Local Government Energy Audit Report

Cold Springs Elementary & Early Childhood Center

January 12, 2021

Prepared for:
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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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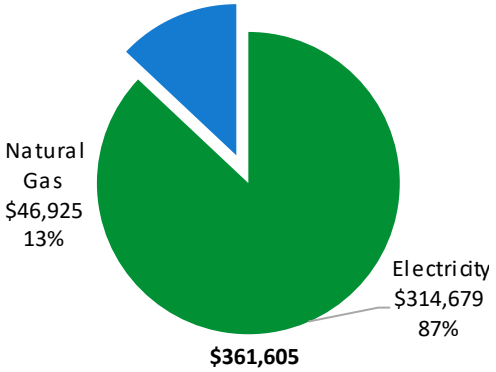
1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for Cold Springs Elementary & Early Childhood Center. 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: $361,605 Electricity: 2,427,559 kWh Natural Gas: 58,445 Therms	
ENERGY STAR® Benchmarking Score	29 *(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.

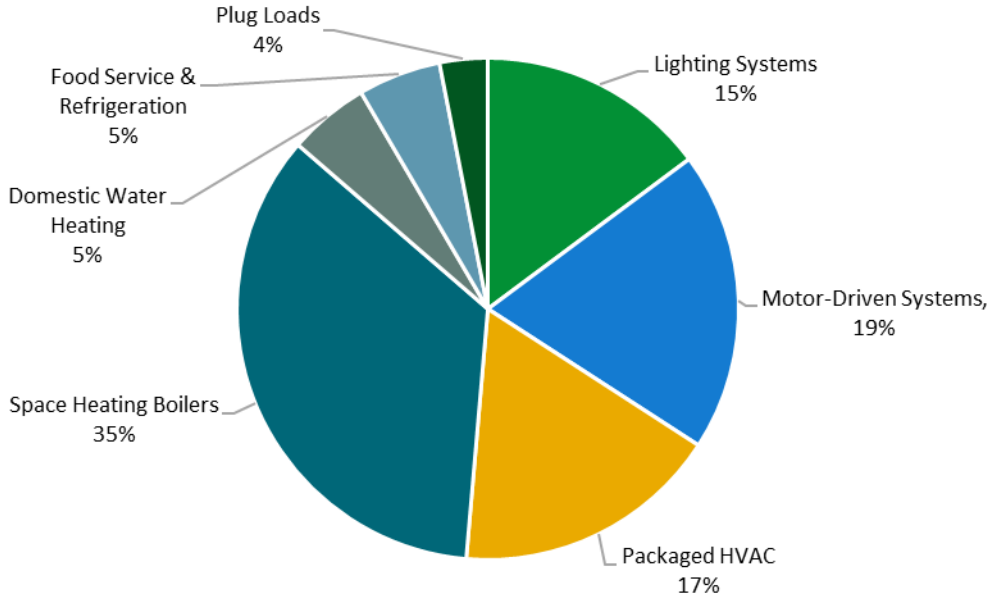


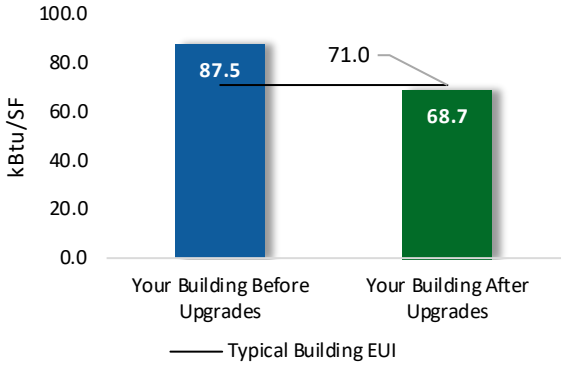
Figure 1 - Energy Use by System

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.

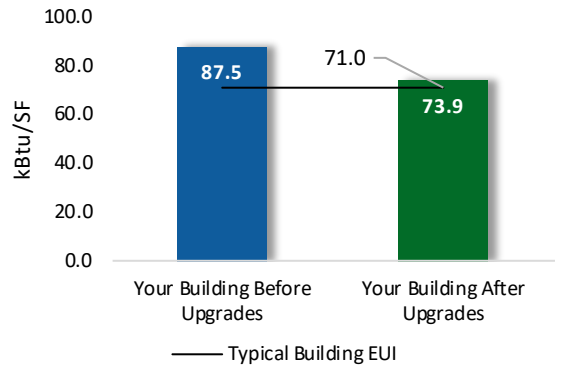
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$801,774
Potential Rebates & Incentives[1]	$170,923
Annual Cost Savings	$96,546
Annual Energy Savings	Electricity: 703,326 kWh Natural Gas: 6,695 Therms
Greenhouse Gas Emission Savings	393 Tons
Simple Payback	6.5 Years
Site Energy Savings (all utilities)	22%



Scenario 2: Cost Effective Package[2]

Installation Cost	$320,496
Potential Rebates & Incentives	$126,915
Annual Cost Savings	$84,521
Annual Energy Savings	Electricity: 651,693 kWh Natural Gas: 54 Therms
Greenhouse Gas Emission Savings	328 Tons
Simple Payback	2.3 Years
Site Energy Savings (all utilities)	16%



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			**336,818**	**71.8**	**-66**	**$43,134**	**$114,745**	**$50,885**	**$63,859**	**1.5**	**331,494**
ECM 1	Install LED Fixtures	Yes	69,595	9.1	-10	$8,943	$22,945	$4,997	$17,948	2.0	68,933
ECM 2	Retrofit Fixtures with LED Lamps	Yes	267,222	62.6	-56	$34,192	$91,799	$45,888	$45,911	1.3	262,561
Lighting Control Measures			**51,734**	**10.4**	**-11**	**$6,619**	**$53,545**	**$29,205**	**$24,340**	**3.7**	**50,829**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	37,575	7.6	-8	$4,808	$32,170	$8,100	$24,070	5.0	36,918
ECM 4	Install High/Low Lighting Controls	Yes	14,159	2.8	-3	$1,812	$21,375	$21,105	$270	0.1	13,911
Variable Frequency Drive (VFD) Measures			**260,038**	**63.0**	**0**	**$33,708**	**$150,046**	**$45,400**	**$104,646**	**3.1**	**261,857**
ECM 5	Install VFDs on Constant Volume (CV) Fans	Yes	175,776	48.6	0	$22,785	$85,597	$25,000	$60,597	2.7	177,005
ECM 6	Install VFDs on Chilled Water Pumps	Yes	29,620	10.4	0	$3,840	$21,690	$5,600	$16,090	4.2	29,827
ECM 7	Install VFDs on Heating Water Pumps	Yes	38,395	4.9	0	$4,977	$25,317	$8,800	$16,517	3.3	38,663
ECM 8	Install VFDs on Cooling Tower Fans	Yes	16,248	-0.9	0	$2,106	$17,441	$6,000	$11,441	5.4	16,361
Unitary HVAC Measures			**1,478**	**1.9**	**0**	**$192**	**$9,866**	**$1,580**	**$8,286**	**43.2**	**1,489**
ECM 9	Install High Efficiency Air Conditioning Units	No	1,478	1.9	0	$192	$9,866	$1,580	$8,286	43.2	1,489
Electric Chiller Replacement			**45,925**	**32.4**	**0**	**$5,953**	**$363,062**	**$19,650**	**$343,412**	**57.7**	**46,246**
ECM 10	Install High Efficiency Chillers	No	45,925	32.4	0	$5,953	$363,062	$19,650	$343,412	57.7	46,246
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**651**	**$5,225**	**$93,663**	**$21,578**	**$72,085**	**13.8**	**76,197**
ECM 11	Install High Efficiency Hot Water Boilers	No	0	0.0	651	$5,225	$93,663	$21,578	$72,085	13.8	76,197
HVAC System Improvements			**261**	**0.0**	**17**	**$167**	**$5,474**	**$20**	**$5,454**	**32.6**	**2,211**
ECM 12	Implement Demand Control Ventilation (DCV)	No	261	0.0	13	$142	$5,438	$0	$5,438	38.4	1,835
ECM 13	Install Pipe Insulation	Yes	0	0.0	3	$26	$36	$20	$16	0.6	376
Domestic Water Heating Upgrade			**0**	**0.0**	**79**	**$631**	**$1,205**	**$1,205**	**$0**	**0.0**	**9,196**
ECM 14	Install Low-Flow DHW Devices	Yes	0	0.0	79	$631	$1,205	$1,205	$0	0.0	9,196
Food Service & Refrigeration Measures			**7,072**	**0.5**	**0**	**$917**	**$10,170**	**$1,400**	**$8,770**	**9.6**	**7,121**
ECM 15	Refrigerator/Freezer Case Electrically Commutated Motors	No	742	0.1	0	$96	$1,517	$400	$1,117	11.6	748
ECM 16	Refrigeration Controls	No	3,227	0.1	0	$418	$7,733	$800	$6,933	16.6	3,249
ECM 17	Vending Machine Control	Yes	3,103	0.4	0	$402	$920	$200	$720	1.8	3,124
TOTALS (COST EFFECTIVE MEASURES)			**651,693**	**145.5**	**5**	**$84,521**	**$320,496**	**$126,915**	**$193,581**	**2.3**	**656,876**
TOTALS (ALL MEASURES)			**703,326**	**180.0**	**670**	**$96,546**	**$801,774**	**$170,923**	**$630,852**	**6.5**	**786,639**

* - 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		x
ECM 2	Retrofit Fixtures with LED Lamps	x		x
ECM 3	Install Occupancy Sensor Lighting Controls	x		x
ECM 4	Install High/Low Lighting Controls	x		x
ECM 5	Install VFDs on Constant Volume (CV) Fans	x		x
ECM 6	Install VFDs on Chilled Water Pumps	x		x
ECM 7	Install VFDs on Heating Water Pumps	x		x
ECM 8	Install VFDs on Cooling Tower Fans	x		x
ECM 9	Install High Efficiency Air Conditioning Units	x		x
ECM 10	Install High Efficiency Chillers	x		x
ECM 11	Install High Efficiency Hot Water Boilers	x		x
ECM 12	Implement Demand Control Ventilation (DCV)			x
ECM 13	Install Pipe Insulation	x		x
ECM 14	Install Low-Flow DHW Devices	x		x
ECM 15	Refrigerator/Freezer Case Electrically Commutated Motors	x		x
ECM 16	Refrigeration Controls	x		x
ECM 17	Vending Machine Control	x		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 Cold Springs Elementary & Early Childhood Center. 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 Cold Springs Elementary & Early Childhood Center located in Gloucester, New Jersey. TRC met with Kevin Biehl to review the facility operations and help focus our investigation on specific energy-using systems.

Cold Springs Elementary School & Early Childhood Center is a two-story, 161,000 square foot building. The facility is comprised of two sections – one is the Cold Springs Elementary School (CSS) which was built in 1994, and the second is the Early Childhood Center (ECC) which was a 2004 expansion. Spaces in the two sections include classrooms, gymnasium, commercial kitchens (one in each section), library, locker rooms, teacher's lounges, offices, dining areas, corridors, stairwells, conference rooms, mechanical and electrical rooms, storage spaces, and a multipurpose room.

The facility's ongoing improvement projects include replacing the two water-cooled chillers in the CSS section, as well as AHU-3 and AHU-4.

2.2 Building Occupancy

The facility is occupied year-round. Typical weekday occupancy is 250 staff and 845 students.

Summer occupancy includes a summer day camp (for 20 days) and continuing maintenance activities. There are no weekend activities.

Building Name	Weekday/Weekend	Operating Schedule
Cold Springs Elementary School & Early Childhood Center	Weekday	8:00 AM to 6:00 PM
	Weekend	Closed
	Summer (20 Weeks Mon-Thurs)	7:00 AM - 6:00 PM
Cold Springs Elementary School & Early Childhood Center (Custodian)	Weekday	6:00 AM to 11:00 PM
	Weekend	Closed
	Summer (20 Weeks Mon-Thurs)	7:00 AM to 5:00 PM

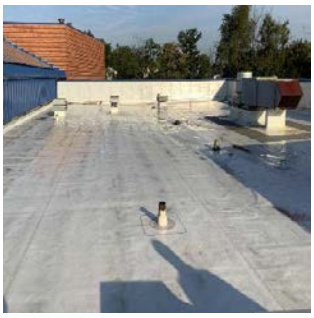
Figure 4 - Building Occupancy Schedule

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 white 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 32-Watt 4-foot linear T8 and 17-Watt 2-foot linear T8 fluorescent lamps. Several fixtures throughout use LED, compact fluorescent lamps (CFL), or incandescent lamps, typically ranging between 9-Watts and 100-Watts. The gym has several 250-Watt metal halide (MH) lamp fixtures, and some classroom areas contain 250-Watt mercury vapor lamps. The dining area contains some high wattage halogen incandescent lamps.

Typically, T8 fluorescent lamps use electronic ballasts. 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.

A majority of interior lighting fixtures are controlled manually. The remaining lighting fixtures, mostly in in classrooms, restrooms, and a few storage spaces; are controlled by occupancy sensors. Hallway lighting is controlled by a timeclock.

Linear Fluorescent Lamp Fixtures

Ceiling Mounted MV and LED Fixtures

Gym Lighting Fixtures

Exit Sign

Exterior fixtures include wall mounted recessed ceiling mounted and pole mounted area lights with compact fluorescent lamps (CFL), metal halide (MH), high-pressure sodium (HPS), and LED fixtures of varying wattages.

Most exterior light fixtures are all controlled by timeclocks and a few pole mounted MH fixtures that are controlled by photocells.

Wall Mounted LED Fixture

Pole Mounted HID Fixture

Ceiling Mounted CFL Lamp Fixture

Pole Mounted LED Fixture

2.5 Air Handling Systems

Unit Ventilators

Most of the classrooms in the CSS section of the building are served by unit ventilators. These unit ventilators are equipped with supply fan motors and outside air dampers. These units have chilled water and heating hot water coils. This system is original to the building and appears to be in fair operating condition. These units are controlled by the building energy management system (EMS).

Fan Coil Units

Most of the ECC rooms, a few sections of hallways, and mechanical spaces are served by fan coil units with fractional hp supply fans of varying sizes. These units have either both chilled water and heating hot water coils or only heating hot water coils based on the areas they are serving and their function. Most of these units are controlled by the building energy management system (EMS).

Refer to Appendix A for detailed information about each unit.

Fan Coil Unit

Unit Ventilator

Unitary Electric HVAC Equipment

Various office areas, server rooms, and electrical rooms throughout the building are conditioned by unitary HVAC equipment. These include split system air conditioning (AC) systems in tech room, IDF rooms, and the elevator room. Their cooling capacity ranges between 1.0 tons and 2.0 tons with energy efficiency ratings (EER) ranging between 10.0 EER and 11.0 EER. These systems are controlled by remote control thermostats located within the space. There are also split air-source heat pump (HP) systems in security and computer rooms that each have a cooling capacity of 1.5 ton, with heating capacities of 18.0 Mbh to 20.0 Mbh. A phone room is served by a 1.0-ton ductless mini-split AC unit that is currently not being used.

Condensing Unit Serving Kitchen MUA

Mini Split HP Condensing Unit

Air Handling Units (AHUs)

Most of the building's hallways, gym, cafeteria, stage and sun hall, multipurpose room, and kitchen are conditioned by dedicated air-handling units (AHUs) which are equipped with a supply fan, an outdoor air damper, chilled water coils, and hot water coils. These units are listed below:

Unit	Location	Area Served	Supply Fan Motor (HP)	Return Fan Motor (HP)
AHU-1	Mechanical 3	Gym	15.0	15.0
AHU-2	Mechanical 3	Gym	20.0	20.0
AHU-3	Mechanical 4	Main Foyer & Second Floor Foyer	20.0	20.0
AHU-5	Mechanical CSS Boiler Room	Hallways 1st & Second Floor	15.0	-
AHU-6	Mechanical CSS Boiler Room	Cafeteria	15.0	-
AHU-7	Mechanical CSS Boiler Room	Stage & Sun Hall	7.5	-
AHU-1	Mechanical ECC	Main Hallway & Main Offices	3.0	2.0
AHU-2	Mechanical ECC	MPR	5.0	3.0
AHU-3	Mechanical ECC	Kitchen	2.0	-

The ECC kitchen's makeup air unit (MAU) is equipped with a 2.0 hp makeup air fan motor, 2.0 hp kitchen hood exhaust fan, gas-fired furnace, and DX coils served by an outdoor condensing unit. The split system AC serving the MAU has a cooling capacity of 10.0 tons, and the gas-fired furnace has a heating capacity of 280.0 MBh. The heating section of this unit is not used often according to facility staff.

The CSS kitchen's makeup air unit (MAU) has a 2.0 hp makeup air fan motor and a 2.0 hp kitchen hood exhaust fan. This unit provides ventilation only and does not have features to provide heating or cooling.

Most of the HVAC systems are controlled by the facility EMS.

Air Handling Unit

2.6 Heating Hot Water Systems

Two Weil McLain 2,452.0 MBh non-condensing hot water boilers serve the CSS section's heating load. Each boiler has a nominal efficiency of 75.0%. The burners are modulating and are each equipped with a constant speed 2.0 hp combustion air fan. The boilers are configured in a lead-lag control scheme. Both boilers are required under high load conditions. One of the boilers runs during summer-time to meet the facility's dehumidification requirement. Installed in 1995, they are nearing the end of their useful life.

The hydronic distribution system for the CSS section is a four-pipe heating and cooling system. According to facility personnel, hot water is typically supplied at 130°F and returns around was 119°F.

The boilers for the CSS section are configured in a constant flow primary distribution with two 20.0 hp constant speed hot water pumps operating with a lead-lag control scheme. The boilers provide hot water to radiators, fan coil units, unit ventilators, and air handling units throughout the building. This system is controlled through the EMS.

Three Lochivar 831.60 MBh non-condensing hot water boilers serve the ECC section's heating load. The burners are modulating with a nominal efficiency of 84.0%. The boilers are configured in a lead-lag control scheme. Two boilers are required under high load conditions. One of the boilers runs during summer-time to meet the facility's dehumidification requirement. Installed in 2004, they are in good working condition.

The hydronic distribution system for the ECC section is a four-pipe heating and cooling system. According to facility personnel, hot water is typically supplied at 130°F and returns around was 119°F.

The boilers in the ECC section serve a primary/secondary distribution system with three constant speed 0.75 hp pumps circulating the primary loop and two VFD controlled 5.0 hp heating hot water pumps operating in lead/lag fashion on the secondary loop. The boilers provide hot water to radiators, fan coil units, unit ventilators, and air handling units throughout the building. This system is controlled through the EMS.

CSS Boilers

ECC Boilers

2.7 Chilled Water Systems

For the CSS section, the chiller plant consists of two York 327.5-ton, constant speed, water-cooled screw chillers. The chillers are configured in a primary only distribution loop with two 25.0 hp constant flow chilled water pumps. These chillers typically operate from mid-April to mid-October each year. They operate on a lead/lag control scheme. Both chillers are required when the cooling load is high. According to facility personnel, the chilled water is typically supplied at 45°F and returns around 49°F.

The condenser water system consists of one single-cell cooling tower with one 50.0 hp fan motor. The fan motor runs at constant speed. Condenser water is supplied to the chillers by two 15.0 hp constant flow pumps.

The chiller plant supplies chilled water to air handlers, fan coil units, and unit ventilators. The chiller plant in this section is original to the building, has reached the end of its useful life, and the school is in the process of replacing the chiller units with more efficient chillers.

For the ECC section, the chiller plant consists of one Trane 225.0-ton, constant speed, air-cooled screw chiller. The chiller is configured in a primary/secondary distribution loop with estimated two 5.0-hp constant flow primary chilled water pumps, and two 15.0-hp secondary chilled water pumps equipped with VFDs serving the secondary chilled water loop. This chiller typically operates from mid-April to mid-October each year. According to facility personnel, the chilled water is typically supplied at 45°F and returns at approximately 47°F.

The chiller plant supplies chilled water to air handlers, fan coil units, and unit ventilators. This unit is nearing the end of its useful life.

Both chilled water systems are being controlled through their respective EMS.

Water Cooled Chillers Serving CSS

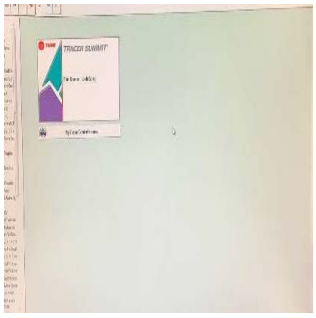
Air Cooled Chiller Serving ECC

2.8 Building Energy Management Systems (EMS)

A Tracer Summit Building Automation System controls the HVAC equipment, boilers, chiller, air handlers, fan coil units, and unit ventilators in the ECC section of the building.

A CM3 EMS controls the HVAC equipment, boilers, chillers, air handlers, fan coil units, and unit ventilators in the CSS section of the building.

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.



Trane Tracer EMS Screenshot

CM3 EMS Screenshot

2.9 Domestic Hot Water

Hot water for the CSS section is produced by two, 125.0 gallon, 800.0 MBh gas-fired storage water heaters with an 80% efficiency. These water heaters are each equipped with a 1.0 hp combustion air fan motor. These units operate on a lead/lag control scheme. Domestic hot water is typically supplied at 140 °F during the winter season and around 120°F-122°F during the rest of the year.

Hot water for the ECC section is produced by one 100.0 gallon, 199.0 MBh gas-fired storage water heater with an 80% efficiency.

Two, 1.0 hp (estimated) circulation pumps distribute water to end uses in the CSS section. The circulation pumps operate continuously. Three, 3.0 hp DHW circulation/booster pumps are also present in the CSS mechanical room, which are not used often.

DHW Heater in CSS Section

DHW Heater in ECC Section

2.10 Food Service Equipment

The kitchens in both CSS and ECC sections have a mix of gas and electric equipment that is used to prepare meals for students and staff. Most cooking is done using convection gas-fired ovens. Bulk prepared foods are held in several electric holding cabinets. Equipment is not high efficiency and is in good condition.

The dishwashers in both CSS and ECC sections are non- ENERGY STAR® high temperature, conveyor type units. The CSS kitchen dishwater has a 36.0 kW electric booster water heater and the ECC kitchen dishwasher has a 15.0 kW electric booster water heater.

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

Combination Oven

Rack Oven

Dishwasher

Food Holding Cabinet

2.11 Refrigeration

Both kitchens have several stand-up refrigerators with solid doors. There are also two stand-up solid door freezers. There are several refrigerator chests. All equipment is standard efficiency and in good condition.

The ECC and CSS sections each have a walk-in cooler, with estimated 0.43-ton and 0.73-ton compressors, respectively. The ECC walk-in unit has a 1/16-hp single-fan evaporator and the CSS walk-in unit has a 1/16-hp three-fan evaporator. These units do not appear to have any controls.

The ECC and CSS sections each have a walk-in medium temperature freezer with an estimated 0.43-ton and 0.75-ton compressor, respectively. The ECC walk-in has a 1/16-hp single-fan evaporator and the CSS walk-in has a 1/16-hp two-fan evaporator. These units have an estimated 1600-Watt defrost electric heaters each. The units do not appear to have controls in place.

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

Stand-Up Solid Door Freezer

Refrigerator Chest

Stand-Up Solid Door Refrigerator

Walk-In 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 79 computer workstations throughout the facility. Plug loads throughout the building include general café and office equipment. There are classroom typical loads such as smart boards, projectors, and fans. Some of the large plug loads in the facility include a clothes washer/dryer, portable dehumidifiers, electric kiln, food warming tables, refrigerated tables, and mixer.

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

There are two refrigerated glass fronted vending machines and two non-refrigerated vending machines. Vending machines are not equipped with occupancy-based controls.

Laptops

Photocopier

Vending Machine

Electric Kiln

2.13 Water-Using Systems

There are approximately 90 restrooms with toilets, urinals, and sinks. Faucet flow rates are at 1.2 gallons per minute (gpm) or higher.

2.14 On-Site Generation

Cold Springs Elementary & Early Childhood Center has a 931-kW capacity photovoltaic (PV) array with approximately 3,060 panels that was installed in 2019.

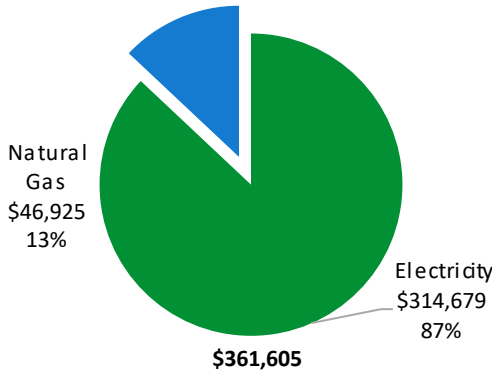
Cold Springs Elementary & Early Childhood Center has two diesel-fired emergency generators that are used in the event of a power outage.

Rooftop Solar Array

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	2,427,559 kWh	$314,679
Natural Gas	58,445 Therms	$46,925
Total		**$361,605**



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.

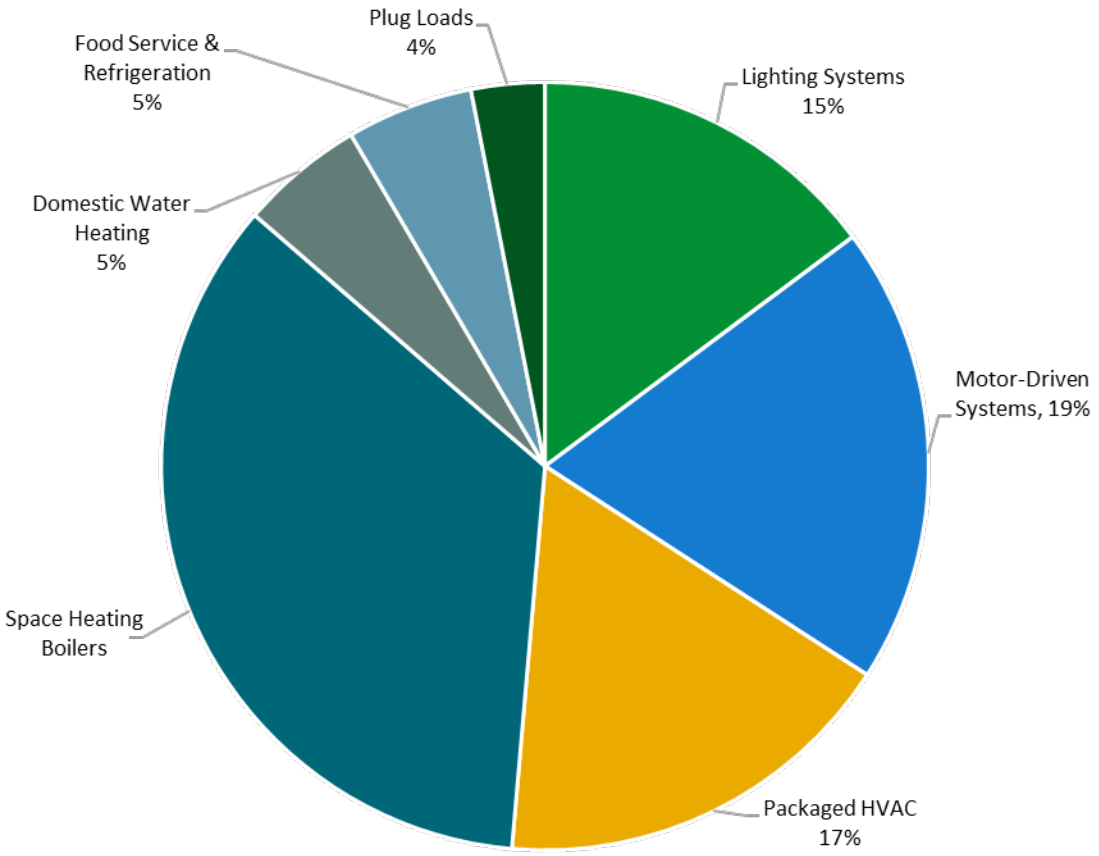
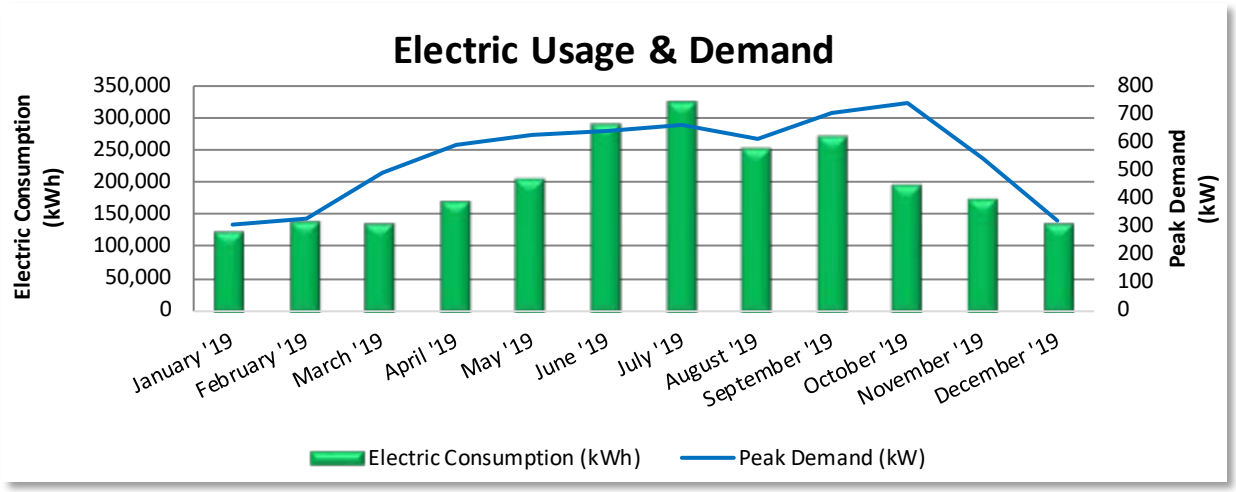


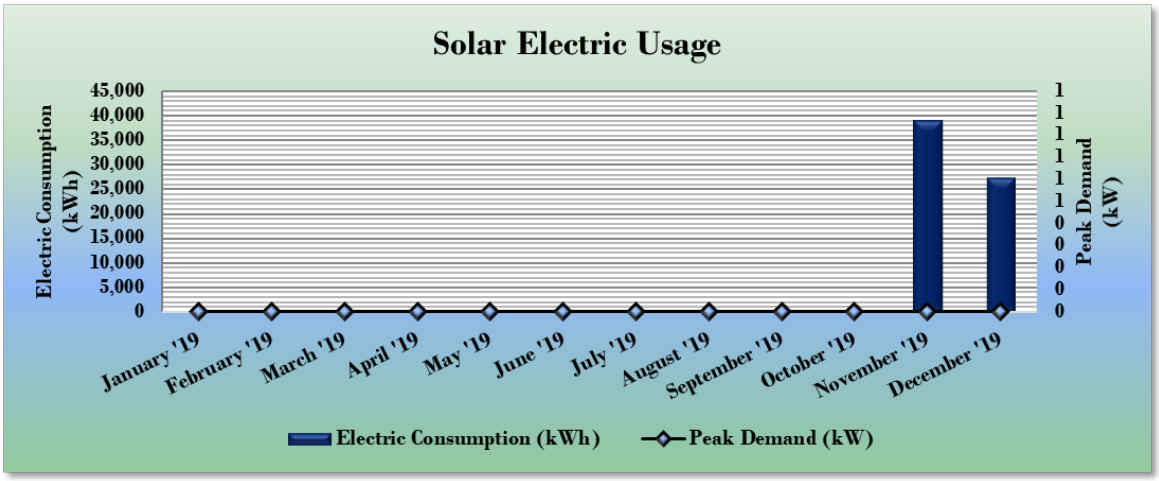
Figure 5 - Energy Balance

3.1 Electricity

PSE&G delivers electricity under rate class Large Power & Lighting (LPLS) & Outdoor Lighting (BPL), 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	125,658	310	$1,165	$14,777
2/28/19	29	140,556	328	$1,231	$18,294
3/29/19	29	136,386	489	$1,835	$16,888
4/30/19	32	170,526	589	$2,208	$21,856
5/30/19	30	207,085	630	$2,361	$25,926
7/1/19	32	290,104	642	$8,134	$40,064
7/31/19	30	324,452	660	$8,362	$41,956
8/29/19	29	252,690	616	$7,797	$32,952
9/30/19	32	269,811	704	$8,915	$34,046
10/29/19	29	197,116	740	$2,784	$24,533
11/27/19	29	175,043	541	$2,035	$23,350
12/31/19	34	138,133	321	$1,498	$20,038
Totals	**365**	**2,427,559**	**740**	**$48,325**	**$314,679**
Annual	**365**	**2,427,559**	**740**	**$48,325**	**$314,679**

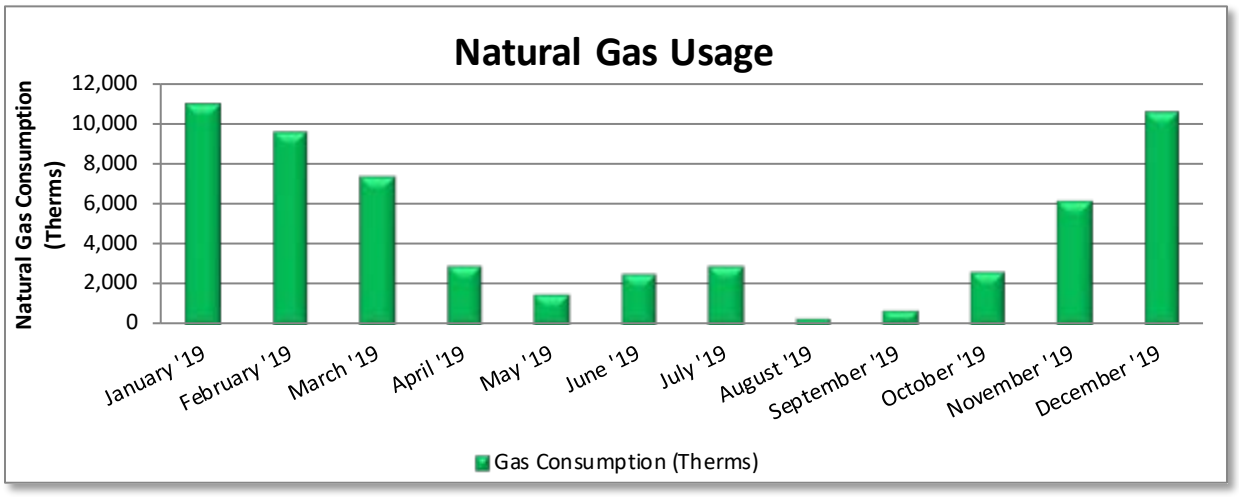


Notes:

- Peak demand of 740 kW occurred in October 2019.
- Average demand over the past 12 months was 547 kW.
- The average electric cost over the past 12 months was $0.130/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 Large Volume Gas (LVG), 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**
1/30/19	30	10,932	$8,601
2/28/19	29	9,578	$8,524
3/29/19	29	7,399	$6,769
4/30/19	32	2,988	$1,892
5/30/19	30	1,518	$1,003
7/1/19	32	2,582	$1,628
7/31/19	30	2,952	$1,727
8/29/19	29	363	$326
9/30/19	32	761	$545
10/29/19	29	2,690	$1,748
11/27/19	29	6,134	$5,652
12/31/19	34	10,548	$8,509
Totals	**365**	**58,445**	**$46,925**
Annual	**365**	**58,445**	**$46,925**

Notes:

- The average gas cost for the past 12 months is $0.803/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.

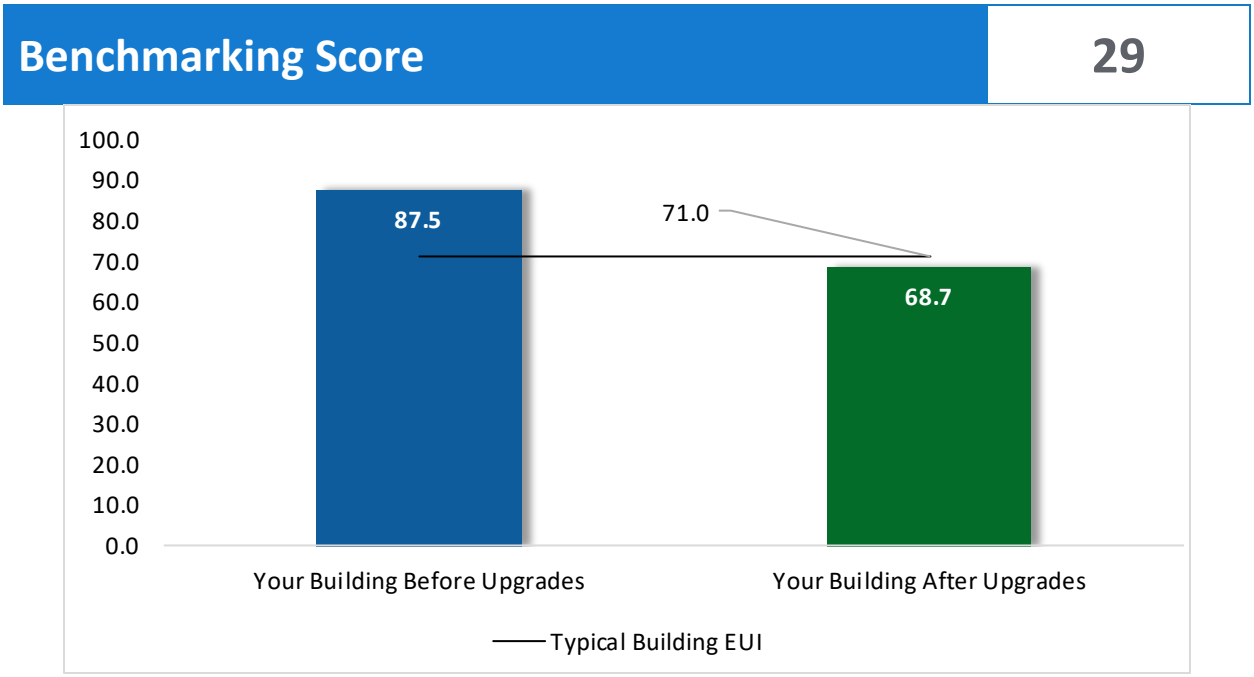


Figure 6 - Energy Use Intensity Comparison[3]

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			**336,818**	**71.8**	**-66**	**$43,134**	**$114,745**	**$50,885**	**$63,859**	**1.5**	**331,494**
ECM 1	Install LED Fixtures	Yes	69,595	9.1	-10	$8,943	$22,945	$4,997	$17,948	2.0	68,933
ECM 2	Retrofit Fixtures with LED Lamps	Yes	267,222	62.6	-56	$34,192	$91,799	$45,888	$45,911	1.3	262,561
Lighting Control Measures			**51,734**	**10.4**	**-11**	**$6,619**	**$53,545**	**$29,205**	**$24,340**	**3.7**	**50,829**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	37,575	7.6	-8	$4,808	$32,170	$8,100	$24,070	5.0	36,918
ECM 4	Install High/Low Lighting Controls	Yes	14,159	2.8	-3	$1,812	$21,375	$21,105	$270	0.1	13,911
Variable Frequency Drive (VFD) Measures			**260,038**	**63.0**	**0**	**$33,708**	**$150,046**	**$45,400**	**$104,646**	**3.1**	**261,857**
ECM 5	Install VFDs on Constant Volume (CV) Fans	Yes	175,776	48.6	0	$22,785	$85,597	$25,000	$60,597	2.7	177,005
ECM 6	Install VFDs on Chilled Water Pumps	Yes	29,620	10.4	0	$3,840	$21,690	$5,600	$16,090	4.2	29,827
ECM 7	Install VFDs on Heating Water Pumps	Yes	38,395	4.9	0	$4,977	$25,317	$8,800	$16,517	3.3	38,663
ECM 8	Install VFDs on Cooling Tower Fans	Yes	16,248	-0.9	0	$2,106	$17,441	$6,000	$11,441	5.4	16,361
Unitary HVAC Measures			**1,478**	**1.9**	**0**	**$192**	**$9,866**	**$1,580**	**$8,286**	**43.2**	**1,489**
ECM 9	Install High Efficiency Air Conditioning Units	No	1,478	1.9	0	$192	$9,866	$1,580	$8,286	43.2	1,489
Electric Chiller Replacement			**45,925**	**32.4**	**0**	**$5,953**	**$363,062**	**$19,650**	**$343,412**	**57.7**	**46,246**
ECM 10	Install High Efficiency Chillers	No	45,925	32.4	0	$5,953	$363,062	$19,650	$343,412	57.7	46,246
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**651**	**$5,225**	**$93,663**	**$21,578**	**$72,085**	**13.8**	**76,197**
ECM 11	Install High Efficiency Hot Water Boilers	No	0	0.0	651	$5,225	$93,663	$21,578	$72,085	13.8	76,197
HVAC System Improvements			**261**	**0.0**	**17**	**$167**	**$5,474**	**$20**	**$5,454**	**32.6**	**2,211**
ECM 12	Implement Demand Control Ventilation (DCV)	No	261	0.0	13	$142	$5,438	$0	$5,438	38.4	1,835
ECM 13	Install Pipe Insulation	Yes	0	0.0	3	$26	$36	$20	$16	0.6	376
Domestic Water Heating Upgrade			**0**	**0.0**	**79**	**$631**	**$1,205**	**$1,205**	**$0**	**0.0**	**9,196**
ECM 14	Install Low-Flow DHW Devices	Yes	0	0.0	79	$631	$1,205	$1,205	$0	0.0	9,196
Food Service & Refrigeration Measures			**7,072**	**0.5**	**0**	**$917**	**$10,170**	**$1,400**	**$8,770**	**9.6**	**7,121**
ECM 15	Refrigerator/Freezer Case Electrically Commutated Motors	No	742	0.1	0	$96	$1,517	$400	$1,117	11.6	748
ECM 16	Refrigeration Controls	No	3,227	0.1	0	$418	$7,733	$800	$6,933	16.6	3,249
ECM 17	Vending Machine Control	Yes	3,103	0.4	0	$402	$920	$200	$720	1.8	3,124
TOTALS			**703,326**	**180.0**	**670**	**$96,546**	**$801,774**	**$170,923**	**$630,852**	**6.5**	**786,639**

* - 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		**336,818**	**71.8**	**-66**	**$43,134**	**$114,745**	**$50,885**	**$63,859**	**1.5**	**331,494**
ECM 1	Install LED Fixtures	69,595	9.1	-10	$8,943	$22,945	$4,997	$17,948	2.0	68,933
ECM 2	Retrofit Fixtures with LED Lamps	267,222	62.6	-56	$34,192	$91,799	$45,888	$45,911	1.3	262,561
Lighting Control Measures		**51,734**	**10.4**	**-11**	**$6,619**	**$53,545**	**$29,205**	**$24,340**	**3.7**	**50,829**
ECM 3	Install Occupancy Sensor Lighting Controls	37,575	7.6	-8	$4,808	$32,170	$8,100	$24,070	5.0	36,918
ECM 4	Install High/Low Lighting Controls	14,159	2.8	-3	$1,812	$21,375	$21,105	$270	0.1	13,911
Variable Frequency Drive (VFD) Measures		**260,038**	**63.0**	**0**	**$33,708**	**$150,046**	**$45,400**	**$104,646**	**3.1**	**261,857**
ECM 5	Install VFDs on Constant Volume (CV) Fans	175,776	48.6	0	$22,785	$85,597	$25,000	$60,597	2.7	177,005
ECM 6	Install VFDs on Chilled Water Pumps	29,620	10.4	0	$3,840	$21,690	$5,600	$16,090	4.2	29,827
ECM 7	Install VFDs on Heating Water Pumps	38,395	4.9	0	$4,977	$25,317	$8,800	$16,517	3.3	38,663
ECM 8	Install VFDs on Cooling Tower Fans	16,248	-0.9	0	$2,106	$17,441	$6,000	$11,441	5.4	16,361
HVAC System Improvements		**0**	**0.0**	**3**	**$26**	**$36**	**$20**	**$16**	**0.6**	**376**
ECM 13	Install Pipe Insulation	0	0.0	3	$26	$36	$20	$16	0.6	376
Domestic Water Heating Upgrade		**0**	**0.0**	**79**	**$631**	**$1,205**	**$1,205**	**$0**	**0.0**	**9,196**
ECM 14	Install Low-Flow DHW Devices	0	0.0	79	$631	$1,205	$1,205	$0	0.0	9,196
Food Service & Refrigeration Measures		**3,103**	**0.4**	**0**	**$402**	**$920**	**$200**	**$720**	**1.8**	**3,124**
ECM 17	Vending Machine Control	3,103	0.4	0	$402	$920	$200	$720	1.8	3,124
TOTALS		**651,693**	**145.5**	**5**	**$84,521**	**$320,496**	**$126,915**	**$193,581**	**2.3**	**656,876**

* - 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		**336,818**	**71.8**	**-66**	**$43,134**	**$114,745**	**$50,885**	**$63,859**	**1.5**	**331,494**
ECM 1	Install LED Fixtures	69,595	9.1	-10	$8,943	$22,945	$4,997	$17,948	2.0	68,933
ECM 2	Retrofit Fixtures with LED Lamps	267,222	62.6	-56	$34,192	$91,799	$45,888	$45,911	1.3	262,561

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: classrooms, gymnasium, exterior wall-mounted, exterior surface mounted, and exterior pole mounted fixtures.

ECM 2: Retrofit Fixtures with LED Lamps

Replace linear fluorescent (T5 & 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, halogen incandescent lamps, incandescent lamps, and CFLs.

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		**51,734**	**10.4**	**-11**	**$6,619**	**$53,545**	**$29,205**	**$24,340**	**3.7**	**50,829**
ECM 3	Install Occupancy Sensor Lighting Controls	37,575	7.6	-8	$4,808	$32,170	$8,100	$24,070	5.0	36,918
ECM 4	Install High/Low Lighting Controls	14,159	2.8	-3	$1,812	$21,375	$21,105	$270	0.1	13,911

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 3: 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: offices, conference rooms, classrooms, dining area, kitchen, library, locker rooms, lounges, restrooms, and storage rooms.

ECM 4: Install High/Low Lighting Controls

Install occupancy sensors to provide dual level lighting control for lighting fixtures in spaces that are infrequently occupied but may require some level of continuous lighting for safety or security reasons.

Lighting fixtures with these controls operate at default low levels when the area is unoccupied to provide minimal lighting to meet security or safety code requirements for egress. Sensors detect occupancy using ultrasonic and/or infrared sensors. When an occupant enters the space, the lighting fixtures switch to full lighting levels. Fixtures automatically switch back to low level after a predefined period of vacancy. In parking lots and parking garages with significant ambient lighting, this control can sometimes be combined with photocell controls to turn the lights off when there is sufficient daylight.

The controller lowers the light level by dimming the fixture output. Therefore, the controlled fixtures need to have a dimmable ballast or driver. This will need to be considered when selecting retrofit lamps and bulbs for the areas proposed for high/low control.

This measure provides energy savings by reducing the light fixture power draw when reduced light output is appropriate.

Affected building areas: hallways and stairwells.

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

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		**260,038**	**63.0**	**0**	**$33,708**	**$150,046**	**$45,400**	**$104,646**	**3.1**	**261,857**
ECM 5	Install VFDs on Constant Volume (CV) Fans	175,776	48.6	0	$22,785	$85,597	$25,000	$60,597	2.7	177,005
ECM 6	Install VFDs on Chilled Water Pumps	29,620	10.4	0	$3,840	$21,690	$5,600	$16,090	4.2	29,827
ECM 7	Install VFDs on Heating Water Pumps	38,395	4.9	0	$4,977	$25,317	$8,800	$16,517	3.3	38,663
ECM 8	Install VFDs on Cooling Tower Fans	16,248	-0.9	0	$2,106	$17,441	$6,000	$11,441	5.4	16,361

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.

VAV system controls should not raise the supply air temperature at the expense of the fan power. A common mistake is to reset the supply air temperature to achieve chiller energy savings, which can lead to additional air flow requirements. Supply air temperature should be kept low (e.g. 55°F) until the minimum fan speed (typically about 50%) is met. At this point, it is efficient to raise the supply air temperature as the load decreases, but not such that additional air flow and thus fan energy is required.

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

Affected air handlers: Supply and return fans in AHU-1 – Gym, AHU-2 – Gym, AHU-3 - main foyer and second floor foyer, AHU-5 - Hallways 1st and second floor, AHU-6 – Cafeteria, AHU-7 - Stage and sun hall, AHU-1 - main hallway and main offices, AHU-2 – MPR, and AHU-3 – kitchen.

ECM 6: Install VFDs on Chilled Water Pumps

Install 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: two, 25.0 hp CSS chilled water pumps.

ECM 7: Install VFDs on Heating Water Pumps

Install 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: two, 20.0 hp HHW pumps in CSS & two, 5.0 hp HHW pumps in ECC.

ECM 8: Install VFDs on Cooling Tower Fans

Install a VFD to control the cooling tower fan motor. The VFD will allow the cooling tower fan to operate at the minimum speed necessary to maintain the temperature of the condenser water returning to the chiller.

Energy savings result from reducing fan speed (and power) when there is a reduced load on the chiller and outside air wet bulb temperatures are depressed. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

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		**1,478**	**1.9**	**0**	**$192**	**$9,866**	**$1,580**	**$8,286**	**43.2**	**1,489**
ECM 9	Install High Efficiency Air Conditioning Units	1,478	1.9	0	$192	$9,866	$1,580	$8,286	43.2	1,489

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 Trane condensing unit and the carrier heat pump 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 split-system air conditioning units with high efficiency split-system air conditioning units. 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: one, Trane condensing unit serving the ECC kitchen MAU and one, Carrier heat pump serving an IDF room.

4.5 Electric Chillers

#	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)
Electric Chiller Replacement		**45,925**	**32.4**	**0**	**$5,953**	**$363,062**	**$19,650**	**$343,412**	**57.7**	**46,246**
ECM 10	Install High Efficiency Chillers	45,925	32.4	0	$5,953	$363,062	$19,650	$343,412	57.7	46,246

ECM 10: Install High Efficiency Chillers

We have evaluated replacing older inefficient electric chillers with new high efficiency chillers. The type of chiller to be installed depends on the magnitude of the cooling load and variability of the cooling load profile, for example:

- Positive displacement chillers are usually under 600 tons of cooling capacity and centrifugal chillers generally start at 150 tons of cooling capacity.
- Constant speed chillers should be used to meet cooling loads with little or no variation while variable speed chillers are more efficient for variable cooling load profiles.
- Water cooled chillers are more efficient than air cooled chillers but require cooling towers and additional pumps to circulate the cooling water.
- In any given size range, variable speed chillers tend to have better partial load efficiency, but worse full load efficiency, than constant speed chillers.

Energy savings result from the improvement in chiller efficiency and matching the right type of chiller to the cooling load. The energy savings are calculated based on the cooling capacity of the new chiller, the improvement in efficiency compared with the base case equipment, the cooling load profile, and the estimated annual operating hours of the chiller before and after the upgrade.

For the purposes of this analysis, we evaluated the replacement of chillers on a one-for-one basis with equipment of the same capacity. We recommend that you work with your design team to select chillers that are sized appropriately for the cooling load at this facility. In some cases, the plant energy use can be reduced by selecting multiple chillers that match the facility load profile rather than one or two large chillers. This can also improve the chiller plant reliability through increased redundancy. Energy savings are maximized by proper selection of new equipment based on the cooling load profile.

Replacing the chiller has a long payback based on energy savings and may not be justifiable based simply on energy considerations. However, the chiller has reached the end of its normal useful life. Typically, the marginal cost of purchasing a high efficiency chiller can be justified by the marginal savings from the improved efficiency. The site is looking to replace the water cooled chillers and we recommend considering purchasing equipment that exceed the minimum efficiency required by building codes.

Affected system: two, 327.5-ton water cooled chillers serving the CSS section.

4.6 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**	**651**	**$5,225**	**$93,663**	**$21,578**	**$72,085**	**13.8**	**76,197**
ECM 11	Install High Efficiency Hot Water Boilers	0	0.0	651	$5,225	$93,663	$21,578	$72,085	13.8	76,197

ECM 11: Install High Efficiency Hot Water Boilers

We evaluated replacing older inefficient hot water boilers with high efficiency hot water boilers. Energy savings results from improved combustion efficiency and reduced standby losses at low loads.

The most notable efficiency improvement is condensing hydronic boilers which can achieve over 90% efficiency under the proper conditions. Condensing hydronic boilers typically operate at efficiencies between 85% and 87% (comparable to other high efficiency boilers) when the return water temperature is above 130°F. The boiler efficiency increases as the return water temperature drops below 130°F. Therefore, condensing hydronic boilers are evaluated when the return water temperature is less than 130°F during most of the operating hours.

For the purposes of this analysis, we evaluated the replacement of boilers on a one-for-one basis with equipment of the same capacity. We recommend that you work with your mechanical design team to select boilers that are sized appropriately for the heating load at this facility. In many cases installing multiple modular boilers rather than one or two large boilers will result in higher overall plant efficiency while providing additional system redundancy.

Replacing the boilers has a long payback and may not be justifiable based simply on energy considerations. However, the boilers [are nearing, have reached] the end of their normal useful life. Typically, the marginal cost of purchasing high efficiency boilers can be justified by the marginal savings from the improved efficiency. When the boiler is eventually replaced, consider purchasing boilers that exceed the minimum efficiency required by building codes. We also recommend working with your mechanical design team to determine whether the heating system can operate with return water temperatures below 130°F, which would allow the use of condensing boilers.

Affected systems: two, 2,452 MBh boilers serving the CSS section.

4.7 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		**261**	**0.0**	**17**	**$167**	**$5,474**	**$20**	**$5,454**	**32.6**	**2,211**
ECM 12	Implement Demand Control Ventilation (DCV)	261	0.0	13	$142	$5,438	$0	$5,438	38.4	1,835
ECM 13	Install Pipe Insulation	0	0.0	3	$26	$36	$20	$16	0.6	376

ECM 12: Implement Demand Control Ventilation (DCV)

We evaluated implementing demand control ventilation (DCV) which 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: evaluated for the gymnasium and cafeteria.

ECM 13: Install Pipe Insulation

Install insulation on 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: domestic hot water piping.

4.8 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**	**79**	**$631**	**$1,205**	**$1,205**	**$0**	**0.0**	**9,196**
ECM 14	Install Low-Flow DHW Devices	0	0.0	79	$631	$1,205	$1,205	$0	0.0	9,196

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.

4.9 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		**7,072**	**0.5**	**0**	**$917**	**$10,170**	**$1,400**	**$8,770**	**9.6**	**7,121**
ECM 15	Refrigerator/Freezer Case Electrically Commutated Motors	742	0.1	0	$96	$1,517	$400	$1,117	11.6	748
ECM 16	Refrigeration Controls	3,227	0.1	0	$418	$7,733	$800	$6,933	16.6	3,249
ECM 17	Vending Machine Control	3,103	0.4	0	$402	$920	$200	$720	1.8	3,124

ECM 15: Refrigerator/Freezer Case Electrically Commutated Motors

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

Defrost controllers can be used to override defrost of evaporator fans when the defrost operation is not necessary, which reduces annual energy consumption. This measure is applicable to existing evaporator fans with a traditional electric defrost mechanism.

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.

4.10 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.

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

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

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.

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.

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[7] or download a copy of EPA's "WaterSense® at Work: Best Management Practices for Commercial and Institutional Facilities"[8] 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.

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

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

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.

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.

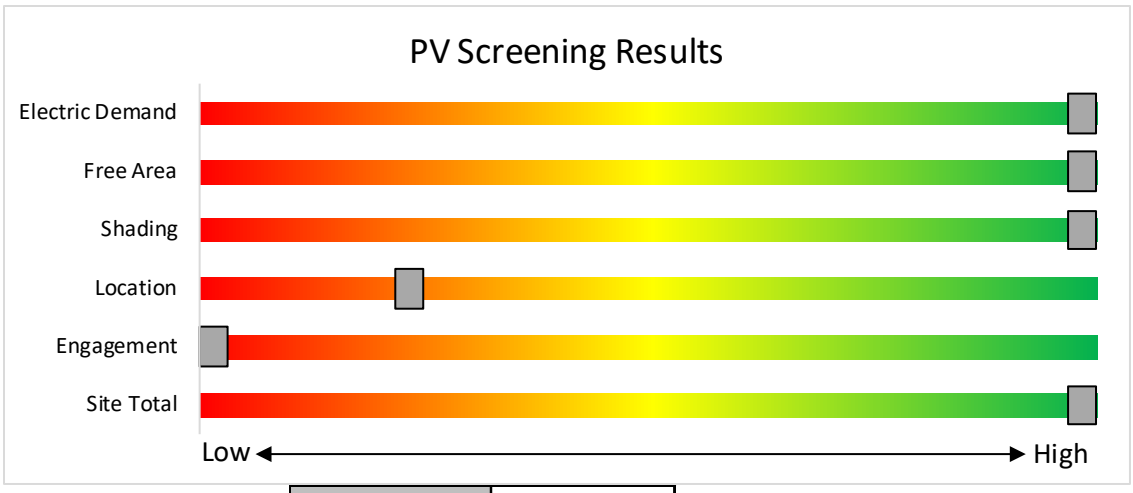
6.1 Solar Photovoltaic

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 additional PV arrays.

The amount of free area, ease of installation (location), and the lack of shading elements contribute to the **high** potential. A PV array located in the parking lot 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	310	kW DC STC
Electric Generation	369,325	kWh/yr
Displaced Cost	$47,870	/yr
Installed Cost	$1,047,800	

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.

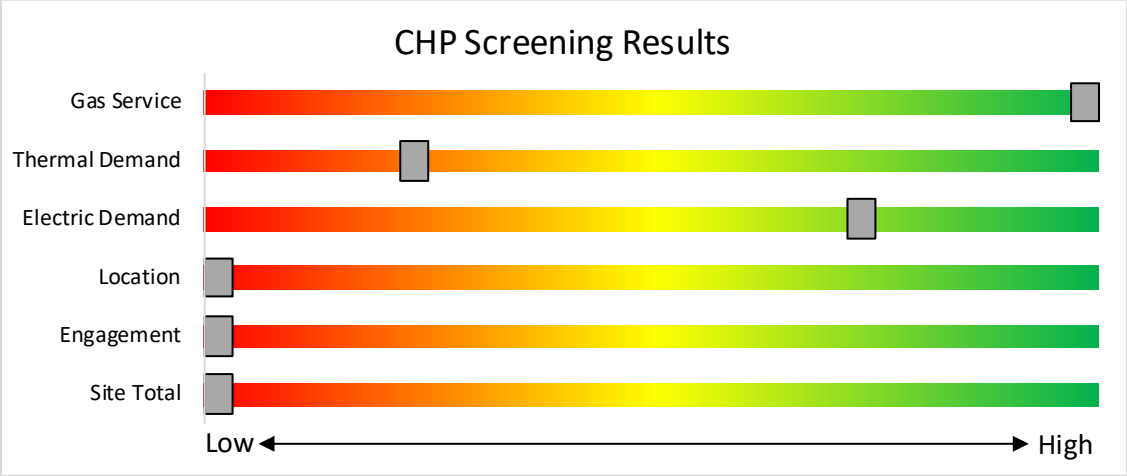


Figure 10 - Combined Heat and Power Screening

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.

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 in to 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.

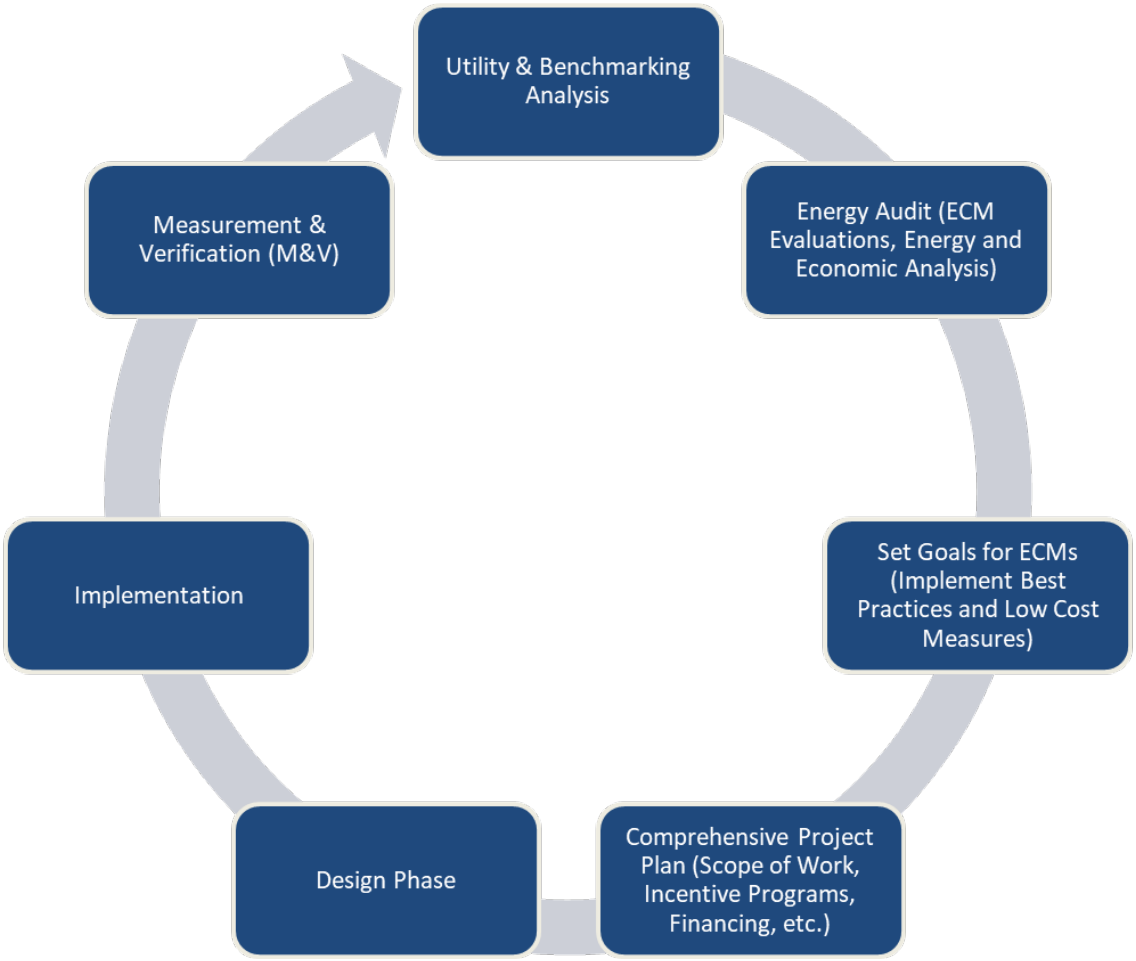


Figure 11 – Project Development Cycle

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[9].

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[10].

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

[10] 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
Classroom 100	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,455	0	$186	$602	$330	1.5
Classroom 101	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,455	0	$186	$602	$330	1.5
Classroom 102	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,455	0	$186	$602	$330	1.5
Classroom 103	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,455	0	$186	$602	$330	1.5
Classroom 104	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	0.4	1,862	0	$238	$708	$310	1.7
Classroom 106	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.3	1,058	0	$135	$438	$240	1.5
Classroom 107	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.2	793	0	$102	$329	$180	1.5
Classroom 108	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,455	0	$186	$602	$330	1.5
Classroom 109	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,455	0	$186	$602	$330	1.5
Classroom 109	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,455	0	$186	$602	$330	1.5
Classroom 110	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,455	0	$186	$602	$330	1.5
Classroom 111	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,455	0	$186	$602	$330	1.5
Classroom 112	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.3	1,058	0	$135	$438	$240	1.5
Classroom 113	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.3	1,058	0	$135	$438	$240	1.5
Classroom 114	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.3	1,058	0	$135	$438	$240	1.5
Classroom 115	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.3	1,058	0	$135	$438	$240	1.5
Classroom 117 Art	11	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	3,360	2, 3	Relamp	Yes	11	LED Lamps: (2) 18W GX23 (Plug-In) Lamps	Occupancy Sensor	37	2,318	0.2	1,076	0	$138	$545	$114	3.1
Classroom 117 Art	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2, 3	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,318	0.7	3,725	-1	$477	$1,416	$620	1.7
Classroom 118	6	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	3,360	2, 3	Relamp	Yes	6	LED Lamps: (2) 18W GX23 (Plug-In) Lamps	Occupancy Sensor	37	2,318	0.1	587	0	$75	$150	$24	1.7
Classroom 118	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
Classroom 118	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	0.5	2,328	0	$298	$818	$370	1.5
Classroom 119	4	Mercury Vapor: (1) 250W Lamp	Wall Switch	S	290	3,360	1, 3	Fixture Replacement	Yes	4	LED - Fixtures: Wall-Wash Lights	Occupancy Sensor	75	2,318	0.7	3,522	-1	$451	$1,045	$510	1.2
Classroom 119	3	LED Lamps: (1) 30W A19 Screw-In Lamp	Wall Switch	S	30	3,360	3	None	Yes	3	LED Lamps: (1) 30W A19 Screw-In Lamp	Occupancy Sensor	30	2,318	0.0	103	0	$13	$0	$0	0.0
Classroom 119	4	LED - Fixtures: Wall-Wash Lights	Wall Switch	S	100	3,360	3	None	Yes	4	LED - Fixtures: Wall-Wash Lights	Occupancy Sensor	100	2,318	0.1	458	0	$59	$270	$70	3.4
Classroom 119	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	0.4	1,862	0	$238	$438	$240	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
Classroom 120	4	Mercury Vapor: (1) 250W Lamp	Wall Switch	S	290	3,360	1, 3	Fixture Replacement	Yes	4	LED - Fixtures: Wall-Wash Lights	Occupancy Sensor	75	2,318	0.7	3,522	-1	$451	$1,045	$510	1.2
Classroom 120	3	LED Lamps: (1) 30W A19 Screw-In Lamp	Wall Switch	S	30	3,360	3	None	Yes	3	LED Lamps: (1) 30W A19 Screw-In Lamp	Occupancy Sensor	30	2,318	0.0	103	0	$13	$0	$0	0.0
Classroom 120	4	LED - Fixtures: Wall-Wash Lights	Wall Switch	S	100	3,360	3	None	Yes	4	LED - Fixtures: Wall-Wash Lights	Occupancy Sensor	100	2,318	0.1	458	0	$59	$270	$70	3.4
Classroom 120	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	0.4	1,862	0	$238	$708	$310	1.7
Classroom 121	4	Mercury Vapor: (1) 250W Lamp	Wall Switch	S	290	3,360	1, 3	Fixture Replacement	Yes	4	LED - Fixtures: Wall-Wash Lights	Occupancy Sensor	75	2,318	0.7	3,522	-1	$451	$1,045	$510	1.2
Classroom 121	3	LED Lamps: (1) 30W A19 Screw-In Lamp	Wall Switch	S	30	3,360	3	None	Yes	3	LED Lamps: (1) 30W A19 Screw-In Lamp	Occupancy Sensor	30	2,318	0.0	103	0	$13	$0	$0	0.0
Classroom 121	4	LED - Fixtures: Wall-Wash Lights	Wall Switch	S	100	3,360	3	None	Yes	4	LED - Fixtures: Wall-Wash Lights	Occupancy Sensor	100	2,318	0.1	458	0	$59	$270	$70	3.4
Classroom 121	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	0.4	1,862	0	$238	$708	$310	1.7
Classroom 122	4	Mercury Vapor: (1) 250W Lamp	Wall Switch	S	290	3,360	1, 3	Fixture Replacement	Yes	4	LED - Fixtures: Wall-Wash Lights	Occupancy Sensor	75	2,318	0.7	3,522	-1	$451	$1,045	$510	1.2
Classroom 122	3	LED Lamps: (1) 30W A19 Screw-In Lamp	Wall Switch	S	30	3,360	3	None	Yes	3	LED Lamps: (1) 30W A19 Screw-In Lamp	Occupancy Sensor	30	2,318	0.0	103	0	$13	$0	$0	0.0
Classroom 122	4	LED - Fixtures: Wall-Wash Lights	Wall Switch	S	100	3,360	3	None	Yes	4	LED - Fixtures: Wall-Wash Lights	Occupancy Sensor	100	2,318	0.1	458	0	$59	$270	$70	3.4
Classroom 122	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	0.4	1,862	0	$238	$708	$310	1.7
Classroom 123	4	Mercury Vapor: (1) 250W Lamp	Wall Switch	S	290	3,360	1, 3	Fixture Replacement	Yes	4	LED - Fixtures: Wall-Wash Lights	Occupancy Sensor	75	2,318	0.7	3,522	-1	$451	$1,045	$510	1.2
Classroom 123	3	LED Lamps: (1) 30W A19 Screw-In Lamp	Wall Switch	S	30	3,360	3	None	Yes	3	LED Lamps: (1) 30W A19 Screw-In Lamp	Occupancy Sensor	30	2,318	0.0	103	0	$13	$0	$0	0.0
Classroom 123	4	LED - Fixtures: Wall-Wash Lights	Wall Switch	S	100	3,360	3	None	Yes	4	LED - Fixtures: Wall-Wash Lights	Occupancy Sensor	100	2,318	0.1	458	0	$59	$270	$70	3.4
Classroom 123	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	0.4	1,862	0	$238	$708	$310	1.7
Classroom 124	4	Mercury Vapor: (1) 250W Lamp	Wall Switch	S	290	3,360	1, 3	Fixture Replacement	Yes	4	LED - Fixtures: Wall-Wash Lights	Occupancy Sensor	75	2,318	0.7	3,522	-1	$451	$1,045	$510	1.2
Classroom 124	3	LED Lamps: (1) 30W A19 Screw-In Lamp	Wall Switch	S	30	3,360	3	None	Yes	3	LED Lamps: (1) 30W A19 Screw-In Lamp	Occupancy Sensor	30	2,318	0.0	103	0	$13	$0	$0	0.0
Classroom 124	4	LED - Fixtures: Wall-Wash Lights	Wall Switch	S	100	3,360	3	None	Yes	4	LED - Fixtures: Wall-Wash Lights	Occupancy Sensor	100	2,318	0.1	458	0	$59	$270	$70	3.4
Classroom 124	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	0.4	1,862	0	$238	$708	$310	1.7
Classroom 125	4	Mercury Vapor: (1) 250W Lamp	Wall Switch	S	290	3,360	1, 3	Fixture Replacement	Yes	4	LED - Fixtures: Wall-Wash Lights	Occupancy Sensor	75	2,318	0.7	3,522	-1	$451	$1,045	$510	1.2
Classroom 125	3	LED Lamps: (1) 30W A19 Screw-In Lamp	Wall Switch	S	30	3,360	3	None	Yes	3	LED Lamps: (1) 30W A19 Screw-In Lamp	Occupancy Sensor	30	2,318	0.0	103	0	$13	$0	$0	0.0
Classroom 125	4	LED - Fixtures: Wall-Wash Lights	Wall Switch	S	100	3,360	3	None	Yes	4	LED - Fixtures: Wall-Wash Lights	Occupancy Sensor	100	2,318	0.1	458	0	$59	$270	$70	3.4
Classroom 125	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	0.4	1,862	0	$238	$708	$310	1.7
Classroom 126	4	Mercury Vapor: (1) 250W Lamp	Wall Switch	S	290	3,360	1, 3	Fixture Replacement	Yes	4	LED - Fixtures: Wall-Wash Lights	Occupancy Sensor	75	2,318	0.7	3,522	-1	$451	$1,045	$510	1.2

	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
Classroom 126	3	LED Lamps: (1) 30W A19 Screw-In Lamp	Wall Switch	S	30	3,360	3	None	Yes	3	LED Lamps: (1) 30W A19 Screw-In Lamp	Occupancy Sensor	30	2,318	0.0	103	0	$13	$0	$0	0.0
Classroom 126	4	LED - Fixtures: Wall-Wash Lights	Wall Switch	S	100	3,360	3	None	Yes	4	LED - Fixtures: Wall-Wash Lights	Occupancy Sensor	100	2,318	0.1	458	0	$59	$270	$70	3.4
Classroom 126	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	0.4	1,862	0	$238	$708	$310	1.7
Classroom 127	4	Mercury Vapor: (1) 250W Lamp	Wall Switch	S	290	3,360	1, 3	Fixture Replacement	Yes	4	LED - Fixtures: Wall-Wash Lights	Occupancy Sensor	75	2,318	0.7	3,522	-1	$451	$1,045	$510	1.2
Classroom 127	3	LED Lamps: (1) 30W A19 Screw-In Lamp	Wall Switch	S	30	3,360	3	None	Yes	3	LED Lamps: (1) 30W A19 Screw-In Lamp	Occupancy Sensor	30	2,318	0.0	103	0	$13	$0	$0	0.0
Classroom 127	4	LED - Fixtures: Wall-Wash Lights	Wall Switch	S	100	3,360	3	None	Yes	4	LED - Fixtures: Wall-Wash Lights	Occupancy Sensor	100	2,318	0.1	458	0	$59	$270	$70	3.4
Classroom 127	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	0.4	1,862	0	$238	$708	$310	1.7
Classroom 128	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.1	529	0	$68	$219	$120	1.5
Classroom 132	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,318	0.1	466	0	$60	$380	$130	4.2
Classroom 132	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.5	1,719	0	$220	$712	$390	1.5
Classroom 132	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,360	2, 3	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,318	0.1	547	0	$70	$262	$120	2.0
Classroom 132A Speech	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	0.3	1,397	0	$179	$599	$250	2.0
Classroom 200	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.3	1,058	0	$135	$438	$240	1.5
Classroom 201	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.3	1,058	0	$135	$438	$240	1.5
Classroom 202	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,322	0	$169	$548	$300	1.5
Classroom 203	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,455	0	$186	$602	$330	1.5
Classroom 204	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,455	0	$186	$602	$330	1.5
Classroom 205	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,455	0	$186	$602	$330	1.5
Classroom 206	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,455	0	$186	$602	$330	1.5
Classroom 207	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,455	0	$186	$602	$330	1.5
Classroom 209	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.2	793	0	$102	$329	$180	1.5
Classroom 210	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.2	793	0	$102	$329	$180	1.5
Classroom 211	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.3	1,058	0	$135	$438	$240	1.5
Classroom 212	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.2	793	0	$102	$329	$180	1.5
Classroom 213	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,455	0	$186	$602	$330	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
Classroom 214	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,455	0	$186	$602	$330	1.5
Classroom 215	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,455	0	$186	$602	$330	1.5
Classroom 216	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,455	0	$186	$602	$330	1.5
Classroom 217	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,455	0	$186	$602	$330	1.5
Classroom 218	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,455	0	$186	$602	$330	1.5
Classroom 219	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,455	0	$186	$602	$330	1.5
Classroom 220	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,455	0	$186	$602	$330	1.5
Classroom 221	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,455	0	$186	$602	$330	1.5
Classroom 222	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.4	1,455	0	$186	$602	$330	1.5
Classroom 223	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.2	793	0	$102	$329	$180	1.5
Classroom Library	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	0.4	1,862	0	$238	$708	$310	1.7
Classroom Music 116	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
Classroom Music 116	30	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2, 3	Relamp	Yes	30	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,318	0.9	4,656	-1	$596	$1,635	$740	1.5
Classroom P-089	14	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,429	2	Relamp	No	14	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,429	0.6	2,095	0	$268	$1,022	$560	1.7
Classroom P-090	14	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,429	2	Relamp	No	14	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,429	0.6	2,095	0	$268	$1,022	$560	1.7
Classroom P-091	3	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Occupancy Sensor	S	63	2,429	2	Relamp	No	3	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,429	0.1	232	0	$30	$195	$72	4.1
Classroom P-091	13	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,429	2	Relamp	No	13	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,429	0.5	1,945	0	$249	$949	$520	1.7
Classroom P-092	3	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Occupancy Sensor	S	63	2,429	2	Relamp	No	3	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,429	0.1	232	0	$30	$195	$72	4.1
Classroom P-092	13	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,429	2	Relamp	No	13	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,429	0.5	1,945	0	$249	$949	$520	1.7
Classroom P-093	3	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Occupancy Sensor	S	63	2,429	2	Relamp	No	3	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,429	0.1	232	0	$30	$195	$72	4.1
Classroom P-093	13	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,429	2	Relamp	No	13	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,429	0.5	1,945	0	$249	$949	$520	1.7
Classroom P-094	3	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Occupancy Sensor	S	63	2,429	2	Relamp	No	3	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,429	0.1	232	0	$30	$195	$72	4.1
Classroom P-094	13	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,429	2	Relamp	No	13	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,429	0.5	1,945	0	$249	$949	$520	1.7
Classroom P-096	3	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Occupancy Sensor	S	63	2,429	2	Relamp	No	3	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,429	0.1	232	0	$30	$195	$72	4.1
Classroom P-096	13	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,429	2	Relamp	No	13	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,429	0.5	1,945	0	$249	$949	$520	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
Classroom P-097	3	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Occupancy Sensor	S	63	2,429	2	Relamp	No	3	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,429	0.1	232	0	$30	$195	$72	4.1
Classroom P-097	13	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,429	2	Relamp	No	13	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,429	0.5	1,945	0	$249	$949	$520	1.7
Classroom P-098	3	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Occupancy Sensor	S	63	2,429	2	Relamp	No	3	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,429	0.1	232	0	$30	$195	$72	4.1
Classroom P-098	13	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,429	2	Relamp	No	13	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,429	0.5	1,945	0	$249	$949	$520	1.7
Classroom P-099	3	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Occupancy Sensor	S	63	2,429	2	Relamp	No	3	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,429	0.1	232	0	$30	$195	$72	4.1
Classroom P-099	13	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,429	2	Relamp	No	13	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,429	0.5	1,945	0	$249	$949	$520	1.7
Classroom P-100	7	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,360	2, 3	Relamp	Yes	7	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,318	0.4	1,914	0	$245	$781	$350	1.8
Classroom P-101	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,429	2	Relamp	No	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,429	0.4	1,347	0	$172	$657	$360	1.7
Classroom P1	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 P1	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,429	2	Relamp	No	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,429	0.3	1,197	0	$153	$584	$320	1.7
Classroom Speech Therapy	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	0.2	931	0	$119	$489	$190	2.5
Conference Main Office	8	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Occupancy Sensor	S	63	2,429	2	Relamp	No	8	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,429	0.2	620	0	$79	$520	$192	4.1
Conference Main Office CSS	10	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	3,360	2, 3	Relamp	Yes	10	LED Lamps: (2) 18W GX23 (Plug-In) Lamps	Occupancy Sensor	37	2,318	0.2	978	0	$125	$520	$110	3.3
Conference Main Office CSS	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,318	0.2	1,242	0	$159	$562	$230	2.1
Corridor 1	4	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	3,360	2, 4	Relamp	Yes	4	LED Lamps: (2) 18W GX23 (Plug-In) Lamps	High/Low Control	37	2,318	0.1	391	0	$50	$325	$241	1.7
Corridor 1	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
Corridor 1	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 4	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,318	0.2	1,164	0	$149	$499	$375	0.8
Corridor 3	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
Corridor 3	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	3,360	2, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	2,318	0.1	314	0	$40	$355	$273	2.0
CSS Hallway	4	Compact Fluorescent: (1) 26W Biaxial Plug-In Lamp	Wall Switch	S	26	3,360	2, 4	Relamp	Yes	4	LED Lamps: (1) 19W GX23 (Plug-In) Lamps	High/Low Control	19	2,318	0.0	191	0	$24	$275	$233	1.7
CSS Hallway	41	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	3,360	2, 4	Relamp	Yes	41	LED Lamps: (2) 18W GX23 (Plug-In) Lamps	High/Low Control	37	2,318	0.8	4,011	-1	$513	$2,600	$1,739	1.7
CSS Hallway	18	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	3,360	2, 4	Relamp	Yes	18	LED Lamps: (2) 18W GX23 (Plug-In) Lamps	High/Low Control	37	2,318	0.3	1,761	0	$225	$1,125	$747	1.7
CSS Hallway	12	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	12	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
CSS Hallway	6	Halogen Incandescent: (1) 50W A19 Screw-In Lamp	Wall Switch	S	50	3,360	2, 4	Relamp	Yes	6	LED Lamps: (1) 8W A19 Lamps	High/Low Control	8	2,318	0.2	986	0	$126	$328	$237	0.7
CSS Hallway	2	Halogen Incandescent: (3) 80W A19 Screw-In Lamps	Wall Switch	S	240	3,360	2, 4	Relamp	Yes	2	LED Lamps: (3) 12W A19 Lamps	High/Low Control	36	2,318	0.3	1,590	0	$203	$328	$152	0.9

	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
CSS Hallway	41	LED - Fixtures: Wall Wash	Wall Switch	S	20	3,360	4	None	Yes	41	LED - Fixtures: Wall Wash	High/Low Control	20	2,318	0.2	940	0	$120	$1,575	$1,575	0.0
CSS Hallway	4	LED Lamps: (1) 30W A19 Screw-In Lamp	Wall Switch	S	30	3,360	4	None	Yes	4	LED Lamps: (1) 30W A19 Screw-In Lamp	High/Low Control	30	2,318	0.0	137	0	$18	$225	$225	0.0
CSS Hallway	3	LED - Fixtures: Close to Ceiling Mount	Wall Switch	S	30	3,360	4	None	Yes	3	LED - Fixtures: Close to Ceiling Mount	High/Low Control	30	2,318	0.0	103	0	$13	$225	$210	1.1
CSS Hallway	7	LED - Fixtures: Close to Ceiling Mount	Wall Switch	S	80	3,360	4	None	Yes	7	LED - Fixtures: Close to Ceiling Mount	High/Low Control	80	2,318	0.1	642	0	$82	$450	$450	0.0
CSS Hallway	2	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	3,360	4	None	Yes	2	LED - Fixtures: Ceiling Mount	High/Low Control	20	2,318	0.0	46	0	$6	$0	$0	0.0
CSS Hallway	14	LED - Fixtures: Cove Mount	Wall Switch	S	20	3,360	4	None	Yes	14	LED - Fixtures: Cove Mount	High/Low Control	20	2,318	0.1	321	0	$41	$675	$675	0.0
CSS Hallway	1	LED - Fixtures: Track or Mono-Point Directional Lighting Fixtures	Wall Switch	S	40	3,360		None	No	1	LED - Fixtures: Track or Mono-Point Directional Lighting Fixtures	Wall Switch	40	3,360	0.0	0	0	$0	$0	$0	0.0
CSS Hallway	88	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	3,360	2, 4	Relamp	Yes	88	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	2,318	1.4	7,154	-1	$915	$4,982	$4,255	0.8
CSS Main Office	16	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	3,360	2, 3	Relamp	Yes	16	LED Lamps: (2) 18W GX23 (Plug-In) Lamps	Occupancy Sensor	37	2,318	0.3	1,565	0	$200	$940	$204	3.7
CSS Main Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,318	0.1	621	0	$79	$416	$150	3.3
Dining Area CSS	6	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	3,360	2, 3	Relamp	Yes	6	LED Lamps: (2) 18W GX23 (Plug-In) Lamps	Occupancy Sensor	37	2,318	0.1	587	0	$75	$150	$24	1.7
Dining Area CSS	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
Dining Area CSS	9	Halogen Incandescent: (1) 500W A19 Screw-In Lamp	Wall Switch	S	500	3,360	2, 3	Relamp	Yes	9	LED Lamps: (1) 75W A19 Lamps	Occupancy Sensor	75	2,318	2.9	14,911	-3	$1,908	$425	$88	0.2
Dining Area CSS	2	Halogen Incandescent: (4) 80W A19 Screw-In Lamps	Wall Switch	S	320	3,360	2, 3	Relamp	Yes	2	LED Lamps: (4) 12W A19 Lamps	Occupancy Sensor	48	2,318	0.4	2,121	0	$271	$138	$16	0.4
Dining Area CSS	4	LED Lamps: (1) 15W A19 Screw-In Lamp	Wall Switch	S	15	3,360	3	None	Yes	4	LED Lamps: (1) 15W A19 Screw-In Lamp	Occupancy Sensor	15	2,318	0.0	69	0	$9	$270	$70	22.7
Dining Area CSS	3	LED Lamps: (1) 9W Biax Lamps	Wall Switch	S	9	3,360	3	None	Yes	3	LED Lamps: (1) 9W Biax Lamps	Occupancy Sensor	9	2,318	0.0	31	0	$4	$0	$0	0.0
Dining Area CSS	20	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	3,360	3	None	Yes	20	LED - Fixtures: Ceiling Mount	Occupancy Sensor	20	2,318	0.1	458	0	$59	$540	$140	6.8
Dining Area CSS	18	LED - Fixtures: Ceiling Mount	Wall Switch	S	30	3,360	3	None	Yes	18	LED - Fixtures: Ceiling Mount	Occupancy Sensor	30	2,318	0.1	619	0	$79	$540	$140	5.1
Dining Area CSS	25	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2, 3	Relamp	Yes	25	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,318	0.8	3,880	-1	$496	$1,453	$640	1.6
ECC Hallway	20	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	3,360	2, 4	Relamp	Yes	20	LED Lamps: (2) 18W GX23 (Plug-In) Lamps	High/Low Control	37	2,318	0.4	1,957	0	$250	$1,400	$980	1.7
ECC Hallway	17	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	17	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
ECC Hallway	5	Incandescent: (1) 100W A19 Screw-In Lamp	Wall Switch	S	100	3,360	2, 4	Relamp	Yes	5	LED Lamps: (1) 15W A19 Lamps	High/Low Control	15	2,318	0.3	1,657	0	$212	$311	$235	0.4
ECC Hallway	10	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Wall Switch	S	20	3,360	4	None	Yes	10	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	High/Low Control	20	2,318	0.0	229	0	$29	$450	$450	0.0
ECC Hallway	14	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	3,360	2, 4	Relamp	Yes	14	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	2,318	0.2	1,101	0	$141	$1,130	$843	2.0
ECC Hallway	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	3,360	2, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	2,318	0.0	157	0	$20	$65	$24	2.0

	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
ECC Hallway	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	3,360	2, 4	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	2,318	0.1	325	0	$42	$298	$265	0.8
ECC Hallway	28	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2, 4	Relamp	Yes	28	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,318	0.8	4,345	-1	$556	$2,147	$1,685	0.8
Electrical Room 3	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	73	0	$9	$73	$40	3.6
Electrical Room 4	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	73	0	$9	$73	$40	3.6
Electrical Room 4	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,000	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,000	0.0	36	0	$5	$37	$20	3.6
Electrical Room 5	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,000	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,000	0.0	36	0	$5	$37	$20	3.6
Electrical Room 6	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	73	0	$9	$73	$40	3.6
Electrical Room Kitchen	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,000	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,000	0.0	36	0	$5	$37	$20	3.6
Elevator Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,318	0.1	310	0	$40	$189	$80	2.7
Elevator Room ECC	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	88	0	$11	$37	$20	1.5
Exterior Ground	3	High-Pressure Sodium: (1) 400W Lamp	Photocell		465	4,380		None	No	3	High-Pressure Sodium: (1) 400W Lamp	Photocell	465	4,380	0.0	0	0	$0	$0	$0	0.0
Concrete Pole Fixtures	9	LED - Fixtures: Concrete Pole Fixtures	Timeclock		26	4,380		None	No	9	LED - Fixtures: Concrete Pole Fixtures	Timeclock	26	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Ground	2	LED - Fixtures: Spot Light	Timeclock		26	4,380		None	No	2	LED - Fixtures: Spot Light	Timeclock	26	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Ground	1	LED - Fixtures: LED School Sign	Timeclock		300	4,380		None	No	1	LED - Fixtures: LED School Sign	Timeclock	300	4,380	0.0	0	0	$0	$0	$0	0.0
Solar Canopy	18	LED - Fixtures: Ceiling Mount	Photocell		30	4,380		None	No	18	LED - Fixtures: Ceiling Mount	Photocell	30	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Ground	16	LED - Fixtures: Ceiling Mount	Timeclock		36	4,380		None	No	16	LED - Fixtures: Ceiling Mount	Timeclock	36	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Ground	32	LED - Fixtures: Ceiling Mount	Timeclock		9	4,380		None	No	32	LED - Fixtures: Ceiling Mount	Timeclock	9	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Ground	2	LED - Fixtures: Ceiling Mount	Timeclock		9	8,760		None	No	2	LED - Fixtures: Ceiling Mount	Timeclock	9	8,760	0.0	0	0	$0	$0	$0	0.0
Exterior Ground	13	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock		36	4,380		None	No	13	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock	36	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Ground	3	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock		72	4,380		None	No	3	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock	72	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Ground	9	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock		90	4,380		None	No	9	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock	90	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Ground	2	LED - Fixtures: Outdoor Porch Wall Mount	Timeclock		13	4,380		None	No	2	LED - Fixtures: Outdoor Porch Wall Mount	Timeclock	13	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Ground	6	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock		52	4,380		None	No	6	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	52	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Ground	60	LED - Fixtures: Wall Pack	Timeclock		26	4,380		None	No	60	LED - Fixtures: Wall Pack	Timeclock	26	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Ground	5	LED - Fixtures: Wall Pack	Timeclock		72	4,380		None	No	5	LED - Fixtures: Wall Pack	Timeclock	72	4,380	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	3	Metal Halide: (1) 1000W Lamp	Timeclock		1,080	4,380	1	Fixture Replacement	No	3	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	300	4,380	0.0	10,249	0	$1,329	-$1,061	-$2,123	0.8
Exterior Ground	4	Metal Halide: (1) 100W Lamp	Timeclock		128	4,380	1	Fixture Replacement	No	4	LED - Fixtures: Downlight Surface Mount	Timeclock	30	4,380	0.0	1,717	0	$223	$800	$40	3.4
Concrete Pole Fixtures	7	Compact Fluorescent: (1) 42W Plug-in Lamp	Timeclock		42	4,380	2	Relamp	No	7	LED Lamps: (1) 29W GX23 (Plug-In) Lamps	Timeclock	29	4,380	0.0	399	0	$52	$88	$14	1.4
Exterior Ground	1	Metal Halide: (1) 250W Lamp	Timeclock		295	4,380	1	Fixture Replacement	No	1	LED - Fixtures: Bollard Fixture	Timeclock	75	4,380	0.0	964	0	$125	$717	$100	4.9
Exterior Ground	6	Metal Halide: (1) 400W Lamp	Timeclock		458	4,380	1	Fixture Replacement	No	6	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	120	4,380	0.0	8,883	0	$1,151	$3,327	$600	2.4
Exterior Ground Level Courtyard	2	Compact Fluorescent: (1) 40W Biaxial Plug-In Lamp	Timeclock		40	4,380	2	Relamp	No	2	LED Lamps: (1) 28W PL-L (Biax) Lamps	Timeclock	28	4,380	0.0	105	0	$14	$27	$4	1.7
Exterior Ground Level Courtyard	4	LED - Fixtures: In Ground Fixtures	Timeclock		26	4,380		None	No	4	LED - Fixtures: In Ground Fixtures	Timeclock	26	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Ground Level Courtyard	1	LED Lamps: (1) 26W Biax Lamps	Timeclock		26	4,380		None	No	1	LED Lamps: (1) 26W Biax Lamps	Timeclock	26	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Ground Level Courtyard	6	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock		52	4,380		None	No	6	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock	52	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Ground Level Courtyard	4	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock		36	4,380		None	No	4	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock	36	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Ground Level Courtyard	2	Metal Halide: (1) 100W Lamp	Timeclock		128	4,380	1	Fixture Replacement	No	2	LED - Fixtures: Downlight Recessed	Timeclock	30	4,380	0.0	858	0	$111	$304	$20	2.5
Faculty Dining	6	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	3,360	2, 3	Relamp	Yes	6	LED Lamps: (2) 18W GX23 (Plug-In) Lamps	Occupancy Sensor	37	2,318	0.1	587	0	$75	$420	$94	4.3
Faculty Dining	4	LED - Fixtures: Close to Ceiling Mount	Wall Switch	S	30	3,360	3	None	Yes	4	LED - Fixtures: Close to Ceiling Mount	Occupancy Sensor	30	2,318	0.0	137	0	$18	$270	$70	11.4
Faculty Dining	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,318	0.1	466	0	$60	$380	$130	4.2
Gymnasium 1	24	Incandescent: (1) 200W A19 Screw-In Lamp	Wall Switch	S	200	3,360	2, 3	Relamp	Yes	24	LED Lamps: (1) 30W A19 Lamps	Occupancy Sensor	30	2,318	3.1	15,905	-3	$2,035	$953	$188	0.4
Gymnasium 1	24	Metal Halide: (1) 250W Lamp	Wall Switch	S	295	3,360	1, 3	Fixture Replacement	Yes	24	LED - Fixtures: High-Bay	Occupancy Sensor	89	2,318	4.0	20,751	-4	$2,655	$17,161	$4,080	4.9
Janitorial 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,000	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,000	0.0	36	0	$5	$37	$20	3.6
Janitorial 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,000	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,000	0.0	36	0	$5	$37	$20	3.6
Janitorial 3	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	73	0	$9	$73	$40	3.6
Janitorial 4	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	36	0	$5	$37	$20	3.6
Janitorial 5	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	36	0	$5	$37	$20	3.6
Kitchen CSS	8	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	3,360	2, 3	Relamp	Yes	8	LED Lamps: (2) 18W GX23 (Plug-In) Lamps	Occupancy Sensor	37	2,318	0.2	783	0	$100	$470	$102	3.7
Kitchen CSS	1	Compact Fluorescent: (1) 42W Spiral Plug-In Lamp	Wall Switch	S	42	3,360	2	Relamp	No	1	LED Lamps: (1) 30W GX23 (Plug-In) Lamps	Wall Switch	30	3,360	0.0	44	0	$6	$13	$2	1.9
Kitchen CSS	7	Incandescent: (1) 100W A19 Screw-In Lamp	Wall Switch	S	100	3,360	2, 3	Relamp	Yes	7	LED Lamps: (1) 15W A19 Lamps	Occupancy Sensor	15	2,318	0.5	2,319	0	$297	$391	$84	1.0
Kitchen CSS	26	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,360	2, 3	Relamp	Yes	26	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,318	1.4	7,109	-1	$910	$2,439	$1,180	1.4

	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 ECC	3	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	3,360	2, 3	Relamp	Yes	3	LED Lamps: (1) 9W A19 Lamps	Occupancy Sensor	9	2,318	0.1	596	0	$76	$52	$6	0.6
Kitchen ECC	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,429	2	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.1	264	0	$34	$110	$60	1.5
Kitchen ECC	21	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	21	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	1.0	4,889	-1	$625	$1,690	$770	1.5
Kitchen Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.1	92	0	$12	$189	$40	12.6
Library 1	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
Library 1	7	LED - Fixtures: Ceiling Mount	Wall Switch	S	15	3,360	3	None	Yes	7	LED - Fixtures: Ceiling Mount	Occupancy Sensor	15	2,318	0.0	120	0	$15	$270	$70	13.0
Library 1	64	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	64	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	2.9	14,899	-3	$1,906	$4,855	$2,270	1.4
Locker Room Boys	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2, 3	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,318	0.2	1,086	0	$139	$526	$210	2.3
Locker Room Boys	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,360	2	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,360	0.0	207	0	$26	$73	$40	1.2
Locker Room Girls	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2, 3	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,318	0.2	1,086	0	$139	$526	$210	2.3
Locker Room Girls	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,360	2	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,360	0.0	207	0	$26	$73	$40	1.2
Lounge Faculty	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	0.4	1,862	0	$238	$708	$310	1.7
Lounge Teachers	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,429	2	Relamp	No	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,429	0.4	1,347	0	$172	$657	$360	1.7
Main Office Copy Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,360	2, 3	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,318	0.1	547	0	$70	$262	$120	2.0
Main Office ECC	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 Office ECC	14	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Occupancy Sensor	S	63	2,429	2	Relamp	No	14	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,429	0.3	1,085	0	$139	$910	$336	4.1
Main Office Lounge	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,360	2, 3	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,318	0.2	1,094	0	$140	$562	$230	2.4
Maintenance Shop	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	11	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.3	1,342	0	$172	$402	$220	1.1
Mechanical 1	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2	Relamp	No	11	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.3	399	0	$51	$402	$220	3.6
Mechanical 3	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2	Relamp	No	16	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.4	581	0	$74	$584	$320	3.6
Mechanical CSS Boiler Room	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.4	653	0	$84	$657	$360	3.6
Mechanical ECC	2	Exit Signs: LED - 2 W Lamp	None		6	1,000		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	1,000	0.0	0	0	$0	$0	$0	0.0
Mechanical ECC	30	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2	Relamp	No	30	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.7	1,089	0	$139	$1,095	$600	3.6
Mechanical IDF	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	73	0	$9	$73	$40	3.6
Mechanical Phone Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	73	0	$9	$73	$40	3.6

	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
MPR	47	Compact Fluorescent: (3) 42W Biaxial Plug-In Lamps	Occupancy Sensor	S	126	2,429	2	Relamp	No	47	LED Lamps: (3) 29W PL-L (Biax) Lamps	Occupancy Sensor	89	2,429	1.3	4,646	-1	$594	$1,904	$282	2.7
MPR	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
Office 208	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	0.2	931	0	$119	$489	$190	2.5
Office P-095A	6	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Occupancy Sensor	S	63	2,429	2	Relamp	No	6	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,429	0.1	465	0	$59	$390	$144	4.1
Office P-095B	4	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Occupancy Sensor	S	63	2,429	2	Relamp	No	4	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,429	0.1	310	0	$40	$260	$96	4.1
Office Nurse	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,360	2, 3	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,318	0.2	820	0	$105	$489	$190	2.8
Office 116A	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	0.1	466	0	$60	$226	$100	2.1
Office 116B	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	0.1	466	0	$60	$226	$100	2.1
Office Assistant Principal	3	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	3,360	2, 3	Relamp	Yes	3	LED Lamps: (2) 18W GX23 (Plug-In) Lamps	Occupancy Sensor	37	2,318	0.1	293	0	$38	$75	$12	1.7
Office Assistant Principal	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	0.3	1,397	0	$179	$599	$250	2.0
Office Child Study Team	3	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	3,360	2, 3	Relamp	Yes	3	LED Lamps: (2) 18W GX23 (Plug-In) Lamps	Occupancy Sensor	37	2,318	0.1	293	0	$38	$345	$82	7.0
Office Child Study Team	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,318	0.1	310	0	$40	$73	$40	0.8
Office CSS Principal	2	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	3,360	2, 3	Relamp	Yes	2	LED Lamps: (2) 18W GX23 (Plug-In) Lamps	Occupancy Sensor	37	2,318	0.0	196	0	$25	$166	$48	4.7
Office CSS Principal	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	0.1	466	0	$60	$226	$100	2.1
Office CST LDTC	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,360	2, 3	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,318	0.1	547	0	$70	$262	$120	2.0
Office CST Phychologist	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	0.1	466	0	$60	$226	$100	2.1
Office CST Social Worker	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	0.1	466	0	$60	$226	$100	2.1
Office director No After 3	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	0.1	466	0	$60	$226	$100	2.1
Office Director of Special Services	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,360	2, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,318	0.1	466	0	$60	$226	$100	2.1
Office Kitchen	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,360	2, 3	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,318	0.1	547	0	$70	$262	$120	2.0
Office Nurse	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2, 3	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,318	0.2	776	0	$99	$183	$100	0.8
Office Nurse	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,360	2, 3	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,318	0.4	2,187	0	$280	$854	$390	1.7
Office PE	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Office PE	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,360	2, 3	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,318	0.1	547	0	$70	$262	$120	2.0
Office PE 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1

	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 PE 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,360	2, 3	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,318	0.1	547	0	$70	$262	$120	2.0
Office Security	2	LED - Fixtures: Ambient - 2' - Direct/Indirect Fixture	Wall Switch	S	30	3,360	3	None	Yes	2	LED - Fixtures: Ambient - 2' - Direct/Indirect Fixture	Occupancy Sensor	30	2,318	0.0	69	0	$9	$116	$40	8.6
Office Security	1	LED - Fixtures: Track or Mono-Point Directional Lighting Fixtures	Wall Switch	S	40	3,360		None	No	1	LED - Fixtures: Track or Mono-Point Directional Lighting Fixtures	Wall Switch	40	3,360	0.0	0	0	$0	$0	$0	0.0
Office VP ECC	6	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Occupancy Sensor	S	63	2,429	2	Relamp	No	6	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,429	0.1	465	0	$59	$390	$144	4.1
Restroom - 106	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - 107	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - 120	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - 121	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - 122	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - 123	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - 124	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - 125	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - 126	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - 127	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - 200	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - 201	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - 202	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - 203	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - 204	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - 205	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - 207	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Female 10	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,318	0.1	466	0	$60	$110	$60	0.8
Restroom - Female 12	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,318	0.1	621	0	$79	$416	$150	3.3
Restroom - Female 14	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2, 3	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,318	0.0	155	0	$20	$37	$20	0.8
Restroom - Female 16	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,318	0.1	310	0	$40	$189	$80	2.7

	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
Restroom - Female 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	88	0	$11	$37	$20	1.5
Restroom - Female 3	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	S	33	2,429	2	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,429	0.0	43	0	$5	$33	$12	3.8
Restroom - Female 3	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.1	264	0	$34	$110	$60	1.5
Restroom - Female 4	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	88	0	$11	$37	$20	1.5
Restroom - Female 5	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Female 6	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.1	264	0	$34	$110	$60	1.5
Restroom - Female 7	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,318	0.1	621	0	$79	$416	$150	3.3
Restroom - Female 8	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Male 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	88	0	$11	$37	$20	1.5
Restroom - Male 10	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,318	0.1	466	0	$60	$380	$130	4.2
Restroom - Male 12	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,318	0.1	621	0	$79	$416	$150	3.3
Restroom - Male 14	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Male 2	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	S	33	2,429	2	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,429	0.0	43	0	$5	$33	$12	3.8
Restroom - Male 2	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.1	264	0	$34	$110	$60	1.5
Restroom - Male 3	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Male 4	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	88	0	$11	$37	$20	1.5
Restroom - Male 5	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.1	264	0	$34	$110	$60	1.5
Restroom - Male 6	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,318	0.1	621	0	$79	$416	$150	3.3
Restroom - Male 8	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - P-096	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	88	0	$11	$37	$20	1.5
Restroom - P-097	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	88	0	$11	$37	$20	1.5
Restroom - P-098	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	88	0	$11	$37	$20	1.5
Restroom - P-099	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	88	0	$11	$37	$20	1.5
Restroom - P90	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	88	0	$11	$37	$20	1.5
Restroom - Unisex 100	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1

	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 - Unisex 101	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex 102	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex 103	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex 108	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex 109	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex 110	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex 111	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex 112	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex 113	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex 114	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex 115	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex 115	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex 211	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex 213	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex 214	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex 215	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex 216	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex 217	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex 218	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex 219	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex 220	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex 221	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex 222	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex 42	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex 43	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1

	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 - Unisex 60	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex P091	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	88	0	$11	$37	$20	1.5
Restroom - Unisex P92	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	88	0	$11	$37	$20	1.5
Restroom - Unisex P93	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	88	0	$11	$37	$20	1.5
Restroom - Unisex P94	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	88	0	$11	$37	$20	1.5
Restroom - Unisex 206	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom - Unisex P089	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	88	0	$11	$37	$20	1.5
Restroom Nurse	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom P-100	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,360	0.0	122	0	$16	$37	$20	1.1
Restroom P-206	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	88	0	$11	$37	$20	1.5
Server Room IDF	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	88	0	$11	$37	$20	1.5
Stairs 1	4	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	3,360	2, 4	Relamp	Yes	4	LED Lamps: (2) 18W GX23 (Plug-In) Lamps	High/Low Control	37	2,318	0.1	391	0	$50	$325	$241	1.7
Stairs 1	5	Incandescent: (2) 100W A19 Screw-In Lamps	Wall Switch	S	200	3,360	2, 4	Relamp	Yes	5	LED Lamps: (2) 15W A19 Lamps	High/Low Control	30	2,318	0.6	3,313	-1	$424	$397	$245	0.4
Stairs 1	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	30	3,360		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	30	3,360	0.0	0	0	$0	$0	$0	0.0
Stairs 2	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
Stairs 2	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	3,360	2, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	2,318	0.0	236	0	$30	$98	$36	2.0
Stairs 2	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2, 4	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,318	0.2	1,242	0	$159	$742	$610	0.8
Stairs 3	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
Stairs 3	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2, 4	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,318	0.3	1,552	0	$199	$815	$650	0.8
Stairs 4	2	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	3,360	2, 4	Relamp	Yes	2	LED Lamps: (2) 18W GX23 (Plug-In) Lamps	High/Low Control	37	2,318	0.0	196	0	$25	$50	$8	1.7
Stairs 4	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
Stairs 4	2	Incandescent: (2) 100W A19 Screw-In Lamps	Wall Switch	S	200	3,360	2, 4	Relamp	Yes	2	LED Lamps: A19 Lamps	High/Low Control	30	2,318	0.3	1,325	0	$170	$294	$148	0.9
Stairs 4	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	15	3,360		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	15	3,360	0.0	0	0	$0	$0	$0	0.0
Stairs 4	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	3,360		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	3,360	0.0	0	0	$0	$0	$0	0.0
Stairs 5	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,360	2, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,318	0.1	310	0	$40	$298	$180	3.0

	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
Stairs 5	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,360	2, 4	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	2,318	0.1	273	0	$35	$73	$40	0.9
Storage 10	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.1	185	0	$24	$416	$80	14.2
Storage 11	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.1	139	0	$18	$380	$60	18.0
Storage 118	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	36	0	$5	$37	$20	3.6
Storage 13	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.1	185	0	$24	$416	$80	14.2
Storage 14	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2, 3	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.4	554	0	$71	$708	$240	6.6
Storage 16	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2, 3	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.2	277	0	$35	$489	$120	10.4
Storage 202	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	73	0	$9	$73	$40	3.6
Storage 22	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,000	2	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,000	0.0	62	0	$8	$73	$40	4.2
Storage 4	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,000	2	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,000	0.1	145	0	$19	$146	$80	3.6
Storage 5	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,000	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,000	0.0	36	0	$5	$37	$20	3.6
Storage 6	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,000	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,000	0.0	36	0	$5	$37	$20	3.6
Storage 7	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,000	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,000	0.0	36	0	$5	$37	$20	3.6
Storage 8	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,000	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,000	0.0	36	0	$5	$37	$20	3.6
Storage 9	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2, 3	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.2	277	0	$35	$489	$120	10.4
Storage 9	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,000	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,000	0.0	36	0	$5	$37	$20	3.6
Storage Art	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 Art	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.1	185	0	$24	$416	$80	14.2
Storage Art 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,000	2	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,000	0.0	62	0	$8	$73	$40	4.2
Storage Dining Hall	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.1	185	0	$24	$416	$80	14.2
Storage Dining Hall 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.1	92	0	$12	$189	$40	12.6
Storage Gym	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2, 3	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.2	277	0	$35	$489	$120	10.4
Storage Gym	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2, 3	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.2	277	0	$35	$219	$120	2.8
Storage Music	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.1	92	0	$12	$189	$40	12.6
Classroom P-252	3	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Occupancy Sensor	S	63	2,429	2	Relamp	No	3	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,429	0.1	232	0	$30	$195	$72	4.1

	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 P-252	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.3	1,146	0	$147	$475	$260	1.5
Classroom P-253	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 P-253	15	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,429	2	Relamp	No	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,429	0.6	2,244	0	$287	$1,095	$600	1.7
Classroom P-254	3	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Occupancy Sensor	S	63	2,429	2	Relamp	No	3	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,429	0.1	232	0	$30	$195	$72	4.1
Classroom P-254	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.3	1,146	0	$147	$475	$260	1.5
Classroom P-255	3	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Occupancy Sensor	S	63	2,429	2	Relamp	No	3	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,429	0.1	232	0	$30	$195	$72	4.1
Classroom P-255	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.3	1,146	0	$147	$475	$260	1.5
Classroom P-256	3	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Occupancy Sensor	S	63	2,429	2	Relamp	No	3	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,429	0.1	232	0	$30	$195	$72	4.1
Classroom P-256	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.3	1,146	0	$147	$475	$260	1.5
Classroom P-257	3	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Occupancy Sensor	S	63	2,429	2	Relamp	No	3	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,429	0.1	232	0	$30	$195	$72	4.1
Classroom P-257	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.3	1,146	0	$147	$475	$260	1.5
Classroom P-258	3	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Occupancy Sensor	S	63	2,429	2	Relamp	No	3	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,429	0.1	232	0	$30	$195	$72	4.1
Classroom P-258	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.3	1,146	0	$147	$475	$260	1.5
Classroom P-259	3	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Occupancy Sensor	S	63	2,429	2	Relamp	No	3	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,429	0.1	232	0	$30	$195	$72	4.1
Classroom P-259	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.3	1,146	0	$147	$475	$260	1.5
Classroom P-260	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.3	1,234	0	$158	$511	$280	1.5
Classroom P-261	3	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Occupancy Sensor	S	63	2,429	2	Relamp	No	3	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,429	0.1	232	0	$30	$195	$72	4.1
Classroom P-261	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.3	1,146	0	$147	$475	$260	1.5
Classroom P-263	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	2	Relamp	No	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.3	1,234	0	$158	$511	$280	1.5
CSS Hallway	4	Compact Fluorescent: (1) 26W Biaxial Plug-In Lamp	Wall Switch	S	26	3,360	2, 4	Relamp	Yes	4	LED Lamps: (1) 19W GX23 (Plug-In) Lamps	High/Low Control	19	2,318	0.0	191	0	$24	$275	$233	1.7
CSS Hallway	4	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	3,360	2, 4	Relamp	Yes	4	LED Lamps: (2) 18W GX23 (Plug-In) Lamps	High/Low Control	37	2,318	0.1	391	0	$50	$325	$241	1.7
CSS 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
CSS Hallway	14	LED Lamps: (2) 13W Biax Lamps	Wall Switch	S	26	3,360	4	None	Yes	14	LED Lamps: (2) 13W Biax Lamps	High/Low Control	26	2,318	0.1	417	0	$53	$675	$675	0.0
CSS Hallway	5	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	3,360	4	None	Yes	5	LED - Fixtures: Ceiling Mount	High/Low Control	20	2,318	0.0	115	0	$15	$225	$225	0.0
CSS Hallway	66	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	3,360	2, 4	Relamp	Yes	66	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	2,318	1.0	5,365	-1	$686	$3,680	$3,135	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
ECC Hallway Floor 2	16	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	3,360	2, 4	Relamp	Yes	16	LED Lamps: (2) 18W GX23 (Plug-In) Lamps	High/Low Control	37	2,318	0.3	1,565	0	$200	$1,075	$739	1.7

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
Mechanical 3	AHU-1 - Gym	1	Supply Fan	15.0	91.0%	No	York	CSI217SHAF	B	3,360	5	No	93.0%	Yes	1	4.4	16,094	0	$2,086	$7,041	$2,400	2.2
Mechanical 3	AHU-1 - Gym	1	Return Fan	15.0	91.0%	No	York	CSI217SHAF	B	3,360	5	No	93.0%	Yes	1	4.6	16,094	0	$2,086	$7,041	$2,400	2.2
Mechanical 3	AHU-2 - Gym	1	Supply Fan	20.0	91.0%	No	York	CSI336SHAF24	B	3,360	5	No	93.0%	Yes	1	5.9	21,458	0	$2,782	$8,582	$2,600	2.2
Mechanical 3	AHU-2 - Gym	1	Return Fan	20.0	91.0%	No	York	CSI336SHAF24	B	3,360	5	No	93.0%	Yes	1	6.1	21,458	0	$2,782	$8,582	$2,600	2.2
Mechanical 4	AHU-3 - main foyer and second floor foyer	1	Supply Fan	20.0	91.0%	No	York	CSI270SVAF24	B	3,360	5	No	93.0%	Yes	1	5.9	21,458	0	$2,782	$8,582	$2,600	2.2
Mechanical 4	AHU-3 - main foyer and second floor foyer	1	Return Fan	20.0	91.0%	No	York	CSI270SVAF24	B	3,360	5	No	93.0%	Yes	1	6.1	21,458	0	$2,782	$8,582	$2,600	2.2
Mechanical CSS boiler room	AHU-5 - Hallways 1st and second floor	1	Supply Fan	15.0	91.0%	No	York	CSI156SHAF18	B	3,360	5	No	93.0%	Yes	1	4.4	16,094	0	$2,086	$7,041	$2,400	2.2
Mechanical CSS boiler room	AHU-6 - Cafeteria	1	Supply Fan	15.0	91.0%	No	York	CSI156SHAF18	B	3,360	5	No	93.0%	Yes	1	4.4	16,094	0	$2,086	$7,041	$2,400	2.2
Mechanical CSS boiler room	AHU-7 - Stage and sun hall	1	Supply Fan	7.5	88.5%	No	York	CSI74SRFCII12	B	3,360	5	No	91.0%	Yes	1	2.2	8,360	0	$1,084	$4,738	$2,000	2.5
Mechanical ECC	AHU-1 - main hallway and main offices	1	Supply Fan	3.0	86.5%	No	Trane	MCCB010UA0B	B	3,360	5	No	89.5%	Yes	1	0.9	3,457	0	$448	$3,884	$400	7.8
Mechanical ECC	AHU-1 - main hallway and main offices	1	Return Fan	2.0	84.0%	No	Trane	MCCB010UA0B	B	3,360	5	No	86.5%	Yes	1	0.6	2,354	0	$305	$3,261	$200	10.0
Mechanical ECC	AHU-2 - MPR	1	Supply Fan	5.0	87.5%	No	Trane	MCCB012UA0B0UA	B	3,360	5	No	89.5%	Yes	1	1.5	5,587	0	$724	$4,076	$1,800	3.1
Mechanical ECC	AHU-2 - MPR	1	Return Fan	3.0	86.5%	No	Trane	MCCB012UA0B0UA	B	3,360	5	No	89.5%	Yes	1	0.9	3,457	0	$448	$3,884	$400	7.8
Mechanical ECC	AHU-3 - kitchen	1	Supply Fan	2.0	84.0%	No	Trane	MCCB006UA0B	B	3,360	5	No	86.5%	Yes	1	0.6	2,354	0	$305	$3,261	$200	10.0
Exterior Roof	MAU - Kitchen	1	Makeup Air Fan	2.0	84.0%	No	Captive air	Unknown	B	1,373		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Roof	MAU - ECC	1	Makeup Air Fan	2.0	84.0%	No	Greenheck	IGX-112-H22-DB	B	1,373		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Roof	Serves kitchen dishwasher	1	Exhaust Fan	0.1	65.0%	No	Penn	DX18B	B	3,360		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Roof	Serves room 118	1	Exhaust Fan	0.5	65.0%	No	Penn Barry	DX14B	B	3,360		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Roof	Serves room 250	1	Exhaust Fan	0.1	65.0%	No	Penn	WCC18	B	3,360		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Roof	serves rest rooms	2	Exhaust Fan	0.1	65.0%	No	Penn	DX11R	B	3,360		No	65.0%	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	Serves stairwell	1	Exhaust Fan	0.1	65.0%	No	Penn	DX11R	B	3,360		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Roof	Serves hallways	2	Exhaust Fan	0.1	65.0%	No	Penn	DX10R (EF-16) & DX13R (EF-17)	B	3,360		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Roof	Serves boiler room	1	Exhaust Fan	0.1	65.0%	No	Penn	DX11R	B	3,360		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Roof	Ef for ahu 6	1	Exhaust Fan	0.1	65.0%	No	Unknown	FX24BFT	B	3,360		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Roof	Serves hallways	2	Exhaust Fan	0.1	65.0%	No	Penn	DX11R	B	3,360		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Roof	Serves foyer	1	Exhaust Fan	0.1	65.0%	No	Penn	DX13R	B	3,360		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Roof	Serves unsure	1	Exhaust Fan	0.1	65.0%	No	Penn	DX13R	B	3,360		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical CSS boiler room	EF serves AHU-6 & AHU-7	1	Exhaust Fan	20.0	91.0%	No	Unknown	Unknown	B	3,360		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Electrical Room 4	corridor 125	1	Fan Coil Unit	0.3	65.0%	No	Unknown	Unknown	B	3,360		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Storage gym	room 19	1	Fan Coil Unit	0.3	65.0%	No	Unknown	Unknown	B	3,360		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Storage gym	gym	1	Fan Coil Unit	0.3	65.0%	No	Unknown	Unknown	B	3,360		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 3	vp suite and laminating room	1	Fan Coil Unit	1.0	82.5%	No	Unknown	Unknown	B	3,360		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Storage 202	Serves 202	1	Fan Coil Unit	0.3	65.0%	No	Unknown	Unknown	B	3,360		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Storage 9	small group instruction room and stairwell	2	Fan Coil Unit	1.0	82.5%	No	Unknown	Unknown	B	3,360		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Corridor 1	Corridor 1	1	Fan Coil Unit	0.1	65.0%	No	Unknown	Unknown	B	3,360		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Corridor 3	Corridor 3	2	Fan Coil Unit	0.1	65.0%	No	Unknown	Unknown	B	3,360		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
CSS hallway	CSS hallway	1	Fan Coil Unit	0.1	65.0%	No	Unknown	Unknown	B	3,360		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
ECC hallway	ECC hallway	1	Fan Coil Unit	0.1	65.0%	No	Unknown	Unknown	B	3,360		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
CSS Classrooms	CSS Classrooms	45	Supply Fan	0.1	65.0%	No	Unknown	Unknown	B	3,360		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
ECC Rooms	ECC Rooms	19	Fan Coil Unit	0.1	65.0%	No	Unknown	Unknown	B	3,360		No	65.0%	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
Mechanical 1	Chilled Water Pump	2	Chilled Water Pump	25.0	88.5%	No	Baldor	284T	B	1,707	6	No	93.6%	Yes	2	10.4	29,620	0	$3,840	$21,690	$5,600	4.2
Mechanical ECC	Chilled Water Pump	2	Chilled Water Pump	5.0	87.5%	No	Unknown	Unknown	B	1,707		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical ECC	Chilled Water Pump	2	Chilled Water Pump	15.0	91.7%	Yes	Unknown	Unknown	B	1,707		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical CSS boiler room	Combustion Air Fan	2	Combustion Air Fan	2.0	84.0%	No	Unknown	Unknown	B	2,500		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical CSS boiler room	Combustion Air Fan	2	Combustion Air Fan	1.0	82.5%	No	Unknown	Unknown	B	2,500		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical ECC	Heating Hot Water Pump	3	Heating Hot Water Pump	0.8	78.0%	No	Bell & Gossett	48Y	B	2,500		No	78.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 1	Condenser Water Pump	2	Condenser Water Pump	15.0	92.0%	No	Baldor	254T	W	1,707		No	92.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Roof	Cooling Tower Fan	1	Cooling Tower Fan	50.0	93.0%	No	Evapco	LSTA 8P-182	W	4,067	8	No	94.5%	Yes	1	-0.9	16,248	0	$2,106	$17,441	$6,000	5.4
Mechanical 1	Exhaust Fan	1	Exhaust Fan	0.1	65.0%	No	Unknown	Unknown	B	2,745		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical CSS boiler room	Heating Hot Water Pump	2	Heating Hot Water Pump	20.0	93.0%	No	Multiple	Multiple	B	2,500	7	No	93.0%	Yes	2	3.8	30,081	0	$3,899	$17,164	$5,200	3.1
Mechanical ECC	Heating Hot Water Pump	2	Heating Hot Water Pump	5.0	87.5%	No	Lincoln	184T	W	2,500	7	No	89.5%	Yes	2	1.1	8,314	0	$1,078	$8,152	$3,600	4.2
Exterior Roof	Kitchen Hood Exhaust Fan	1	Kitchen Hood Exhaust Fan	2.0	84.0%	No	Penn	FX12BX	B	1,373		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Roof	Kitchen Hood Exhaust Fan	1	Kitchen Hood Exhaust Fan	2.0	84.0%	No	Captive air	4HX98	B	1,373		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Elevator room	Other	1	Process Pump	20.0	72.0%	No	Unknown	Unknown	B	400		No	72.0%	No		0.0	0	0	$0	$0	$0	0.0
Elevator room ECC	Other	1	Process Pump	20.0	72.0%	No	Schneider	Unknown	B	400		No	72.0%	No		0.0	0	0	$0	$0	$0	0.0
Maintenance shop	Other	1	Other	5.0	87.5%	No	Unknown	Unknown	B	100		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 1	Other	1	Other	5.0	89.5%	No	Baldor	184JM	W	2,745		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical ECC	Supply Fan	3	Supply Fan	0.3	65.0%	No	Unknown	Unknown	W	2,745		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 1	Water Supply Pump	3	Water Supply Pump	3.0	82.5%	No	Baldor	145JM	B	275		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical CSS boiler room	Water Supply Pump	1	DHW Circulation Pump	1.0	82.5%	No	Unknown	Unknown	B	8,760		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0

Location	Area(s)/System(s) Served	Existing Conditions: Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	Proposed Conditions: ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Energy Impact & Financial Analysis: 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 CSS boiler room	Water Supply Pump	1	DHW Circulation Pump	1.0	82.5%	No	Unknown	Unknown	B	8,760		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Maintenance shop	Unit Heater	1	Supply Fan	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

Location	Area(s)/System(s) Served	Existing Conditions: 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	Proposed Conditions: 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	Energy Impact & Financial Analysis: 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	ECC kitchen make up air unit	1	Split-System	10.00		10.40		Trane	TTA120B400EA	B	9	Yes	1	Split-System	10.00		14.00		1.5	593	0	$77	$4,224	$1,580	34.4
Exterior Roof	Serve tech room	2	Ductless Mini-Split AC	1.43		11.00		Panasonic	CUE18NKUA	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior Roof	Serves security room Installed about 5 years ago	1	Ductless Mini-Split HP	1.50	20.00	15.00	4.396248533458382 COP	LG	LUU187HV	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior Roof	IDF room	1	Ductless Mini-Split AC	2.00		10.59		Carrier	38HDL024-311	B	9	Yes	1	Ductless Mini-Split AC	2.00		18.00		0.5	885	0	$115	$5,642	$0	49.2
Exterior Roof	Elevator Room	1	Ductless Mini-Split AC	1.00		11.00		EMI	NOSCC180F000	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior Roof	IDF room	1	Ductless Mini-Split AC	1.00		11.00		Sanyo	C0951	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior Roof	Computer Room 202	2	Ductless Mini-Split HP	1.50	18.00	12.50	3.663540445486 52 COP	Carrier	38MAQB18R—-3	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior Roof	MAU - ECC	1	Package Unit		280.00		0.8 Et	Greenheck	IGX-112-1122-DB	B		No							0.0	0	0	$0	$0	$0	0.0
Exterior Roof	Phone Room	1	Ductless Mini-Split AC	0.96		10.00		Sanyo	C1211	B		No							0.0	0	0	$0	$0	$0	0.0

Electric Chiller Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions: Chiller Quantity	System Type	Cooling Capacity per Unit (Tons)	Manufacturer	Model	Remaining Useful Life	Proposed Conditions: ECM #	Install High Efficiency Chillers?	Chiller Quantity	System Type	Constant/ Variable Speed	Cooling Capacity (Tons)	Full Load Efficiency (kW/Ton)	IPLV Efficiency (kW/Ton)	Energy Impact & Financial Analysis: 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	Early Childhood Learning Center	1	Air-Cooled Screw Chiller	225.00	Trane	RTAC 2254 UHON UAF	B		No							0.0	0	0	$0	$0	$0	0.0
Mechanical 1	Cold Springs Elementary School	2	Water-Cooled Screw Chiller	327.50	York	YSBBCAS1-CGB	B	10	Yes	2	Water-Cooled Screw Chiller	Constant	327.50	0.60	0.52	32.4	45,925	0	$5,953	$363,062	$19,650	57.7

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 CSS boiler room	Cold Springs Elementary School	2	Non-Condensing Hot Water Boiler	2,452	Weil McLain	1088	B	11	Yes	2	Condensing Hot Water Boiler	2,452	93.00%	Et	0.0	0	651	$5,225	$93,663	$21,578	13.8
Mechanical ECC	Early Childhood Center	3	Non-Condensing Hot Water Boiler	832	Lochinvar	CHN0991	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
Mechanical 3	AHU-1 & 2 - Gym	12	2.00	18.81	0.00	188.13	0.0	126	7	$69	$2,719	$0	39.6
Mechanical CSS boiler room	AHU-6 - Cafeteria	12	2.00	20.00	0.00	200.00	0.0	134	7	$73	$2,719	$0	37.3

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 CSS boiler room	DHW Piping	13	5	1.50	0.0	0	3	$26	$36	$20	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 CSS boiler room	Throughout Building	2	Storage Tank Water Heater (> 50 Gal)	PVI	80 P 125A-MXG	W		No						0.0	0	0	$0	$0	$0	0.0
Mechanical ECC	Kitchen Only	1	Storage Tank Water Heater (> 50 Gal)	AO Smith	BTR 197 110	B		No						0.0	0	0	$0	$0	$0	0.0
Kitchen CSS	Kitchen CSS	1	Booster Water Heater	Hatco	C-36	B		No						0.0	0	0	$0	$0	$0	0.0
Kitchen ECC	Kitchen ECC	1	Booster Water Heater	Hatco	C-15	B		No						0.0	0	0	$0	$0	$0	0.0

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
Restroms	14	21	Faucet Aerator (Lavatory)	1.20	0.50	0.0	0	8	$66	$151	$151	0.0
Offices & Restrooms	14	7	Faucet Aerator (Lavatory)	1.50	0.50	0.0	0	4	$31	$50	$50	0.0
Classrooms & Restrooms	14	140	Faucet Aerator (Lavatory)	2.20	0.50	0.0	0	66	$533	$1,004	$1,004	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 CSS	1	Cooler (35F to 55F)	Brown	CTA38-88	15, 16	Yes	No	Yes	0.0	730	0	$95	$2,584	$390	23.2
Kitchen ECC	1	Cooler (35F to 55F)	Manitowoc	Unknown	15, 16	Yes	No	Yes	0.0	615	0	$80	$1,977	$230	21.9
Kitchen CSS	1	Medium Temp Freezer (0F to 30F)	Heatcraft	BZT022L6CF	16	No	Yes	Yes	0.0	1,516	0	$197	$2,193	$250	9.9
Kitchen ECC	1	Medium Temp Freezer (0F to 30F)	Manitowoc	Unknown	15, 16	Yes	Yes	Yes	0.0	1,108	0	$144	$2,496	$330	15.1

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 CSS	3	Refrigerator Chest	Powers	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen ECC	2	Refrigerator Chest	Unknown	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen CSS	1	Stand-Up Freezer, Solid Door (16 - 30 cu. ft.)	Traulsen	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen ECC	1	Stand-Up Freezer, Solid Door (31 - 50 cu. ft.)	Continental	2F-HD	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen CSS	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Traulsen	AHT132	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen CSS	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Continental	IR_PT_HD	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen CSS	3	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Traulsen	RHT132WPUT	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen ECC	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Continental	DL-2R-SS-PT	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
Kitchen CSS	1	Self-Contained Unit (≥175 lbs/day), Continuous	Manitowoc	QY0274A	No		No	0.0	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 CSS	1	Gas Rack Oven (Double)	Vulcan	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen CSS	1	Gas Combination Oven/Steam Cooker (<15 Pans)	Garland	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen CSS	1	Gas Rack Oven (Double)	Montague	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen ECC	1	Gas Combination Oven/Steam Cooker (<15 Pans)	Vulcan	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen ECC	1	Gas Rack Oven (Single)	Vulcan	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen ECC	1	Insulated Food Holding Cabinet (Full Size)	FWE	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen CSS	1	Gas Steamer	Cleveland	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen CSS	1	Electric Convection Oven (Full Size)	Market forge	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0

Dishwasher Inventory & Recommendations

	Existing Conditions							Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Dishwasher Type	Manufacturer	Model	Water Heater Fuel Type	Booster Heater Fuel Type	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	Payback w/ Incentives in Years
Kitchen CSS	1	Single Tank Conveyor (High Temp)	Insinger	Admiral	Electric	Electric	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen ECC	1	Single Tank Conveyor (High Temp)	Insinger	Commander 18-5	Electric	Electric	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
Classroom 118	1	Clothes Washer/Dryer	5,000	No	Unknown	Unknown
Multiple	11	Coffee Machine	900	No	Multiple	Multiple
Multiple	32	Dehumidifier	180	Yes	Unknown	Unknown
Multiple	79	Desktop Computers	120	No	Multiple	Multiple
Multiple	3	Portable Fan	100	No	Multiple	Multiple
Storage art 2	1	Electric Kiln	9,984	No	Skutt Automatic Kiln	KM-1227
Classrooms and Offices	623	Laptops	45	Yes	Multiple	Multiple
Multiple	10	Microwave	1,000	No	Multiple	Multiple
Kitchen CSS	1	Food Warming Table	3,239	No	Servolift	501-4
Kitchen CSS	1	Mixer	1,492	No	Hobart	H6001
Kitchen ECC	1	Food Warming Table	3,239	No	Servolift	501-4
Kitchen ECC	1	Refrigeratated table	637	No	Servolift	502-4R-CW
Office child study team	1	Paper Shredder	150	No	Unknown	Unknown
Multiple	9	Printer (Medium/Small)	60	No	Multiple	Multiple
Multiple	8	Printer/Copier (Large)	500	No	Multiple	Multiple
Multiple	80	Projector	200	No	Multiple	Multiple
Multiple	7	Refrigerator (Mini)	250	No	Multiple	Multiple
Multiple	6	Refrigerator (Residential)	800	No	Multiple	Multiple
Multiple	15	Television	50	No	Multiple	Multiple
Kitchen and Faculkty Dining	2	Toaster	850	No	Multiple	Multiple
Multiple	8	Water Cooler	92	No	Multiple	Multiple
CSS Principal Office	1	Water Fountain	92	No	Unknown	Unknown

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
Faculty Dining & Teacher's Lounge	2	Glass Fronted Refrigerated	17	Yes	0.3	2,418	0	$313	$460	$200	0.8
Faculty Dining & Teacher's Lounge	2	Non-Refrigerated	17	Yes	0.1	685	0	$89	$460	$0	5.2

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]

Cold Springs Elementary & Early Childhood Center

Primary Property Type: K-12 School
Gross Floor Area (ft²): 161,000
Built: 1996

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
Cold Springs Elementary & Early Childhood Center 1194 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: 12484545

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
87.5 kBtu/ft²

Source EUI
178.6 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	5,877,312 (42%)
Electric - Grid (kBtu)	7,986,441 (57%)
Electric - Solar (kBtu)	225,610 (2%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	71
National Median Source EUI (kBtu/ft²)	144.9
% Diff from National Median Source EUI	23%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	1,098

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.