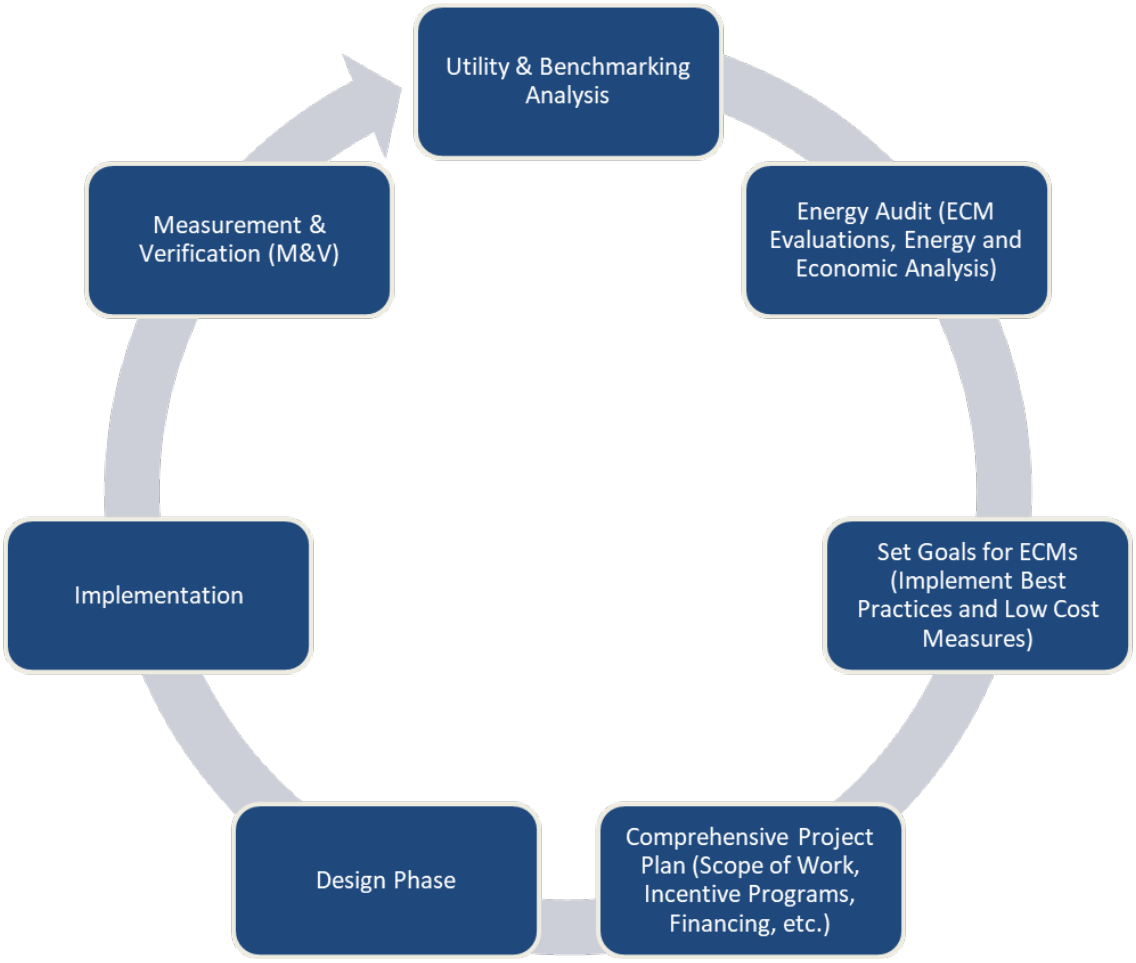


Figure 11 – Project Development Cycle

9 Energy Purchasing and Procurement Strategies

9.1 Retail Electric Supply Options

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 already buys electricity from a third-party supplier, review and compare prices at the end of each contract year.

A list of licensed third-party electric suppliers is available at the NJBPU website[10].

9.2 Retail Natural Gas Supply Options

The natural gas market in New Jersey is also deregulated. Most customers that remain with the utility for natural gas service pay rates that are market-based and that fluctuate monthly. 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 typically depends on whether a customer prefers 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 does not already purchase natural gas from a third-party supplier, consider shopping for a reduced rate from third-party natural gas suppliers. If your facility already purchases natural gas from a third-party supplier, review and compare prices at the end of each contract year.

A list of licensed third-party natural gas suppliers is available at the NJBPU website[11].

[10] www.state.nj.us/bpu/commercial/shopping.html.

[11] 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	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
A Wing Hallway	9	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	9	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
A Wing Hallway	1	Linear Fluorescent - T12: 3' T12 (30W) - 1L	Wall Switch	S	46	4,275	2	Relamp & Reballast	No	1	LED - Linear Tubes: (1) 3' Lamp	Wall Switch	11	4,275	0.0	167	0	$21	$51	$10	1.9
A Wing Hallway	38	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Timeclock	S	93	6,570	3	Relamp	No	38	LED - Linear Tubes: (3) 4' Lamps	Timeclock	44	6,570	1.4	13,594	-3	$1,712	$2,081	$1,140	0.5
B Wing Hallway	5	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
B Wing Hallway	24	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Timeclock	S	93	6,570	3	Relamp	No	24	LED - Linear Tubes: (3) 4' Lamps	Timeclock	44	6,570	0.9	8,586	-2	$1,081	$1,315	$720	0.5
Business Office A10	9	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Occupancy Sensor	S	168	3,105	3	Relamp	No	9	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	3,105	0.3	1,537	0	$194	$486	$72	2.1
Classroom 7B	14	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	14	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.9	5,700	-1	$718	$1,026	$182	1.2
Classroom 7B	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom A1	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	3,105	3	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,105	0.1	338	0	$43	$110	$60	1.2
Classroom A1	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	3,105	3	Relamp	No	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,105	0.5	2,367	0	$298	$767	$420	1.2
Classroom A15	12	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	12	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.7	4,886	-1	$615	$918	$166	1.2
Classroom A15	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom A17	9	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	9	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.6	3,664	-1	$461	$756	$142	1.3
Classroom A17	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom A19	12	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	12	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.7	4,886	-1	$615	$918	$166	1.2
Classroom A19	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom A19A	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.1	889	0	$112	$434	$160	2.5
Classroom A3	12	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Occupancy Sensor	S	168	3,105	3	Relamp	No	12	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	3,105	0.4	2,049	0	$258	$648	$96	2.1
Classroom A3	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	3,105	3	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,105	0.1	338	0	$43	$110	$60	1.2
Classroom A5	12	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Occupancy Sensor	S	168	3,105	3	Relamp	No	12	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	3,105	0.4	2,049	0	$258	$648	$96	2.1
Classroom A5	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	3,105	3	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,105	0.1	338	0	$43	$110	$60	1.2
Classroom B1	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom B1	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.4	2,369	0	$298	$708	$310	1.3
Classroom B10	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom B10	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.4	2,369	0	$298	$708	$310	1.3

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom B11	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom B11	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.4	2,369	0	$298	$708	$310	1.3
Classroom B12	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom B12	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.4	2,369	0	$298	$708	$310	1.3
Classroom B13	6	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	6	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.4	2,443	-1	$308	$594	$118	1.5
Classroom B14	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom B14	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.4	2,369	0	$298	$708	$310	1.3
Classroom B15	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom B15	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.4	2,369	0	$298	$708	$310	1.3
Classroom B16	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom B16	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.4	2,369	0	$298	$708	$310	1.3
Classroom B17	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom B17	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.4	2,369	0	$298	$708	$310	1.3
Classroom B18	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom B18	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.4	2,369	0	$298	$708	$310	1.3
Classroom B2	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom B2	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.4	2,369	0	$298	$708	$310	1.3
Classroom B3	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom B3	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.4	2,369	0	$298	$708	$310	1.3
Classroom B4	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom B4	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.4	2,369	0	$298	$708	$310	1.3
Classroom B5	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom B5	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.4	2,369	0	$298	$708	$310	1.3
Classroom B6	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$380	$130	3.3
Classroom B6	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.4	2,369	0	$298	$708	$310	1.3

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom B7	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom B7	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.4	2,369	0	$298	$708	$310	1.3
Classroom B8	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom B8	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.4	2,369	0	$298	$708	$310	1.3
Classroom B9	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom B9	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.4	2,369	0	$298	$708	$310	1.3
Classroom Band	16	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	16	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	1.0	6,514	-1	$820	$1,404	$268	1.4
Classroom Band	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Classroom Band	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$380	$130	3.3
Classroom Band	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,950	0.0	184	0	$23	$72	$20	2.3
Classroom Band	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,950	0.0	184	0	$23	$72	$20	2.3
Classroom Band Practice	1	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3	Relamp	No	1	LED Lamps: (4) 29W PL-L (Biax) Lamps	Wall Switch	118	4,275	0.0	235	0	$30	$54	$8	1.6
Classroom Band Practice 2	2	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	2	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.1	814	0	$103	$224	$56	1.6
Classroom C-1	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$380	$130	3.3
Classroom C-1	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	3,105	3	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,105	0.4	2,029	0	$255	$657	$360	1.2
Classroom C-10	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$380	$130	3.3
Classroom C-10	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	3,105	3	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,105	0.3	1,353	0	$170	$438	$240	1.2
Classroom C-11	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$380	$130	3.3
Classroom C-11	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	3,105	3	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,105	0.3	1,353	0	$170	$438	$240	1.2
Classroom C-12	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$380	$130	3.3
Classroom C-12	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	3,105	3	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,105	0.3	1,353	0	$170	$438	$240	1.2
Classroom C-2	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$380	$130	3.3
Classroom C-2	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	3,105	3	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,105	0.3	1,353	0	$170	$438	$240	1.2
Classroom C-3	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$380	$130	3.3

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom C-3	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	3,105	3	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,105	0.3	1,353	0	$170	$438	$240	1.2
Classroom C-4	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$380	$130	3.3
Classroom C-4	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	3,105	3	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,105	0.3	1,353	0	$170	$438	$240	1.2
Classroom C-5	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$380	$130	3.3
Classroom C-5	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	3,105	3	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,105	0.3	1,353	0	$170	$438	$240	1.2
Classroom C-6	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$380	$130	3.3
Classroom C-6	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	3,105	3	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,105	0.3	1,353	0	$170	$438	$240	1.2
Classroom C-7	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$380	$130	3.3
Classroom C-7	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	3,105	3	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,105	0.3	1,353	0	$170	$438	$240	1.2
Classroom C-8	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$380	$130	3.3
Classroom C-8	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	3,105	3	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,105	0.3	1,353	0	$170	$438	$240	1.2
Classroom C-9	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$380	$130	3.3
Classroom C-9	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	3,105	3	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,105	0.3	1,353	0	$170	$438	$240	1.2
Classroom C22	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$380	$130	3.3
Classroom C22	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	3,105	3	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,105	0.4	1,691	0	$213	$548	$300	1.2
Classroom C24	1	Incandescent: (2) 100W A19 Screw-In Lamps	Wall Switch	S	200	4,275	3	Relamp	No	1	LED Lamps: (2) 15W A19 Lamps	Wall Switch	30	4,275	0.1	799	0	$101	$34	$4	0.3
Classroom C24	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,950	0.0	310	0	$39	$55	$30	0.6
Classroom C24	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	3,105	3	Relamp	No	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,105	0.6	2,705	-1	$341	$876	$480	1.2
Classroom D-8	13	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	13	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.8	5,293	-1	$667	$972	$174	1.2
Classroom D-8	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom D1	16	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	16	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	1.0	6,514	-1	$820	$1,404	$268	1.4
Classroom D1	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Classroom D1	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom D11	12	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	12	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.7	4,886	-1	$615	$918	$166	1.2
Classroom D11	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom D11	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom D12	14	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	14	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.9	5,700	-1	$718	$1,026	$182	1.2
Classroom D12	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom D2	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.3	1,777	0	$224	$599	$250	1.6
Classroom D3	12	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	12	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.7	4,886	-1	$615	$918	$166	1.2
Classroom D3	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Classroom D3	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom D5	16	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	16	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	1.0	6,514	-1	$820	$1,404	$268	1.4
Classroom D5	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	790	0	$99	$146	$80	0.7
Classroom D7A	15	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	15	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.9	6,107	-1	$769	$1,080	$190	1.2
Classroom D7A	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Classroom D7A	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Classroom E1	12	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	12	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.7	4,886	-1	$615	$918	$166	1.2
Classroom E1	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	790	0	$99	$146	$80	0.7
Classroom E2	12	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	12	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.7	4,886	-1	$615	$918	$166	1.2
Classroom E2	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	790	0	$99	$146	$80	0.7
Classroom E3	8	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	8	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.5	3,257	-1	$410	$702	$134	1.4
Classroom E3	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	790	0	$99	$146	$80	0.7
Classroom E6	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.4	2,666	-1	$336	$763	$340	1.3
Classroom H8	12	LED - Fixtures: Ambient - 2' - Direct/Indirect Fixture	Occupancy Sensor	S	30	3,105		None	No	12	LED - Fixtures: Ambient - 2' - Direct/Indirect Fixture	Occupancy Sensor	30	3,105	0.0	0	0	$0	$0	$0	0.0
Classroom H9	8	LED - Fixtures: TV Studio Lighting	Wall Switch	S	20	4,275	4	None	Yes	8	LED - Fixtures: TV Studio Lighting	Occupancy Sensor	20	2,950	0.0	233	0	$29	$270	$70	6.8
Classroom H9	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,275	4	None	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	380	0	$48	$270	$70	4.2
Conference A21B	3	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	3	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.2	1,221	0	$154	$432	$94	2.2
Conference A21B	2	Incandescent: (1) 75W A19 Screw-In Lamp	Wall Switch	S	75	4,275	3, 4	Relamp	Yes	2	LED Lamps: (1) 12W A19 Lamps	Occupancy Sensor	12	2,950	0.1	628	0	$79	$34	$4	0.4
Conference Main Office	6	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	6	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.4	2,443	-1	$308	$594	$118	1.5

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Copy Room	2	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	2	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.1	814	0	$103	$224	$56	1.6
Gym Corridor	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Gym Corridor	18	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	4,275	3, 4	Relamp	Yes	18	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,950	0.3	1,862	0	$234	$869	$320	2.3
Gym Corridor	33	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Timeclock	S	93	6,570	3	Relamp	No	33	LED - Linear Tubes: (3) 4' Lamps	Timeclock	44	6,570	1.2	11,805	-2	$1,487	$1,807	$990	0.5
Hallway	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Hallway	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Timeclock	S	93	6,570	3	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Timeclock	44	6,570	0.1	715	0	$90	$110	$60	0.5
D Wing Hallway	3	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Timeclock	S	52	6,570	3	Relamp	No	3	LED Lamps: GX23 (Plug-In) Lamps	Timeclock	37	6,570	0.0	325	0	$41	$75	$12	1.5
D Wing Hallway	8	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	8	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
D Wing Hallway	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	4,275	3	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,275	0.0	165	0	$21	$37	$20	0.8
D Wing Hallway	41	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Timeclock	S	93	6,570	3	Relamp	No	41	LED - Linear Tubes: (3) 4' Lamps	Timeclock	44	6,570	1.5	14,667	-3	$1,847	$2,246	$1,230	0.5
Dining Area D19	6	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Dining Area D19	1	Incandescent: (3) 60W A19 Screw-In Lamps	Wall Switch	S	180	4,275	3	Relamp	No	1	LED Lamps: (3) 9W A19 Lamps	Wall Switch	27	4,275	0.1	719	0	$91	$52	$6	0.5
Dining Area D19	41	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	41	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	1.2	8,096	-2	$1,020	$2,307	$1,030	1.3
E Wing Hallway	5	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Timeclock	S	52	6,570	3	Relamp	No	5	LED Lamps: GX23 (Plug-In) Lamps	Timeclock	37	6,570	0.1	542	0	$68	$125	$20	1.5
E Wing Hallway	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
E Wing Hallway	7	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Timeclock	S	33	6,570	3	Relamp	No	7	LED - Linear Tubes: (2) 2' Lamps	Timeclock	17	6,570	0.1	809	0	$102	$228	$84	1.4
E Wing Hallway	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Timeclock	S	93	6,570	3	Relamp	No	15	LED - Linear Tubes: (3) 4' Lamps	Timeclock	44	6,570	0.5	5,366	-1	$676	$822	$450	0.5
Exam Room	2	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	2	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.1	814	0	$103	$224	$56	1.6
Exterior Courtyard	2	Incandescent: (1) 60W A19 Screw-In Lamp	Timeclock		60	3,650	3	Relamp	No	2	LED Lamps: (1) 9W A19 Lamps	Timeclock	9	3,650	0.0	372	0	$48	$34	$4	0.6
Exterior Courtyard	2	High-Pressure Sodium: (1) 250W Lamp	Timeclock		295	3,650	1	Fixture Replacement	No	2	LED - Fixtures: Stairwell/Passageway Lighting	Timeclock	75	3,650	0.0	1,606	0	$205	$621	$180	2.2
Exterior Ground Level	28	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Photocell		52	4,380	3	Relamp	No	28	LED Lamps: GX23 (Plug-In) Lamps	Photocell	37	4,380	0.0	1,840	0	$235	$700	$112	2.5
Exterior Ground Level	19	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Photocell		52	4,380	3	Relamp	No	19	LED Lamps: GX23 (Plug-In) Lamps	Photocell	37	4,380	0.0	1,248	0	$159	$475	$76	2.5
Exterior Ground Level	2	Incandescent: (1) 60W A19 Screw-In Lamp	Photocell		60	4,380	3	Relamp	No	2	LED Lamps: (1) 9W A19 Lamps	Photocell	9	4,380	0.0	447	0	$57	$34	$4	0.5
Baseball Field Scoreboard	1	LED - Fixtures: LED Scoreboard Baseball Field	Breaker		150	800		None	No	1	LED - Fixtures: LED Scoreboard Baseball Field	Breaker	150	800	0.0	0	0	$0	$0	$0	0.0
Solar Canopy	36	LED - Fixtures: Ceiling Mount	Timeclock		30	3,650		None	No	36	LED - Fixtures: Ceiling Mount	Timeclock	30	3,650	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Exterior Ground Level	37	LED - Fixtures: Wall Pack	Photocell		15	4,380		None	No	37	LED - Fixtures: Wall Pack	Photocell	15	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Ground Level	2	High-Pressure Sodium: (1) 1000W Lamp	Photocell		1,100	4,380	1	Fixture Replacement	No	2	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Photocell	300	4,380	0.0	7,008	0	$895	$434	$400	0.0
Exterior Ground Level	2	High-Pressure Sodium: (1) 100W Lamp	Photocell		138	4,380	1	Fixture Replacement	No	2	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Photocell	30	4,380	0.0	946	0	$121	$501	$400	0.8
Exterior Ground Level	1	High-Pressure Sodium: (1) 100W Lamp	Photocell		138	4,380	1	Fixture Replacement	No	1	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Photocell	30	4,380	0.0	473	0	$60	$250	$200	0.8
Pole Mounted Fixtures	4	High-Pressure Sodium: (1) 100W Lamp	Timeclock		138	3,650	1	Fixture Replacement	No	4	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock	30	3,650	0.0	1,577	0	$201	$1,002	$800	1.0
Exterior Ground Level	2	High-Pressure Sodium: (1) 100W Lamp	Photocell		138	4,380	1	Fixture Replacement	No	2	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Photocell	30	4,380	0.0	946	0	$121	$501	$400	0.8
Exterior Ground Level	1	High-Pressure Sodium: (1) 100W Lamp	Photocell		138	4,380	1	Fixture Replacement	No	1	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Photocell	30	4,380	0.0	473	0	$60	$250	$200	0.8
Exterior Ground Level	4	High-Pressure Sodium: (1) 150W Lamp	Photocell		188	4,380	1	Fixture Replacement	No	4	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Photocell	45	4,380	0.0	2,505	0	$320	$1,297	$800	1.6
Exterior Ground Level	11	High-Pressure Sodium: (1) 150W Lamp	Timeclock		188	3,650	1	Fixture Replacement	No	11	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock	45	3,650	0.0	5,741	0	$733	$3,567	$2,200	1.9
Football Stand Lighting	1	Metal Halide: (2) 150W Lamps	Breaker		300	100	1	Fixture Replacement	No	1	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Breaker	90	100	0.0	21	0	$3	$492	$200	109.1
Exterior Ground Level	1	High-Pressure Sodium: (1) 150W Lamp	Photocell		188	4,380	1	Fixture Replacement	No	1	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Photocell	75	4,380	0.0	495	0	$63	$445	$200	3.9
Exterior Ground Level	18	High-Pressure Sodium: (1) 250W Lamp	Timeclock		295	3,650	1	Fixture Replacement	No	18	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock	75	3,650	0.0	14,454	0	$1,845	$8,015	$3,600	2.4
Exterior Ground Level	1	High-Pressure Sodium: (1) 250W Lamp	Photocell		295	4,380	1	Fixture Replacement	No	1	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Photocell	75	4,380	0.0	964	0	$123	$445	$200	2.0
Exterior Ground Level	1	High-Pressure Sodium: (2) 250W Lamps	Photocell		500	4,380	1	Fixture Replacement	No	1	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Photocell	150	4,380	0.0	1,533	0	$196	$592	$200	2.0
Exterior Ground Level	1	High-Pressure Sodium: (1) 400W Lamp	Timeclock		465	3,650	1	Fixture Replacement	No	1	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock	120	3,650	0.0	1,259	0	$161	$560	$200	2.2
Field Lighting	2	Metal Halide: (16) 750W Lamps	Breaker		12,000	300	1	Fixture Replacement	No	2	LED - Fixtures: Large Pole/Arm-Mounted Area/Roadway Fixture	Breaker	3,600	300	0.0	5,040	0	$643	$35,520	$0	55.2
Field Lighting	1	Metal Halide: (18) 750W Lamps	Breaker		13,500	300	1	Fixture Replacement	No	1	LED - Fixtures: Large Pole/Arm-Mounted Area/Roadway Fixture	Breaker	4,050	300	0.0	2,835	0	$362	$9,990	$0	27.6
Field Lighting	1	Metal Halide: (20) 750W Lamps	Breaker		15,000	300	1	Fixture Replacement	No	1	LED - Fixtures: Large Pole/Arm-Mounted Area/Roadway Fixture	Breaker	4,500	300	0.0	3,150	0	$402	$11,100	$0	27.6
Fitness Room	14	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	60	4,275	4	None	Yes	14	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	60	2,950	0.2	1,225	0	$154	$270	$70	1.3
Weight Room	17	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	60	4,275	4	None	Yes	17	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	60	2,950	0.2	1,487	0	$187	$540	$140	2.1
Gym Foyer	6	Compact Fluorescent: (1) 26W Biaxial Plug-In Lamp	Wall Switch	S	26	4,275	3, 4	Relamp	Yes	6	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	19	2,950	0.1	364	0	$46	$345	$82	5.7
Gym Foyer	8	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	4,275	3, 4	Relamp	Yes	8	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	37	2,950	0.2	996	0	$125	$470	$102	2.9
Gym Foyer	5	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Gym Foyer	29	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	29	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	1.3	8,589	-2	$1,082	$2,128	$1,010	1.0
Gymnasium Old	4	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	4,275	3, 4	Relamp	Yes	4	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	37	2,950	0.1	498	0	$63	$370	$86	4.5

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Gymnasium Old	2	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	4,275	3, 4	Relamp	Yes	2	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	37	2,950	0.0	249	0	$31	$166	$48	3.8
Gymnasium Old	6	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Gymnasium Old	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	4,275	3, 4	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,950	0.2	1,392	0	$175	$562	$230	1.9
Gymnasium Old	20	Metal Halide: (1) 400W Lamp	Wall Switch	S	458	4,275	1, 4	Fixture Replacement	Yes	20	LED - Fixtures: High-Bay	Occupancy Sensor	120	2,950	5.4	35,288	-7	$4,444	$14,250	$3,400	2.4
Hallway Main Office	18	Compact Fluorescent: (2) 26W Triple Biaxial Plug-In Lamps	Timeclock	S	52	6,570	3	Relamp	No	18	LED Lamps: GX23 (Plug-In) Lamps	Timeclock	37	6,570	0.2	1,951	0	$246	$450	$72	1.5
Hallway Main Office	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Instructional Supervisor A9	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	3,105	3	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,105	0.1	338	0	$43	$110	$60	1.2
Instructional Supervisor A9	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	3,105	3	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,105	0.3	1,353	0	$170	$438	$240	1.2
Janitorial 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	395	0	$50	$189	$40	3.0
Janitorial 2	1	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	4,275	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	37	4,275	0.0	71	0	$9	$25	$4	2.4
Janitorial 3	1	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	4,275	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	37	4,275	0.0	71	0	$9	$25	$4	2.4
Janitorial 31A	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	4,275		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	4,275	0.0	0	0	$0	$0	$0	0.0
Janitorial 4	1	Incandescent: (1) 100W A19 Screw-In Lamp	Wall Switch	S	100	4,275	3	Relamp	No	1	LED Lamps: (1) 15W A19 Lamps	Wall Switch	15	4,275	0.1	400	0	$50	$17	$2	0.3
Janitorial 6	1	U-Bend Fluorescent - T12: U T12 (40W) - 2L	Wall Switch	S	88	4,275	2	Relamp & Reballast	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,275	0.0	259	0	$33	$105	$20	2.6
Janitorial 7	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	4,275		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	4,275	0.0	0	0	$0	$0	$0	0.0
Janitorial 8	1	Incandescent: (1) 100W A19 Screw-In Lamp	Wall Switch	S	100	4,275	3	Relamp	No	1	LED Lamps: (1) 15W A19 Lamps	Wall Switch	15	4,275	0.1	400	0	$50	$17	$2	0.3
Janitorial 9	1	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	4,275	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	37	4,275	0.0	71	0	$9	$25	$4	2.4
Janitorial D6	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	790	0	$99	$416	$150	2.7
Kitchen D23	1	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	4,275	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	37	4,275	0.0	71	0	$9	$25	$4	2.4
Kitchen Hood D23	6	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	4,275	3, 4	Relamp	Yes	6	LED Lamps: (1) 9W A19 Lamps	Occupancy Sensor	9	2,950	0.2	1,518	0	$191	$373	$12	1.9
Kitchen D23	1	Incandescent: (2) 60W A19 Screw-In Lamps	Wall Switch	S	120	4,275	3	Relamp	No	1	LED Lamps: (2) 9W A19 Lamps	Wall Switch	18	4,275	0.1	480	0	$60	$34	$4	0.5
Kitchen D23	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.7	4,739	-1	$597	$1,416	$620	1.3
Kitchen Dishwasher D23A	1	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	4,275	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	37	4,275	0.0	71	0	$9	$25	$4	2.4
Kitchen Dishwasher D23A	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,275	0.1	621	0	$78	$146	$80	0.8
Kitchen Walk-In Freezer	1	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	4,275	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	37	4,275	0.0	71	0	$9	$25	$4	2.4

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen Walk-In Freezer	2	LED Lamps: (1) 15W A19 Screw-In Lamp	Wall Switch	S	15	4,275		None	No	2	LED Lamps: (1) 15W A19 Screw-In Lamp	Wall Switch	15	4,275	0.0	0	0	$0	$0	$0	0.0
Kitchen Walk-In Freezer	1	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	4,275	2	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	4,275	0.1	404	0	$51	$129	$40	1.7
Library Bookstore	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.3	1,777	0	$224	$599	$250	1.6
Library H4	37	Compact Fluorescent: (2) 26W Triple Biaxial Plug-In Lamps	Wall Switch	S	52	4,275	3, 4	Relamp	Yes	37	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	37	2,950	0.7	4,606	-1	$580	$1,735	$358	2.4
Library H4	7	Linear Fluorescent - T5: 9" T5 Circline Lamp (22Watt)	Wall Switch	S	22	4,275	3, 4	Relamp	Yes	7	LED - Linear Tubes: (1) 16W T5 LED Circline Lamp	Occupancy Sensor	16	2,950	0.1	361	0	$45	$389	$70	7.0
Library H4	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	4,275	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,950	0.0	200	0	$25	$65	$24	1.6
Library H4	85	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	85	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	2.6	16,784	-4	$2,114	$4,724	$2,120	1.2
Library H4	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.3	1,777	0	$224	$599	$250	1.6
Library Office 1	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.2	1,185	0	$149	$489	$190	2.0
Locker Room Boys	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.3	1,975	0	$249	$635	$270	1.5
Locker Room Boys Old Gym	11	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	4,275	3, 4	Relamp	Yes	11	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	37	2,950	0.2	1,369	0	$172	$545	$114	2.5
Locker Room Boys Old Gym	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Locker Room Boys Old Gym	4	Incandescent: (2) 60W A19 Screw-In Lamps	Wall Switch	S	120	4,275	3, 4	Relamp	Yes	4	LED Lamps: (2) 9W A19 Lamps	Occupancy Sensor	18	2,950	0.3	2,024	0	$255	$408	$86	1.3
Locker Room Boys Old Gym	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	395	0	$50	$73	$40	0.7
Locker Room Boys Old Gym	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.3	1,777	0	$224	$599	$250	1.6
Locker Room Boys Old Gym	23	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	23	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	1.0	6,812	-1	$858	$1,800	$830	1.1
Locker Room Girls	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,275	0.0	155	0	$20	$37	$20	0.8
Locker Room Girls	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.4	2,666	-1	$336	$763	$340	1.3
Locker Room Girls Old Gym	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Locker Room Girls Old Gym	3	Incandescent: (1) 100W A19 Screw-In Lamp	Wall Switch	S	100	4,275	3, 4	Relamp	Yes	3	LED Lamps: (1) 15W A19 Lamps	Occupancy Sensor	15	2,950	0.2	1,265	0	$159	$52	$6	0.3
Locker Room Girls Old Gym	2	Incandescent: (2) 100W A19 Screw-In Lamps	Wall Switch	S	200	4,275	3, 4	Relamp	Yes	2	LED Lamps: (2) 15W A19 Lamps	Occupancy Sensor	30	2,950	0.3	1,686	0	$212	$185	$48	0.6
Locker Room Girls Old Gym	5	Incandescent: (2) 100W A19 Screw-In Lamps	Wall Switch	S	200	4,275	3, 4	Relamp	Yes	5	LED Lamps: (2) 15W A19 Lamps	Occupancy Sensor	30	2,950	0.6	4,216	-1	$531	$442	$90	0.7
Locker Room Girls Old Gym	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	395	0	$50	$73	$40	0.7
Locker Room Girls Old Gym	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.7	4,443	-1	$559	$1,092	$520	1.0
Lounge A14E	1	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3	Relamp	No	1	LED Lamps: (4) 29W PL-L (Biax) Lamps	Wall Switch	118	4,275	0.0	235	0	$30	$54	$8	1.6

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Lounge B19	8	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	8	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.5	3,257	-1	$410	$702	$134	1.4
Lounge Nurse	2	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	2	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.1	814	0	$103	$224	$56	1.6
Lounge Tech	8	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	8	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.5	3,257	-1	$410	$702	$134	1.4
Main Electric Room	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Main Electric Room	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,275	0.4	2,793	-1	$352	$657	$360	0.8
Main Lobby	6	Compact Fluorescent: (2) 26W Triple Biaxial Plug-In Lamps	Timeclock	S	52	6,570	3	Relamp	No	6	LED Lamps: GX23 (Plug-In) Lamps	Timeclock	37	6,570	0.1	650	0	$82	$150	$24	1.5
Main Lobby	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Main Lobby	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Timeclock	S	62	6,570	3	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Timeclock	29	6,570	0.4	3,577	-1	$451	$548	$300	0.5
Main Office	6	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	6	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.4	2,443	-1	$308	$594	$118	1.5
Main Office	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Mechanical 1	2	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	4,275	3	Relamp	No	2	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	37	4,275	0.0	141	0	$18	$50	$8	2.4
Mechanical 1	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Mechanical 1	1	LED Lamps: (1) 15W A19 Screw-In Lamp	Wall Switch	S	15	4,275		None	No	1	LED Lamps: (1) 15W A19 Screw-In Lamp	Wall Switch	15	4,275	0.0	0	0	$0	$0	$0	0.0
Mechanical 1	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,275	0.2	1,241	0	$156	$292	$160	0.8
New Gym Field House	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
New Gym Field House	20	Metal Halide: (1) 400W Lamp	Wall Switch	S	458	4,275	1, 4	Fixture Replacement	Yes	20	LED - Fixtures: High-Bay	Occupancy Sensor	120	2,950	5.4	35,288	-7	$4,444	$14,250	$3,400	2.4
New Gym Field House	14	Metal Halide: (1) 400W Lamp	Wall Switch	S	458	4,275	1, 4	Fixture Replacement	Yes	14	LED - Fixtures: High-Bay	Occupancy Sensor	120	2,950	3.8	24,701	-5	$3,111	$9,975	$2,380	2.4
Office Maintence	1	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	4,275	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	37	4,275	0.0	71	0	$9	$25	$4	2.4
Office Maintence	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Office Maintence	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	4,275	4	None	Yes	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	2,950	0.0	29	0	$4	$0	$0	0.0
Office Maintence	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.2	1,185	0	$149	$489	$190	2.0
Office Athletic Director	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.3	1,777	0	$224	$599	$250	1.6
Office C14	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	4,275	4	None	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.0	190	0	$24	$270	$70	8.3
Office C25	6	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	6	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.4	2,443	-1	$308	$594	$118	1.5
Office PE Girl's	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.1	592	0	$75	$226	$100	1.7

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Office D21	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	4,275	3	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,275	0.0	75	0	$9	$33	$12	2.2
Office D21	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,275	0.0	155	0	$20	$37	$20	0.8
Office Guidance A14	10	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	10	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.6	4,071	-1	$513	$810	$150	1.3
Office Guidance A14	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Office Nurse A12	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Office Nurse A12	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.2	1,185	0	$149	$489	$190	2.0
Office PE	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.1	592	0	$75	$226	$100	1.7
Office PE Boys	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	4,275		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	4,275	0.0	0	0	$0	$0	$0	0.0
Office PE C-26D	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	395	0	$50	$189	$40	3.0
Office PE Girls	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,275	0.0	155	0	$20	$37	$20	0.8
Office PE Girls	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,275	0.0	155	0	$20	$37	$20	0.8
Office Principal A22	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.1	889	0	$112	$434	$160	2.5
Office Principal A22	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.1	592	0	$75	$110	$60	0.7
Office Security H3	2	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	2	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.1	814	0	$103	$224	$56	1.6
Office Teachers Room	6	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	6	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.4	2,443	-1	$308	$594	$118	1.5
Office Theater	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,275	0.0	155	0	$20	$37	$20	0.8
Office VP A4	2	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	2	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.1	814	0	$103	$224	$56	1.6
Recreation New Wrestling Room	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Recreation New Wrestling Room	41	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	4,275	4	None	Yes	41	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.4	2,600	-1	$327	$810	$210	1.8
Restroom- Female 3	5	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	4,275	3, 4	Relamp	Yes	5	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,950	0.1	500	0	$63	$433	$130	4.8
Restroom - Female 1	4	U-Bend Fluorescent - T12: U T12 (40W) - 2L	Wall Switch	S	88	4,275	2, 4	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,950	0.2	1,227	0	$155	$689	$150	3.5
Restroom - Female 1	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	592	0	$75	$110	$60	0.7
Restroom - Female 11	5	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	4,275	3, 4	Relamp	Yes	5	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,950	0.1	500	0	$63	$433	$130	4.8
Restroom - Female 13	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	4,275	3	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,275	0.0	226	0	$28	$98	$36	2.2
Restroom - Female 2	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	4,275	3	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,275	0.0	150	0	$19	$65	$24	2.2

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Restroom - Female 4	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	4,275	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,950	0.1	400	0	$50	$400	$118	5.6
Restroom - Female 6	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	4,275	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,950	0.1	400	0	$50	$400	$118	5.6
Restroom - Female 8	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	4,275	3	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,275	0.0	226	0	$28	$98	$36	2.2
Restroom - Female Library	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.1	592	0	$75	$226	$100	1.7
Restroom - Male 1	2	U-Bend Fluorescent - T12: U T12 (40W) - 2L	Wall Switch	S	88	4,275	2, 4	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,950	0.1	613	0	$77	$325	$80	3.2
Restroom - Male 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,275	0.0	155	0	$20	$37	$20	0.8
Restroom - Male 11	5	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	4,275	3, 4	Relamp	Yes	5	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,950	0.1	500	0	$63	$433	$130	4.8
Restroom - Male 13	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	4,275	3	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,275	0.0	226	0	$28	$98	$36	2.2
Restroom - Male 3	5	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	4,275	3, 4	Relamp	Yes	5	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,950	0.1	500	0	$63	$433	$130	4.8
Restroom - Male 4	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	4,275	3	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,275	0.0	75	0	$9	$33	$12	2.2
Restroom - Male 4	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	4,275	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,275	0.0	136	0	$17	$72	$20	3.1
Restroom - Male 4	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	4,275	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,950	0.1	400	0	$50	$400	$118	5.6
Restroom - Male 6	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	4,275	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,950	0.1	400	0	$50	$400	$118	5.6
Restroom - Male Library	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,275	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,950	0.1	592	0	$75	$226	$100	1.7
Restroom - Unisex 2	1	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	4,275	3	Relamp	No	1	LED Lamps: (1) 9W A19 Lamps	Wall Switch	9	4,275	0.0	240	0	$30	$17	$2	0.5
Restroom - Unisex 3	1	LED Lamps: (1) 15W A19 Screw-In Lamp	Wall Switch	S	15	4,275		None	No	1	LED Lamps: (1) 15W A19 Screw-In Lamp	Wall Switch	15	4,275	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex 4	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	4,275	3	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,275	0.0	75	0	$9	$33	$12	2.2
Restroom - Unisex 4	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,275	0.0	155	0	$20	$37	$20	0.8
Restroom - Unisex 5	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	4,275	3	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,275	0.0	75	0	$9	$33	$12	2.2
Restroom - Unisex 5	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,275	0.0	155	0	$20	$37	$20	0.8
Restroom - Unisex 7	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,275	0.0	155	0	$20	$37	$20	0.8
Restroom - Unisex C Wing Faculty	1	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	4,275	3	Relamp	No	1	LED Lamps: (1) 9W A19 Lamps	Wall Switch	9	4,275	0.0	240	0	$30	$17	$2	0.5
Restroom - Male 2	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	4,275	3	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,275	0.0	150	0	$19	$65	$24	2.2
Restroom Nurse	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	4,275	3	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,275	0.0	75	0	$9	$33	$12	2.2
Restroom Nurse	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,275	0.0	155	0	$20	$37	$20	0.8

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Science Prep Room	2	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	2	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.1	814	0	$103	$224	$56	1.6
Server Room 1	5	Compact Fluorescent: (4) 42W Biaxial Plug-In Lamps	Wall Switch	S	168	4,275	3, 4	Relamp	Yes	5	LED Lamps: (4) 29W PL-L (Biax) Lamps	Occupancy Sensor	118	2,950	0.3	2,036	0	$256	$540	$110	1.7
Server Room 1	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,950	0.1	369	0	$46	$145	$40	2.3
Storage 4	1	Incandescent: (2) 60W A19 Screw-In Lamps	Wall Switch	S	120	1,000	3	Relamp	No	1	LED Lamps: (2) 9W A19 Lamps	Wall Switch	18	1,000	0.1	112	0	$14	$34	$4	2.2
Storage 5	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	1,000		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	1,000	0.0	0	0	$0	$0	$0	0.0
Storage 9	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,000	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,000	0.0	54	0	$7	$55	$30	3.6
Storage A15	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,000	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	690	0.1	208	0	$26	$434	$90	13.2
Storage A7	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,000	3	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,000	0.1	109	0	$14	$110	$60	3.6
Storage A7	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,000	3	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,000	0.3	436	0	$55	$438	$240	3.6
Storage C28C	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	73	0	$9	$73	$40	3.6
Storage D13A	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Storage D13A	4	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	1,000	3, 4	Relamp	Yes	4	LED Lamps: (1) 9W A19 Lamps	Occupancy Sensor	9	690	0.2	237	0	$30	$69	$8	2.0
Storage D13A	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3, 4	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.2	370	0	$47	$562	$160	8.6
Storage D19A	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,000	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	690	0.1	139	0	$17	$226	$60	9.5
Storage G2	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	73	0	$9	$73	$40	3.6
Storage G7	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	73	0	$9	$73	$40	3.6
Storage Gym	1	Exit Signs: LED - 2 W Lamp	None		6	1,000		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	1,000	0.0	0	0	$0	$0	$0	0.0
Storage Gym	7	LED Lamps: (1) 15W A19 Screw-In Lamp	Wall Switch	S	15	1,000	4	None	Yes	7	LED Lamps: (1) 15W A19 Screw-In Lamp	Occupancy Sensor	15	690	0.0	36	0	$5	$270	$0	59.9
Storage Gym 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,000	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	690	0.1	139	0	$17	$226	$60	9.5
Storage Gym Old	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	1,000		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	1,000	0.0	0	0	$0	$0	$0	0.0
Teacher Dining D25	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.1	790	0	$99	$416	$150	2.7
Theater 1	6	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Theater Spot Lights	2	Halogen Incandescent: (1) 300W Screw-in Lamps	Wall Switch	S	300	4,275	3	Relamp	No	2	LED Lamps: (1) 45W LED Screw-In Lamp	Wall Switch	45	4,275	0.4	2,398	-1	$302	$46	$12	0.1
Theather Stage Lights	5	Halogen Incandescent: (1) 400W Screw-in Lamps	Wall Switch	S	400	1,000	3	Relamp	No	5	LED Lamps: (1) 45W LED Screw-In Lamp	Wall Switch	60	1,000	1.2	1,870	0	$235	$116	$30	0.4
Theather Stage Lights	3	Halogen Incandescent: (4) 400W Screw-in Lamps	Wall Switch	S	1,600	1,000	3	Relamp	No	3	LED Lamps: (4) 60W LED Screw-In Lamp	Wall Switch	240	1,000	2.9	4,488	-1	$565	$279	$72	0.4

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Theater Spot Lights	4	Halogen Incandescent: (1) 500W Screw-in Lamps	Wall Switch	S	500	4,275	3	Relamp	No	4	LED Lamps: (1) 45W LED Screw-In Lamp	Wall Switch	75	4,275	1.2	7,994	-2	$1,007	$93	$24	0.1
Theater 1	2	Incandescent: (2) 100W A19 Screw-In Lamps	Wall Switch	S	200	4,275	3, 4	Relamp	Yes	2	LED Lamps: (2) 15W A19 Lamps	Occupancy Sensor	30	2,950	0.3	1,686	0	$212	$185	$48	0.6
Theater 1	5	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	4,275	3, 4	Relamp	Yes	5	LED Lamps: (1) 9W A19 Lamps	Occupancy Sensor	9	2,950	0.2	1,265	0	$159	$86	$10	0.5
Theater 1	6	LED - Fixtures: High-Bay	Wall Switch	S	30	4,275	4	None	Yes	6	LED - Fixtures: High-Bay	Occupancy Sensor	30	2,950	0.0	262	0	$33	$270	$70	6.1
Theater 1	6	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	4,275	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,950	0.1	600	0	$76	$195	$72	1.6
Theater 1	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.2	1,382	0	$174	$526	$210	1.8
Theater 1	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	0.2	1,382	0	$174	$256	$140	0.7
Theater 1	64	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3, 4	Relamp	Yes	64	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,950	1.9	12,637	-3	$1,591	$3,687	$1,630	1.3
Theater Storage	1	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	1,000	3	Relamp	No	1	LED Lamps: (1) 9W A19 Lamps	Wall Switch	9	1,000	0.0	56	0	$7	$17	$2	2.2
Theater Storage 2	1	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	1,000	3	Relamp	No	1	LED Lamps: (1) 9W A19 Lamps	Wall Switch	9	1,000	0.0	56	0	$7	$17	$2	2.2
Volt Main Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,275	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,275	0.0	155	0	$20	$37	$20	0.8

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?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Exterior Roof	RTU-14 and 15 new gym	2	Supply Fan	7.5	91.0%	No	Trane	YCH301C4H0CA	B	5,040	5	No	91.0%	Yes	2	4.3	23,241	0	$2,967	$9,476	$4,000	1.8
Exterior Roof	RTU-16 both locker rooms for new gym	1	Supply Fan	2.0	86.5%	No	Trane	FADA0314FB025011000A12002A003	B	5,040	5	No	86.5%	Yes	1	0.6	3,260	0	$416	$3,261	$200	7.4
Exterior Roof	RTU-18 boys locker room old gym	1	Supply Fan	2.0	86.5%	No	Trane	FADA0314FB030011000A12202A	B	5,040	5	No	86.5%	Yes	1	0.6	3,260	0	$416	$3,261	$200	7.4
Exterior Roof	RTU-19 girls locker room	1	Supply Fan	3.0	89.5%	No	Trane	FADA0314FB035011000A13203A	B	5,040	5	No	89.5%	Yes	1	0.9	4,726	0	$603	$3,884	$400	5.8
Exterior Roof	RTU-2 B wing hallway	1	Supply Fan	0.5	76.2%	No	Trane	AHAA200F0F000LL3E5U0CKT18	B	5,040		No	76.2%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Roof	RTU-21A Cafeteria	1	Supply Fan	7.5	91.0%	No	Trane	YCD211C4H0CA	B	5,040	5	No	91.0%	Yes	1	2.1	11,620	0	$1,484	$4,738	$2,000	1.8
Exterior Roof	RTU-21B Cafeteria	1	Supply Fan	7.5	91.0%	No	Trane	YCD211C4H0CA	B	5,040	5	No	91.0%	Yes	1	2.1	11,620	0	$1,484	$4,738	$2,000	1.8
Exterior Roof	RTU-21C Cafeteria	1	Supply Fan	7.5	91.0%	No	Trane	YCD211C4H0CA	B	5,040	5	No	91.0%	Yes	1	2.1	11,620	0	$1,484	$4,738	$2,000	1.8
Exterior Roof	RTU-22 kitchen	1	Supply Fan	1.5	86.5%	No	Trane	YHC092A4RYA	B	5,040	5	No	86.5%	Yes	1	0.4	2,445	0	$312	$3,391	$150	10.4
Exterior Roof	RTU-23 teachers lounge	1	Supply Fan	1.5	86.5%	No	Trane	YHC036A4RZA	B	5,040	5	No	86.5%	Yes	1	0.4	2,445	0	$312	$3,391	$150	10.4
Exterior Roof	RTU-24 D wing hallway	1	Supply Fan	1.5	86.5%	No	Trane	AHAA200F0F000LL3E5U0CKT18	B	5,040	5	No	86.5%	Yes	1	0.4	2,445	0	$312	$3,391	$150	10.4
Exterior Roof	RTU-25 A wing hallway	1	Supply Fan	1.5	86.5%	No	Trane	AHAA400F0F000LP3E5U0CKT18	B	5,040	5	No	86.5%	Yes	1	0.4	2,445	0	$312	$3,391	$150	10.4
Exterior Roof	RTU-3 C wing hallway exit	1	Supply Fan	1.5	86.5%	No	Trane	AHAA200F0F000LL3E5U0CKT18	B	5,040	5	No	86.5%	Yes	1	0.4	2,445	0	$312	$3,391	$150	10.4
Exterior Roof	RTU-4 C wing hallway	1	Supply Fan	1.5	86.5%	No	Trane	AHAA200F0F000LL3E5U0CKT18	B	5,040	5	No	86.5%	Yes	1	0.4	2,445	0	$312	$3,391	$150	10.4
Exterior Roof	RTU-5 A wing hallway	1	Supply Fan	1.5	86.5%	No	Trane	AHAA200F0F000LL3E5U0CKT18	B	5,040	5	No	86.5%	Yes	1	0.4	2,445	0	$312	$3,391	$150	10.4
Exterior Roof	RTU-6 A wing hallway	1	Supply Fan	1.5	86.5%	No	Trane	AHAA200F0F000LL3E5U0CKT18	B	5,040	5	No	86.5%	Yes	1	0.4	2,445	0	$312	$3,391	$150	10.4
Exterior Roof	RTU-8 media center desk	1	Supply Fan	1.5	86.5%	No	Trane	YHC092A4RXA1TGA0A1B	B	5,040	5	No	86.5%	Yes	1	0.4	2,445	0	$312	$3,391	$150	10.4
Exterior Roof	RTU-7 Media center	1	Supply Fan	1.5	86.5%	No	Trane	YHC092A4RXA1TGA0A1B	B	5,040	5	No	86.5%	Yes	1	0.4	2,445	0	$312	$3,391	$150	10.4
Exterior Roof	RTU-9 Media center classrooms	1	Supply Fan	7.5	91.0%	No	Trane	YCH211C4LBCA	B	5,040	5	No	91.0%	Yes	1	2.1	11,620	0	$1,484	$4,738	$2,000	1.8
Exterior Roof	MAU-1 Kitchen	1	Supply Fan	3.0	89.5%	No	Greenheck	IG-112-H30-DBC	B	5,040		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0

		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?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Exterior Roof	RTU-20	1	Supply Fan	5.0	89.5%	No	Trane	GRAA20PFKA0NBL*B500	B	5,040	5	No	89.5%	Yes	1	1.4	7,877	0	$1,006	$4,076	$1,800	2.3
Exterior Roof	EF-16, EF-16 & EF 4	3	Exhaust Fan	0.3	71.0%	No	Cook	120 ACE	B	2,745		No	71.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Roof	EF-13	1	Exhaust Fan	0.5	75.0%	No	Cook	135 ACE	B	2,745		No	75.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Roof	EF-19	1	Exhaust Fan	0.8	75.0%	No	Cook	165 ACE	B	2,745		No	75.0%	No		0.0	0	0	$0	$0	$0	0.0
Corridor hallway	Cabinet Unit Heater	1	Fan Coil Unit	0.3	65.0%	No	Unknown	Unknown	B	2,745		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
D wing hallway	Cabinet Unit Heater	3	Fan Coil Unit	0.3	65.0%	No	Unknown	Unknown	B	2,745		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
E Wing Hallway	Cabinet Unit Heater	1	Fan Coil Unit	0.3	65.0%	No	Unknown	Unknown	B	2,745		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0

Packaged 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 (MBh)	Cooling Mode Efficiency (SEER/IEER/EER)	Heating Mode Efficiency	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Exterior Roof	CU-17/RTU17 - gym foyer	1	Package Unit	12.50	276.50	9.44	0.760887862986083 Et	Trane	TTA150B400EA / GRDA35PFKF0N6LQ1B5U0CJKLTV36	B	9	Yes	1	Package Unit	12.50	276.50	14.00	0.82 Et	2.6	3,106	6	$450	$15,683	$2,225	29.9
Exterior Roof	CU-20/RTU20 - gym foyer	1	Package Unit	10.00	276.50	9.44	0.760887862986083 Et	Trane	TTA120B400EA	B	9	Yes	1	Package Unit	10.00	276.50	14.00	0.82 Et	2.1	2,485	6	$371	$13,545	$1,580	32.3
Main electric room	Main electric room	4	Electric Resistance Heat		11.26		1 Et	Trane	Unknown	B		No							0.0	0	0	$0	$0	$0	0.0
Exterior Roof	ROTC office	1	Split-System	0.79		10.11		EMI	SCC090A	B		No							0.0	0	0	$0	$0	$0	0.0
Exterior Roof	Prep lab D8	1	Split-System	0.79		10.11		EMI	SCC090A00	B		No							0.0	0	0	$0	$0	$0	0.0
Exterior Roof	Server room	1	Packaged Terminal AC	5.25		10.80		Trane	THC063A4R0A	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior Roof	RTU-1 - B wing Exit	1	Package Unit		369.38			Trane	AHAA200F0F000LL3E5U0CKT18	B		No							0.0	0	0	$0	$0	$0	0.0
Exterior Roof	RTU-10 auditorium	1	Package Unit	50.00	324.00	9.15	0.780150846859148 Et	Trane	SFHFC504P7G5	B	9	Yes	1	Package Unit	50.00	324.00	12.50	0.82 Et	8.8	10,545	5	$1,387	$46,614	$8,500	27.5
Exterior Roof	RTU-11 C wing hallway	1	Package Unit		369.38			Trane	AHAA200F0F000LL3E5U0CKT18	B		No							0.0	0	0	$0	$0	$0	0.0
Exterior Roof	RTU-26 E wing hallway	1	Package Unit		369.38			Trane	AHAA200F0F000LL3E5U0CKT18	B		No							0.0	0	0	$0	$0	$0	0.0
Exterior Roof	RTU-12 old gym boys side	1	Package Unit	20.08	324.00	9.44	0.780150846859148 Et	Trane	YCD241C4HACA	B	9	Yes	1	Package Unit	20.08	324.00	12.50	0.82 Et	3.1	3,752	5	$520	$22,111	$3,414	36.0
Exterior Roof	RTU-13 old gym girls side	1	Package Unit	20.08	324.00	9.44	0.780150846859148 Et	Trane	YCD241C4HACA	B	9	Yes	1	Package Unit	20.08	324.00	12.50	0.82 Et	3.1	3,752	5	$520	$22,111	$3,414	36.0
Exterior Roof	RTU-14 and 15 new gym	2	Package Unit	25.08	324.00	9.15	0.780150846859148 Et	Trane	YCH301C4H0CA	B	9	Yes	2	Package Unit	25.08	324.00	12.50	0.82 Et	8.8	10,580	10	$1,433	$52,603	$8,528	30.8
Exterior Roof	RTU-16 both locker rooms for new gym	1	Package Unit	26.17	200.00	9.15	0.770519354922616 Et	Trane	FADA0314FB025011000A12002A003	B	9	Yes	1	Package Unit	26.17	200.00	12.50	0.82 Et	4.6	5,518	4	$736	$27,204	$4,448	30.9
Exterior Roof	RTU-18 boys locker room old gym	1	Package Unit	26.17	240.00	9.15	0.770519354922616 Et	Trane	FADA0314FB030011000A12202A	B	9	Yes	1	Package Unit	26.17	240.00	12.50	0.82 Et	4.6	5,518	5	$743	$27,204	$4,448	30.6
Exterior Roof	RTU-19 girls locker room	1	Package Unit	26.17	280.00	9.50	0.8 Et	Trane	FADA0314FB035011000A13203A	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior Roof	RTU-2 B wing hallway	1	Package Unit		369.38			Trane	AHAA200F0F000LL3E5U0CKT18	B		No							0.0	0	0	$0	$0	$0	0.0
Exterior Roof	RTU-21A Cafeteria	1	Package Unit	17.58	284.00	10.80	0.781526774278653 Et	Trane	YCD211C4H0CA	B	9	Yes	1	Package Unit	17.58	284.00	14.00	0.82 Et	2.2	2,679	4	$377	$20,002	$3,130	44.8
Exterior Roof	RTU-21B Cafeteria	1	Package Unit	17.58	284.00	10.80	0.781526774278653 Et	Trane	YCD211C4H0CA	B	9	Yes	1	Package Unit	17.58	284.00	14.00	0.82 Et	2.2	2,679	4	$377	$20,002	$3,130	44.8
Exterior Roof	RTU-21C Cafeteria	1	Package Unit	17.58	284.00	10.80	0.781526774278653 Et	Trane	YCD211C4H0CA	B	9	Yes	1	Package Unit	17.58	284.00	14.00	0.82 Et	2.2	2,679	4	$377	$20,002	$3,130	44.8

		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 (MBh)	Cooling Mode Efficiency (SEER/IEER/EER)	Heating Mode Efficiency	Manufacturer	Model	Remaining Useful Life	ECM #	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	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Exterior Roof	RTU-22 kitchen	1	Package Unit	7.67	96.00	10.80	0.7705193 54922616 Et	Trane	YHC092A4RYA	B	9	Yes	1	Package Unit	7.67	96.00	14.00	0.82 Et	1.0	1,168	2	$164	$11,540	$1,211	62.8
Exterior Roof	RTU-23 teachers lounge	1	Package Unit	3.00	96.00	10.80	0.7705193 54922616 Et	Trane	YHC036A4RZA	B	9	Yes	1	Package Unit	3.00	96.00	16.00	0.82 AFUE	0.5	650	2	$98	$7,507	$618	70.1
Exterior Roof	RTU-24 D wing hallway	1	Package Unit		369.38			Trane	AHAA200F0F000 LL3E5U0CKT18	B		No							0.0	0	0	$0	$0	$0	0.0
Exterior Roof	RTU-25 A wing hallway	1	Package Unit		369.38			Trane	AHAA400F0F000 LP3E5U0CKT18	B		No							0.0	0	0	$0	$0	$0	0.0
Exterior Roof	RTU-3 C wing hallway exit	1	Package Unit		369.38			Trane	AHAA200F0F000 LL3E5U0CKT18	B		No							0.0	0	0	$0	$0	$0	0.0
Exterior Roof	RTU-4 C wing hallway	1	Package Unit		369.38			Trane	AHAA200F0F000 LL3E5U0CKT18	B		No							0.0	0	0	$0	$0	$0	0.0
Exterior Roof	RTU-5 A wing hallway	1	Package Unit		369.38			Trane	AHAA200F0F000 LL3E5U0CKT18	B		No							0.0	0	0	$0	$0	$0	0.0
Exterior Roof	RTU-6 A wing hallway	1	Package Unit		369.38			Trane	AHAA200F0F000 LL3E5U0CKT18	B		No							0.0	0	0	$0	$0	$0	0.0
Exterior Roof	RTU-8 media center desk	1	Package Unit	7.67	96.00	10.40	0.7705193 54922616 Et	Trane	YHC092A4RXA1T GA0A1B	B	9	Yes	1	Package Unit	7.67	96.00	14.00	0.82 Et	1.1	1,364	2	$189	$11,540	$1,211	54.5
Exterior Roof	RTU-7 Media center	1	Package Unit	7.67	96.00	10.40	0.7705193 54922616 Et	Trane	YHC092A4RXA1T GA0A1B	B	9	Yes	1	Package Unit	7.67	96.00	14.00	0.82 Et	1.1	1,364	2	$189	$11,540	$1,211	54.5
Exterior Roof	RTU-9 Media center classrooms	1	Package Unit	17.58	203.00	10.40	0.7820771 45246455 Et	Trane	YCH211C4LBCA	B	9	Yes	1	Package Unit	17.58	203.00	14.00	0.82 Et	2.6	3,128	3	$424	$20,002	$3,130	39.8
Classroom E2	Classroom E2	2	Window AC	1.00		10.59		Unknown	Unknown	B	9	Yes	2	Window AC	1.00		12.00		0.1	159	0	$20	$1,406	$0	69.2
Classroom E6	Classroom E6	1	Window AC	1.00		10.59		Maytag	Unknown	B	9	Yes	1	Window AC	1.00		12.00		0.1	80	0	$10	$703	$0	69.2
Lounge tech	Lounge tech	1	Window AC	1.00		10.59		LG	Unknown	B	9	Yes	1	Window AC	1.00		12.00		0.1	80	0	$10	$703	$0	69.2
Exterior Roof	MAU-1 Kitchen	1	Forced Air Furnace		320.00		0.7705193 54922616 Et	Greenheck	IG-112-H30-DBC	B	10	Yes	1	Forced Air Furnace		320.00		0.97 22.657333 3333333	0.0	0	21	$174	$7,587	$1,000	37.9
Exterior Roof	RTU-20 New Gym Lobby	1	Package Unit	10.00	200.00	10.40	0.7705193 54922616 Et	Trane	GRAA20PFK/(TTA120B400EA)	B	9	Yes	1	Package Unit	10.00	200.00	14.00	0.82 Et	1.5	1,779	4	$259	$13,545	$1,580	46.2
Exterior Ground	Office	1	Split-System	2.00		10.50		Heil	NAC024AKC3	W		No							0.0	0	0	$0	$0	$0	0.0

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)	Manufacturer	Model	Remaining Useful Life	ECM #	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Exterior Ground Level	CHW System	2	Air-Cooled Screw Chiller	250.00	Trane	RTAC 2504 UK0H UAFN LITY 1COL NN5E A10N G0EX N	B		No							0.0	0	0	$0	$0	$0	0.0

Space Heating Boiler 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)	Manufacturer	Model	Remaining Useful Life	ECM #	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical 1	HHW Loop	2	Non-Condensing Hot Water Boiler	9,234	Smith	6500A-18	W		No						0.0	0	0	$0	$0	$0	0.0

Demand Control Ventilation Recommendations

		Recommendation Inputs					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	ECM #	Number of Zones	Cooling Capacity of Controlled System (Tons)	Electric Heating Capacity of Controlled System (kBtu/hr)	Output Heating Capacity of Controlled System (MBh)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Exterior Roof	RTU-11 & 12 - old gym boys & girls	11	4.00	40.16	0.00	648.00	0.0	11,807	9	$1,580	$5,438	$0	3.4
Exterior Roof	RTU-14 and 15 new gym	11	4.00	25.08	0.00	324.00	0.0	7,149	4	$949	$5,438	$0	5.7
Exterior Roof	RTU-16 both locker rooms for new gym	11	2.00	26.17	0.00	200.00	0.0	7,458	3	$975	$2,719	$0	2.8
Exterior Roof	RTU-18 boys locker room old gym	11	2.00	26.17	0.00	240.00	0.0	7,458	3	$979	$2,719	$0	2.8
Exterior Roof	RTU-19 girls locker room	11	2.00	26.17	0.00	280.00	0.0	7,458	4	$984	$2,719	$0	2.8
Exterior Roof	CU-17/RTU17 - gym foyer	11	2.00	12.50	0.00	276.50	0.0	3,675	4	$501	$2,719	$0	5.4
Exterior Roof	CU-20/RTU20 - gym foyer	11	2.00	10.00	0.00	276.50	0.0	2,940	4	$407	$2,719	$0	6.7
Exterior Roof	RTU-7 & 8 - media center	11	4.00	15.34	0.00	192.00	0.0	4,970	3	$656	$5,438	$0	8.3
Exterior Roof	RTU-23 teachers lounge	11	2.00	3.00	0.00	96.00	0.0	972	1	$135	$2,719	$0	20.1
Exterior Roof	RTU-22 kitchen	11	2.00	7.67	0.00	97.00	0.0	2,484	1	$328	$2,719	$0	8.3

Pipe Insulation Recommendations

		Recommendation Inputs			Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	ECM #	Length of Uninsulated Pipe (ft)	Pipe Diameter (in)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical 1	DHW Piping	12	6	1.00	0.0	0	3	$22	$35	$24	0.5
Exterior Roof	HHW Piping	12	8	1.50	0.0	0	5	$43	$58	$32	0.6

DHW Inventory & Recommendations

		Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Manufacturer	Model	Remaining Useful Life	ECM #	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical 1	Whole Building	1	Storage Tank Water Heater (> 50 Gal)	Bradford White	D80L3993NA	W		No						0.0	0	0	$0	$0	$0	0.0
Storage G7	New gym locker rooms	2	Storage Tank Water Heater (> 50 Gal)	AO Smith	BTH 199 970	B	13	Yes	2	Storage Tank Water Heater (> 50 Gal)	Natural Gas	93.00%	UEF	0.0	0	67	$552	$26,048	$2,799	42.1

Low-Flow Device Recommendations

	Recommedation Inputs					Energy Impact & Financial Analysis						
Location	ECM #	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Locker Room Girls Old Gym	14	2	Faucet Aerator (Lavatory)	0.50	0.50	0.0	0	0	$0	$14	$14	0.0
Kitchen and Restrooms	14	60	Faucet Aerator (Lavatory)	2.20	0.50	0.0	0	57	$473	$430	$430	0.0

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions				Proposed Conditions				Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	Manufacturer	Model	ECM #	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen D23	1	Cooler	Heat craft	Unknown	15, 16	Yes	No	Yes	0.1	1,251	0	$160	$2,281	$310	12.3
Kitchen D23	1	Cooler	Penn	Unknown	15, 16	Yes	No	Yes	0.0	757	0	$97	$1,977	$230	18.1
Kitchen walk-in freezer	1	Medium Temp Freezer (0 F to 30 F)	Unknown	Unknown	15, 16	Yes	No	Yes	0.2	3,054	0	$390	$3,191	$550	6.8

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	Manufacturer	Model	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen dishwasher D23A	2	Freezer Chest	Unknown	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Dining Area D19	1	Stand-Up Refrigerator, Glass Door (≤15 cu. ft.)	QBD	CD26-HC	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen D23	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Continental	2R	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen D23	1	Stand-Up Refrigerator, Solid Door (>50 cu. ft.)	Continental	3R	No		No	0.0	0	0	$0	$0	$0	0.0

Commercial Ice Maker Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Ice Maker Type	Manufacturer	Model	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Office - Enclosed trainer	1	Ice Making Head (<450 lbs/day), Batch	Manitowoc	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Office D-14	1	Ice Making Head (<450 lbs/day), Batch	Manitowoc	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0

Novelty Cooler Inventory & Recommendations

	Existing Conditions				Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Cooler Description	Manufacturer	Model	ECM #	Install Automatic Shutoff Control?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen D23	2	Cooler (35 F to 55 F)	Turbo Air	TOM-60DXB		No	0.00	0	0	$0	$0	$0	0.0

Cooking Equipment Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	Manufacturer	Model	High Efficiency Equipement?	ECM #	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen D23	1	Gas Convection Oven (Full Size)	Blodgett	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen D23	1	Gas Combination Oven/Steam Cooker (<15 Pans)	Vulcan	Unknown	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen D23	1	Gas Convection Oven (Full Size)	Vulcan	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen D23	1	Gas Convection Oven (Full Size)	Vulcan	Unknown	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen D23	1	Gas Convection Oven (Full Size)	Monotague	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Dining Area D19	1	Insulated Food Holding Cabinet (Full Size)	Metro	HM 2000	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen D23	1	Insulated Food Holding Cabinet (Full Size)	Win Holt	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen D23	1	Insulated Food Holding Cabinet (Full Size)	Win Holt	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen D23	1	Gas Steamer	Market forge	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Classroom C24	4	Electric Combination Oven/Steam Cooker (<15 Pans)	Unknown	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0

Plug Load Inventory

	Existing Conditions					
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?	Manufacturer	Model
Multiple	5	Coffee Machine	900	No	Multiple	Multiple
Office A13	1	Dehumidifier	180	Yes	Unknown	Unknown
Multiple	135	Desktop Computers	120	No	Multiple	Multiple
Office Guidance A14	1	Fan (Portable)	100	No	Unknown	Unknown
Classrooms	204	Laptops	45	Yes	Multiple	Multiple
Multiple	16	Microwave	1,000	No	Multiple	Multiple
Multiple	4	Paper Shredder	150	No	Multiple	Multiple
Multiple	20	Printer (Medium/Small)	60	No	Multiple	Multiple
Multiple	8	Printer/Copier (Large)	500	No	Multiple	Multiple
Multiple	57	Projector	200	No	Multiple	Multiple
Multiple	15	Refrigerator (Mini)	250	No	Multiple	Multiple
Multiple	5	Refrigerator (Residential)	800	No	Multiple	Multiple
Multiple	8	Speakers (Large)	200	No	Multiple	Multiple
Multiple	38	Television	50	No	Multiple	Multiple
Multiple	2	Toaster Oven	850	No	Multiple	Multiple
Multiple	14	Water Cooler	92	No	Multiple	Multiple
Classroom C24	4	Hood Fans	100	No	Unknown	Unknown
Classroom C24	1	Washer Dryer	5,000	No	Unknown	Unknown
Classroom D11	1	Saw	200	No	Unknown	Unknown
Classroom D3	1	Photo developing machine	80	No	Unknown	Unknown
Classroom D4	2	3D Printer	300	No	Unknown	Unknown
Classroom D5	3	Camera	100	No	Unknown	Unknown
Dining Area D19	4	Food Warmer	500	No	Multiple	Multiple
Dining Area D19	3	Refrigerated table	960	No	Unknown	Unknown
Fitness room	4	Bikes	500	No	Unknown	Unknown
Fitness room	6	Tred Mill	1,000	No	Unknown	Unknown
Fitness room	6	Elipticals	500	No	Unknown	Unknown
Fitness room	1	Stepper	500	No	Unknown	Unknown
Gymnasium Old	2	ScoreBoard	500	No	Unknown	Unknown
New Gym Field House	1	ScoreBoard	500	No	Unknown	Unknown
Classroom D7A	1	Kiln	9,980	No	LL Kilns	e28T-3-208
Classroom D7A	1	Kiln	9,984	No	Skutt Automatic Kiln	KM-1227
Kitchen D3	1	Coffee Machine	1,800	No	Bloomfield	Unknown
Classroom D3	1	Thermal Transfer Press	1,750	No	Unknown	Unknown
Kitchen D23	1	Deli Slicer	373	No	Unknown	Unknown

	Existing Conditions					
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?	Manufacturer	Model
Kitchen D24	2	Food Warmer	1,440	No	Hatco	Unknown
Classroom D7A	1	Air Filter	560	No	Air King	M 25

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	ECM #	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Lounge B19	1	Glass Fronted Refrigerated	17	Yes	0.1	1,209	0	$154	$230	$100	0.8
Lounge B19	1	Non-Refrigerated	17	Yes	0.0	343	0	$44	$230	$0	5.3

APPENDIX B: ENERGY STAR® STATEMENT OF ENERGY PERFORMANCE

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.

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ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Gloucester City High School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 172,000
Built: 1960

For Year Ending: December 31, 2019
Date Generated: November 04, 2020

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
Gloucester City High School 1300 Market Street Gloucester, New Jersey 08030	Gloucester City Public Schools 1300 Market Street Gloucester City, NJ 08030 856-456-7000	Teri Weeks 1300 Market Street Gloucester City, NJ 08030 856-456-7000 x 2160 tweeks@gcsd.k12.nj.us

Property ID: 12484544

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
93.8 kBtu/ft²

Source EUI
184.9 kBtu/ft²

Annual Energy by Fuel		National Median Comparison	
Electric - Solar (kBtu)	333,363 (2%)	National Median Site EUI (kBtu/ft²)	73.9
Natural Gas (kBtu)	7,283,742 (45%)	National Median Source EUI (kBtu/ft²)	145.8
Electric - Grid (kBtu)	8,508,967 (53%)	% Diff from National Median Source EUI	27%
		Annual Emissions	
		Greenhouse Gas Emissions (Metric Tons CO2e/year)	1,233

Signature & Stamp of Verifying Professional

I _____ (Name) verify that the above information is true and correct to the best of my knowledge.

LP Signature: _____ Date: _____

Licensed Professional

___ _____
,
(___)___-____
_____

Professional Engineer or Registered Architect Stamp (if applicable)

APPENDIX C: GLOSSARY

TERM	DEFINITION
Blended Rate	Used to calculate fiscal savings associated with measures. The blended rate is calculated by dividing the amount of your bill by the total energy use. For example, if your bill is $22,217.22, and you used 266,400 kilowatt-hours, your blended rate is 8.3 cents per kilowatt-hour.
Btu	*British thermal unit*: a unit of energy equal to the amount of heat required to increase the temperature of one pound of water by one-degree Fahrenheit.
CHP	*Combined heat and power*. Also referred to as cogeneration.
COP	*Coefficient of performance*: a measure of efficiency in terms of useful energy delivered divided by total energy input.
Demand Response	Demand response reduces or shifts electricity usage at or among participating buildings/sites during peak energy use periods in response to time-based rates or other forms of financial incentives.
DCV	*Demand control ventilation*: a control strategy to limit the amount of outside air introduced to the conditioned space based on actual occupancy need.
US DOE	*United States Department of Energy*
EC Motor	*Electronically commutated motor*
ECM	*Energy conservation measure*
EER	*Energy efficiency ratio*: a measure of efficiency in terms of cooling energy provided divided by electric input.
EUI	*Energy Use Intensity:* measures energy consumption per square foot and is a standard metric for comparing buildings' energy performance.
Energy Efficiency	Reducing the amount of energy necessary to provide comfort and service to a building/area. Achieved through the installation of new equipment and/or optimizing the operation of energy use systems. Unlike conservation, which involves some reduction of service, energy efficiency provides energy reductions without sacrifice of service.
ENERGY STAR®	ENERGY STAR® is the government-backed symbol for energy efficiency. The ENERGY STAR® program is managed by the EPA.
EPA	*United States Environmental Protection Agency*
Generation	The process of generating electric power from sources of primary energy (e.g., natural gas, the sun, oil).
GHG	*Greenhouse gas* gases that are transparent to solar (short-wave) radiation but opaque to long-wave (infrared) radiation, thus preventing long-wave radiant energy from leaving Earth's atmosphere. The net effect is a trapping of absorbed radiation and a tendency to warm the planet's surface.
gpf	*Gallons per flush*

gpm	*Gallon per minute*
HID	*High intensity discharge:* high-output lighting lamps such as high-pressure sodium, metal halide, and mercury vapor.
hp	*Horsepower*
HPS	*High-pressure sodium*: a type of HID lamp
HSPF	*Heating seasonal performance factor:* a measure of efficiency typically applied to heat pumps. Heating energy provided divided by seasonal energy input.
HVAC	*Heating, ventilating, and air conditioning*
IHP 2014	US DOE Integral Horsepower rule. The current ruling regarding required electric motor efficiency.
IPLV	*Integrated part load value:* a measure of the part load efficiency usually applied to chillers.
kBtu	One thousand British thermal units
kW	*Kilowatt*: equal to 1,000 Watts.
kWh	*Kilowatt-hour*: 1,000 Watts of power expended over one hour.
LED	*Light emitting diode*: a high-efficiency source of light with a long lamp life.
LGEA	*Local Government Energy Audit*
Load	The total power a building or system is using at any given time.
Measure	A single activity, or installation of a single type of equipment, that is implemented in a building system to reduce total energy consumption.
MH	*Metal halide*: a type of HID lamp
MBh	*Thousand Btu per hour*
MBtu	*One thousand British thermal units*
MMBtu	*One million British thermal units*
MV	*Mercury Vapor:* a type of HID lamp
NJBPU	*New Jersey Board of Public Utilities*
NJCEP	*New Jersey's Clean Energy Program:* NJCEP is a statewide program that offers financial incentives, programs and services for New Jersey residents, business owners and local governments to help them save energy, money and the environment.
psig	Pounds per square inch gauge
Plug Load	Refers to the amount of power used in a space by products that are powered by means of an ordinary AC plug.
PV	*Photovoltaic:* refers to an electronic device capable of converting incident light directly into electricity (direct current).

SEER	*Seasonal energy efficiency ratio:* a measure of efficiency in terms of annual cooling energy provided divided by total electric input.
SEP	*Statement of energy performance:* a summary document from the ENERGY STAR® Portfolio Manager®.
Simple Payback	The amount of time needed to recoup the funds expended in an investment or to reach the break-even point between investment and savings.
SREC	*Solar renewable energy credit*: a credit you can earn from the state for energy produced from a photovoltaic array.
TREC	*Transition Incentive Renewable Energy Certificate:* a factorized renewable energy certificate you can earn from the state for energy produced from a photovoltaic array.
T5, T8, T12	A reference to a linear lamp diameter. The number represents increments of 1/8th of an inch.
Temperature Setpoint	The temperature at which a temperature regulating device (thermostat, for example) has been set.
therm	100,000 Btu. Typically used as a measure of natural gas consumption.
tons	A unit of cooling capacity equal to 12,000 Btu/hr.
Turnkey	Provision of a complete product or service that is ready for immediate use
VAV	*Variable air volume*
VFD	*Variable frequency drive*: a controller used to vary the speed of an electric motor.
WaterSense®	The symbol for water efficiency. The WaterSense® program is managed by the EPA.
Watt (W)	Unit of power commonly used to measure electricity use.