Local Government Energy Audit Report

Sayreville War Memorial High School

February 8, 2019

Prepared for:

Sayreville Public Schools
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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 Energy Services (TRC) reviewed the energy conservation measures and estimates of energy savings were reviewed 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 installation costs on our experience at similar facilities, pricing from local contractors and vendors, and/or cost estimates from RS Means. We encourage the owner of the facility is encouraged to independently confirm these cost estimates and to obtain multiple estimates when considering measure installations. Actual installation costs can vary widely based on individual measures and conditions. TRC and NJBPU do not guarantee installed cost estimates and shall in no event be held liable should actual installed costs vary from estimates.

The New Jersey 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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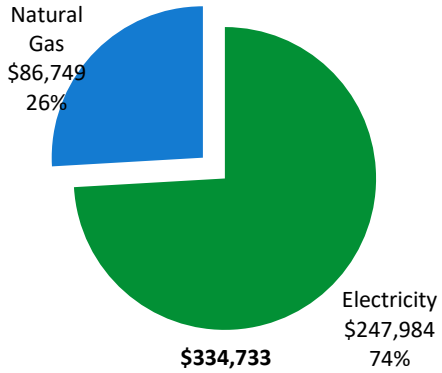
1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for Sayreville War Memorial High School. This report provides you with information about your facility's energy use, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help make changes in your facility. TRC Energy Services (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 help protect our environment by reducing statewide energy consumption.

BUILDING PERFORMANCE REPORT

Annual Utilities	Costs: $334,733 Electricity: 1,910,391 kWh Natural Gas: 96,686 Therms	
ENERGY STAR® Benchmarking Score	66 *(1-100 scale)*	Congratulations, your building performs better than the national average. This report has suggestions about how to keep your building running efficiently, further improve performance and lower your energy bills even more.

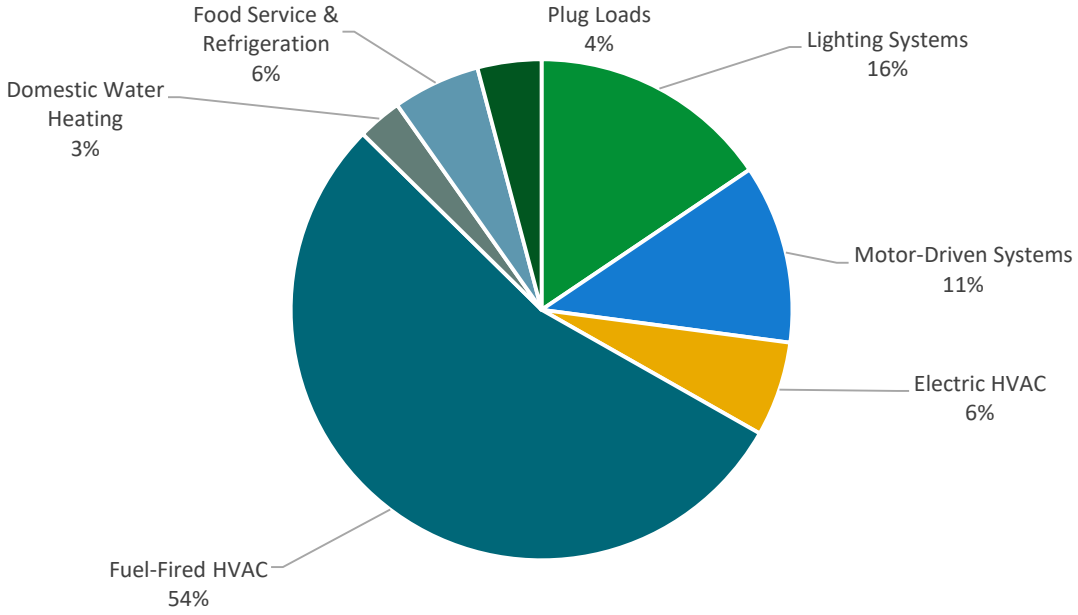


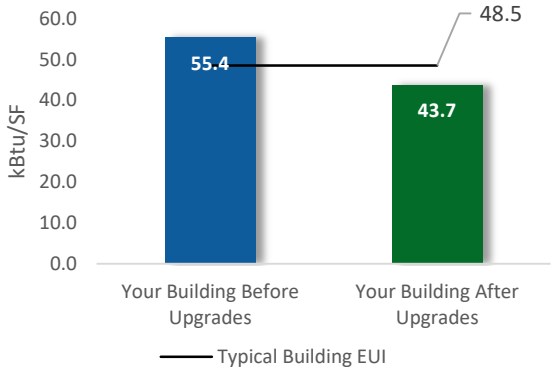
Figure 1 - Energy Use by System

POTENTIAL IMPROVEMENTS

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

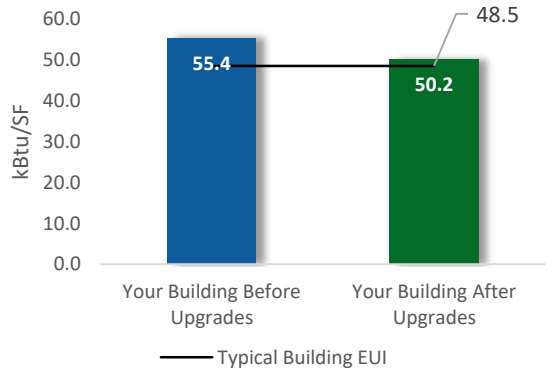
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$1,213,126
Potential Rebates & Incentives[1]	$70,205
Annual Cost Savings	$85,130
Annual Energy Savings	Electricity: 550,077 kWh Natural Gas: 15,298 Therms
Greenhouse Gas Emission Savings	367 Tons
Simple Payback	13.4 Years
Site Energy Savings (all utilities)	21%



Scenario 2: Cost Effective Package[2]

Installation Cost	$379,878
Potential Rebates & Incentives	$49,556
Annual Cost Savings	$58,325
Annual Energy Savings	Electricity: 450,786 kWh
Greenhouse Gas Emission Savings	226 Tons
Simple Payback	5.7 Years
Site Energy Savings (all utilities)	9%



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	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Lifetime Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**358,802**	**86.9**	**-75**	**$45,907**	**$688,599**	**$294,320**	**$41,486**	**$252,834**	**5.5**	**352,582**
ECM 1	Install LED Fixtures	128,253	0.7	-1	$16,643	$249,640	$147,783	$6,980	$140,803	8.5	129,076
ECM 2	Retrofit Fixtures with LED Lamps	230,549	86.3	-74	$29,264	$438,959	$146,537	$34,506	$112,031	3.8	223,506
Lighting Control Measures		**10,424**	**2.9**	**-3**	**$1,324**	**$10,592**	**$21,320**	**$1,930**	**$19,390**	**14.6**	**10,117**
ECM 3	Install Occupancy Sensor Lighting Controls	6,692	2.2	-2	$849	$6,794	$15,320	$1,930	$13,390	15.8	6,485
ECM 4	Install Daylight Dimming Controls	412	0.0	0	$53	$428	$400	$0	$400	7.5	415
ECM 5	Install High/Low Lighting Controls	3,320	0.7	-1	$421	$3,370	$5,600	$0	$5,600	13.3	3,217
Motor Upgrades		**3,107**	**0.7**	**0**	**$403**	**$6,050**	**$14,794**	**$0**	**$14,794**	**36.7**	**3,129**
ECM 6	Premium Efficiency Motors	3,107	0.7	0	$403	$6,050	$14,794	$0	$14,794	36.7	3,129
Variable Frequency Drive (VFD) Measures		**75,229**	**21.6**	**0**	**$9,765**	**$146,480**	**$46,956**	**$6,040**	**$40,916**	**4.2**	**75,755**
ECM 7	Install VFDs on Constant Volume (CV) Fans	75,229	21.6	0	$9,765	$146,480	$46,956	$6,040	$40,916	4.2	75,755
Electric Unitary HVAC Measures		**98,285**	**47.6**	**0**	**$12,758**	**$191,372**	**$470,428**	**$10,749**	**$459,679**	**36.0**	**98,972**
	Install High Efficiency Air Conditioning Units	81,432	45.3	0	$10,571	$158,558	$422,689	$8,152	$414,537	39.2	82,001
	Install High Efficiency Heat Pumps	16,852	2.4	0	$2,188	$32,814	$47,739	$2,597	$45,142	20.6	16,970
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**1,551**	**$13,916**	**$278,321**	**$360,703**	**$10,000**	**$350,703**	**25.2**	**181,605**
	Install High Efficiency Hot Water Boilers	0	0.0	1,085	$9,739	$194,780	$214,790	$0	$214,790	22.1	127,094
	Install High Efficiency Furnaces	0	0.0	466	$4,177	$83,541	$145,913	$10,000	$135,913	32.5	54,511
Domestic Water Heating Upgrade		**0**	**0.0**	**57**	**$508**	**$5,077**	**$2,029**	**$0**	**$2,029**	**4.0**	**6,625**
ECM 8	Install Low-Flow DHW Devices	0	0.0	57	$508	$5,077	$2,029	$0	$2,029	4.0	6,625
Food Service & Refrigeration Measures		**4,230**	**0.5**	**0**	**$549**	**$3,660**	**$2,576**	**$0**	**$2,576**	**4.7**	**4,260**
	Replace Refrigeration Equipment	1,007	0.1	0	$131	$1,568	$2,116	$0	$2,116	16.2	1,014
ECM 9	Vending Machine Control	3,224	0.4	0	$418	$2,092	$460	$100	$360	0.9	3,246
TOTALS		**550,077**	**160.3**	**1,530**	**$85,130**	**$1,330,150**	**$1,213,126**	**$70,205**	**$1,142,921**	**13.4**	**733,045**

* - 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

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 Clean Energy Programs gives 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 Daylight Dimming Controls			x
ECM 5	Install High/Low Lighting Controls			x
ECM 6	Premium Efficiency Motors			x
ECM 7	Install VFDs on Constant Volume (CV) HVAC	x		x
ECM 8	Install Low-Flow Domestic Hot Water Devices			x
ECM 9	Vending Machine Control	x		x

Figure 3 – Funding Options

New Jersey 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. 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.

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% 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.

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 their 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 Sayreville War Memorial High School. This report provides information on how your facility uses energy, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help you implement the ECMs. This report also contains valuable information on financial incentives from 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 August 20, 2018, TRC performed an energy audit at Sayreville War Memorial High School located in Parlin, NJ. TRC met with Kenny to review the facility operations and help focus our investigation on specific energy-using systems.

Sayreville War Memorial High School is a two-story, 292,289 square foot building built in 1962. Spaces include: classrooms, gymnasium, auxiliary gymnasiums, weight room, auditorium, music rooms, library, offices, cafeteria, kitchen, corridors, stairwells and mechanical space. The building is 100% heated and approximately 40% cooled. The HVAC systems including the hot water boilers, unit ventilators, roof top equipment and make up air units are linked to the Automated Logic Building Energy Management System (EMS). Lighting throughout the building includes traditional linear fluorescent technology. The front parking lot lighting is on the main meter and reported to be 250-Watt high pressure sodium, pole-mounted fixtures. The sports field lighting is also reported to be on the main meter and 1500-Watt fixtures.

Recent improvements include: The gymnasium high bay fixtures were upgraded about three years ago and now use T5 high output lamps.

Facility concerns include: The main operational and maintenance concerns include the condition of auditorium lighting and the space heating boilers which are beyond their useful life.

2.2 Building Occupancy

The facility is occupied year-round. Normal school is in session from September through June. The sports and band areas use the building on Saturdays and Sundays, as well. Typical peak building occupancy includes about 1700 students and 150 staff members. Summer school includes various use of sports and band areas in July and August as well as continuing maintenance and custodial activities.

Building Name	Weekday/Weekend	Operating Schedule
Classrooms & Offices	Weekday	7:00AM - 3:00PM
	Weekend	Unocupied
After Hours Cleaning	Weekday	3:00PM - 11:00PM
	Weekend	Unocupied
Sports & Band Areas	Weekday	7:00AM - 3:00PM
	Saturday	7:00AM - 3:00PM
	Sunday	5:00AM - 4:00PM
Cafeteria	Weekday	8:00AM - 9:00PM

Figure 4 - Building Occupancy Schedule

2.3 Building Envelope

Building walls are concrete block over structural steel with a brick or stone facade. There is also floor to ceiling window facades in some areas. The roof is flat and appears to be in fair condition. Some exterior walls have minimal, or missing insulation and are in poor condition with cracks contributing to air infiltration. The majority of windows are double pane and operable with metal frames, clear glass with internal shading. The window frame caulk is deteriorated and exterior door weather-stripping is either missing or in poor condition. Degraded window and door seals increase drafts and outside air infiltration.

Exterior Door with No Weather-Stripping

Exterior Wall Frame Caulk in Poor Condition

Building Façade and Roof

Building Facade

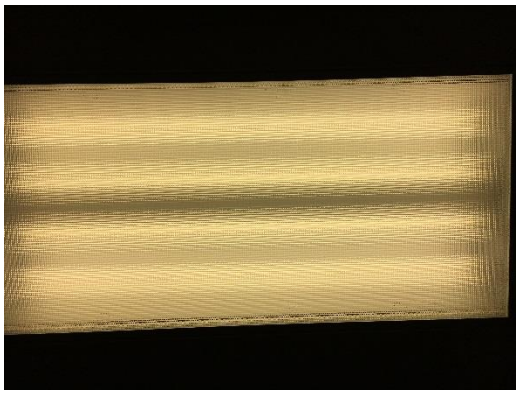
2.4 Lighting Systems

The primary interior lighting system uses 32-Watt linear fluorescent T8 lamps. Light fixtures are in fair condition. Fixture types include 1 to 4-lamp, 2- or 4-foot long troffer and surface mounted wrap fixtures. There are several U-lamp T8 and T5 lamp recessed troffer fixtures as well. Troffer fixtures have prismatic lenses or parabolic lenses. There are also compact fluorescent plug-in, recessed can fixtures and compact fluorescent biax lamp up-light fixtures.

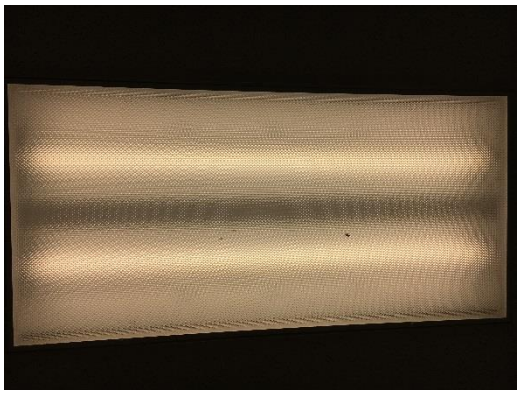
The light fixtures in the kitchen are in poor condition. The auditorium overhead lighting is recessed into a tall ceiling creating a difficulty for maintenance. Stage lighting includes old inefficient lamps which are no longer available in the market.

Gymnasium fixtures have high bay linear fluorescent T5 high output lamp fixtures and are controlled by fixture-mounted occupancy sensors. The library and cafeterias are lit by indirect recessed troffer fixtures with 28-Watt linear fluorescent T5 lamps. All exit signs are LED.

Interior lighting levels were generally sufficient, while some classroom light levels were over lit. Second floor classroom light levels ranged between 45 – 65 footcandles (FC)s-and the A-wing classrooms ranged between 38 – 52 FCs. The minimum light levels required for classroom space by IES standards is 30 FC. However, additional considerations must be investigated during design to determine the cost effectiveness of reducing the number of lamps. Some classrooms have bi-level switching and therefore, it is uncertain as to how often these fixtures operate at each level of switching (number of lamps). Reducing the light output would require a level of design, beyond the scope of this energy audit, to determine the feasibility. Options may include upgrading to 1-LED lamp fixtures, 2x4 LED retrofit kits, changing the number of fixtures, etc. The options range too much to provide an analysis and cost would vary drastically on the proposed approach. We recommend that this be investigated further by an electrical contractor if lighting upgrades move forward to implementation.



Typical 4-foot 4-lamp T8 Fixture



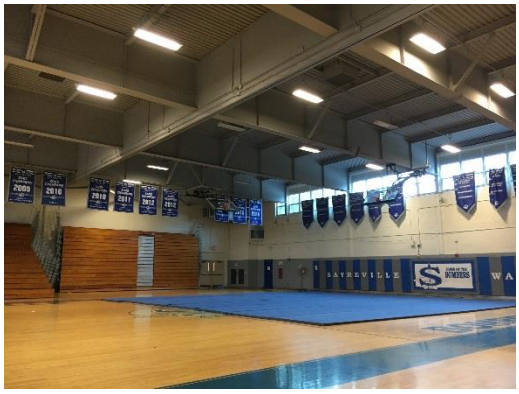
Typical 4-foot 2-lamp T8 Fixture

Cafeteria Lighting

Cafeteria 4-foot 3-lamp T5 Indirect Fixture

Typical Recessed Can Fixture with CFL Plug in Lamps

Auditorium Lighting and Stage Flood Lamps



Gymnasium Lighting

T5 High Output Lamp Stock

Band Room Lighting

Hallway Lighting

Classroom with 4-foot 2-lamp T8 Wrap Fixtures

Classroom with 4-foot 3-lamp T8 Troffer Fixtures

Lighting fixtures in the cafeterias, gymnasiums, locker rooms, fitness room, office areas, most classrooms, some restrooms and hallways are controlled by occupancy sensors. The remainder of the light fixtures are controlled by wall switches which include office space, library, hallways, storage rooms, mechanical space, restrooms and the A wing classrooms.

Interior Occupancy Based Sensors

Interior Wall Switches

Exterior fixtures include wall packs, flood lights, canopy lights and pole mounted area light fixtures with a mixture of technologies. HID fixtures include high pressure sodium or metal halide lamps. Some of these fixtures have yellowed lenses which are in poor condition. General purpose fixtures include incandescent or compact fluorescent lamps. Exterior light fixtures are controlled by time clocks which are set for 7:00 PM to 7:00 AM operation. Some are controlled by photocell sensors which are fixture mounted. At the time of the audit, a few fixtures were noted to be on during a sunny day. The front parking lot lighting is on the main meter and reported to be 250-Watt high pressure sodium lamp, pole mounted fixtures. The sports field lighting is also reported to be on the main meter and consists of 1,500-Watt fixtures.

Typical Wall Pack Fixture – On during Daytime

Under Canopy & Wall Pack Fixtures

Under Canopy Fixture – On during Daytime

Wall Mounted Flood Fixture

Exterior Photocell Sensor

Exterior Timeclocks set to 7PM-7AM

Stadium Lighting

Pole-Mounted Area Light Fixture

2.5 Air Handling Systems

Unit Ventilators

The older unit ventilators have 1/4 HP supply fan motors, pneumatically controlled outside air dampers and zone valves that operate with a pneumatic control system. This system is original to the building and appears to be in poor operating condition. The newer unit ventilators have 1/6 HP supply fan motors, controlled outside air dampers and zone valves that operate with the EMS control system. These unit ventilators are equipped with economizers. This system appears to be in fair operating condition.

Newer Unit Ventilator (UV)

The ceiling unit heaters (CUHs) as well as heating-ventilation (HV) units serve one auxiliary gymnasium, hallways, some interior offices as well as mechanical and storage areas. They are equipped with supply fans driven by motors that range between 3/4 HP and 3 HP and hot water coils. These are controlled by the building EMS.

Ceiling Unit Heaters (CUH)

Heating-Ventilation (HV) Unit

Air Handling Units (AHUs)

The main gymnasium, one auxiliary gym, locker rooms, kitchen, music rooms, auditorium and some classrooms are served by air handling units that are a mixture of packaged air conditioning units, makeup air units with gas burners and gas-fired roof top units. All of these systems are controlled by the EMS. The majority of these were installed in 2007.

Packaged air condition units with direct expansion (DX) coils provide cooling during the summer months. Some are equipped with economizers; however we were unable to verify the current operational condition of the economizers. For the purposes of this report, the energy efficiency of these units has been de-rated due to the age of the equipment. The makeup air units with gas burners and gas-fired roof top units are summarized in the next section describing the heating systems. The packaged roof top units are summarized in the table below:

Unit (Make & Model)	Tag	Size (Tons)	Efficiency (EER)
Lennox LCA090H2BN1G	RTU-1	7.50	9.45
Lennox LCA090H2BN1G	RTU-2	7.50	9.45
Lennox LCA060H2BN1G	RTU-3	5.00	9.45
Lennox LCA060H2BN1G	RTU-4	5.00	9.45
Lennox LCA060H2BN1G	RTU-5	5.00	9.45
Lennox LCA060H2BN1G	RTU-6	5.00	9.45

Packaged AC Unit

Packaged AC Unit

Energy Recovery Units (ERUs)

The cafeteria and gymnasium are served by packaged air-to-air energy recovery units. They are equipped with split system air-cooled condensing units as well as indirect fire as burners. These systems are controlled by the building energy management system (EMS). They operate to maintain an indoor occupied space temperature of 68°F during the heating season and 70°F to 72°F during the cooling season. For the purposes of this report, the energy efficiency of these units has been de-rated due to the age of the equipment. The ERUs are summarized in the table below:

Unit (Make & Model)	Condensing Unit (Make & Model)	Total Cooling Capacity (Tons)	Efficiency (EER)	Total Heating Capacity (MBH)	Supply Fan Motor HP	Exhaust Fan Motor HP	Efficiency (AFUE)
Annexair ERP-E-12-HW04-C-HG-AC	Carrier 38AH-034---611AA	30	10.53	600	10	10	82%
Annexair ERP-E-12-HW04-C-HG-AC	Carrier 38AH-034---611AA	30	10.53	900	10	10	82%
Annexair ERP-E-20-HW09-C-HG-AC	Carrier 38AH-064---621	60	10.53	900	15	10	82%

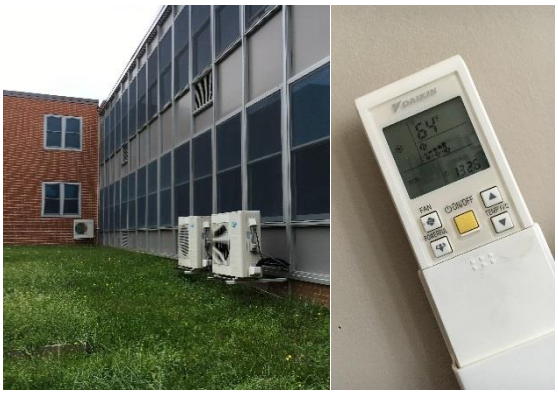
Energy Recovery Unit (ERU)

Energy Recovery Unit (ERU)

Split Heat Pump Systems

There are a few classrooms and offices which are conditioned by split heat pump systems. These systems average 3 tons of cooling capacity and 36 MBH in heating capacity. They are in good condition, high efficiency and are remote controlled by occupants.

Unit (Make & Model)		Quantity	Cooling Capacity (Tons)	Heating Capacity (MBH)
Perfect Air	2PAMSH36	2	3.00	36.00
Samsung	UH140CAV	2	4.00	54.50
Daiken	4MXS32GVJU	2	2.62	33.60
Perfect Air	1PAMSH36-SZO-14.5	3	3.00	33.60



Split Heat Pump Systems – Outdoor Condensing Units

Split Heat Pump Systems – Indoor Unit

Split Air Conditioning (AC) Systems

There are a range of split AC systems with outdoor condensing units that are on average 3 to 4 tons. They vary in efficiency, however all are at least in fair condition, of standard efficiency and within their useful life. These are either controlled by the EMS or are remote controlled.

Unit (Make & Model)	Quantity	Cooling Capacity (Tons)
EMI S1CA2000	2	1.00
Sanyo CM1972A	1	1.00
ICP CAE091HBA	1	7.50
Daikin RKSB6LVJU	1	3.00
Mitsubishi Unreadable	1	3.00
Sanyo C0911	1	0.75
Unreadable AC060X1331A	2	5.00
Unreadable AAFRCU918	2	2.00
Lennox HS29-048-13Y	3	4.00
Lennox Unreadable	4	3.00

Split AC Systems – Outdoor Condensing Units

Split AC Systems – Outdoor Condensing Units

Split AC Systems – Outdoor Condensing Units

Split AC Systems – Outdoor Condensing Unit

Split AC Systems – Outdoor Condensing Units

Split AC Systems – Indoor Unit

2.6 Heating Systems

There are three AERCO (Model: BMK2.0) 1892 MBH gas-fired condensing hot water boilers which are new and in good condition. There are also two Universal Boiler Works (Model: BF 175 W4-6P) 5858 MBH gas-fired non-condensing hot water boilers which are which are beyond their useful life but well maintained. All five of these boilers serve the building heating load. The burners are fully modulating. The boilers are configured in an automated control scheme configured with the EMS. The number of boilers that operate depends on the building load, occupancy and outdoor air temperature.

The hydronic distribution system is a 2-pipe heating only system. The boilers are configured in a constant flow primary distribution with two 10 HP and two 100 HP dual temp, VFD-controlled hot water pumps operating with an automated control scheme. The system was originally designed as a dual temperature system which switches to chilled water in the summer. However, the chiller has not been operational and this aspect of the system has been abandoned. The boilers provide hot water to radiators, unit ventilator and heating-ventilation units throughout the building.

Hot water is supplied at 180°F when the outside air temperature is low, and the set point is adjusted linearly to 120°F when the outside air is above 65°F. The system is locked out at an outside temperature of 53°F.

Non-Condensing Hot Water Boilers

Condensing Hot Water Boilers

Hot Water Pumps and Motor Nameplate

Hot Water Pumps and Motor Nameplate

The music rooms, auditorium and some classrooms are served by makeup air units (MUAs) with gas burners and gas fired roof top units (HVs). All of these systems are controlled by the EMS. Majority of these were also installed in 2007, are in fair condition and standard efficiency. These units are summarized in the table below:

Unit (Make & Model)	Quantity	Unit Tag(s)	Heating Capacity (MBH)	Supply Fan Motor
Sterling E1M-PV10C6C01N63L2AA1A5B5E1K5L1	1	MUA-1	80	1 HP
Sterling E1M-PV15C6C01N63M2AA1A5B5E1K5L1	6	MUA-2 through MUA-7	120	1.5 HP
Sterling E1M-AH20A0N00061K5CA1B5L1N6	1	HV-2	320	3/4 HP
Sterling E1M-PV40C6C03N61P5CA5B5L1N6	3	HV-3 through HV-5	320	3 HP
Sterling E1M-PV15C6C01N63M2AA1A5B5E1K5L1	3	HV-6 through HV-8	120	1.5 HP
Sterling E1M-PV80C6C01N	2	MUA-8 & MUA-9	640	5 HP
Sterling E1M-PV40C6C01N63P2AA1A5B5E1K5L1	1	MUA-10	320	3 HP

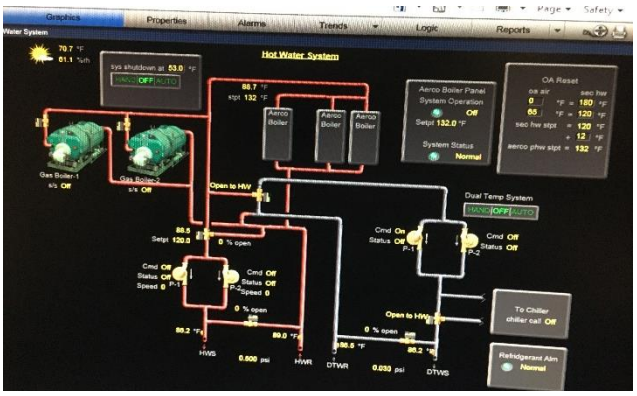
Gas Fired Make Up Air Unit

Gas Fired Make Up Air Units

2.7 Building Energy Management Systems (EMS)

An Automated Logic EMS control is utilized for the management of the major HVAC equipment including the boilers, air handlers and package units. The EMS provides equipment scheduling control and monitors and controls space temperatures, supply air temperatures, humidity, heating water loop temperatures, percent outdoor air flow. The EMS schedule and temperature set points are summarized in the table below:

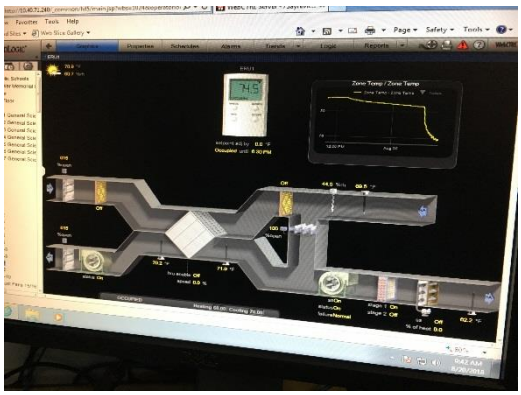
Area Served	Schedule Days	Schedule Times	Heating Temperature Set Point or Range	Cooling Temperature Set Point or Range
Gymnasium	Monday to Friday	6:00 AM to 5:00 PM	69°F	N/A
Cafeterias	Monday to Friday	6:00 AM to 1:30 PM	68°F - 70°F	70°F - 72°F
Auditorium	Monday to Friday	6:00 AM to 4:00 PM	68°F - 70°F	70°F - 72°F
Classrooms	Monday to Friday	6:00 AM to 3:00 PM	68°F - 70°F	N/A



Hot Water System Graphic

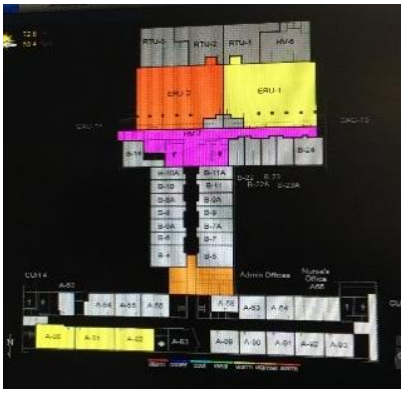
OAT Reset Schedule

EMS Graphics



EMS Graphic of ERU

EMS Graphics



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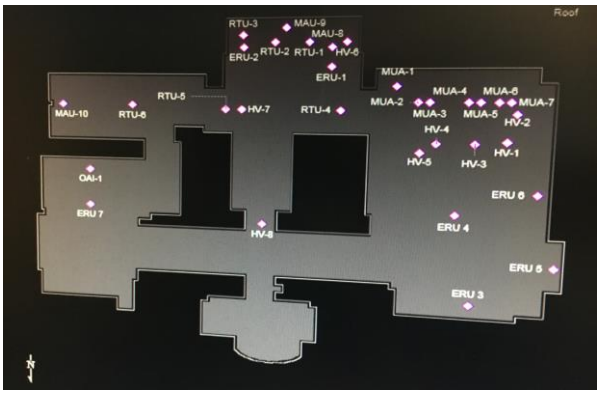

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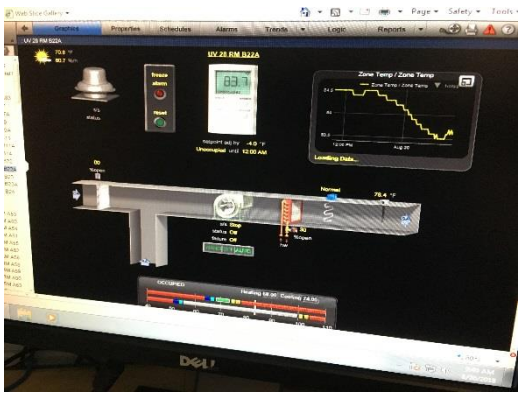
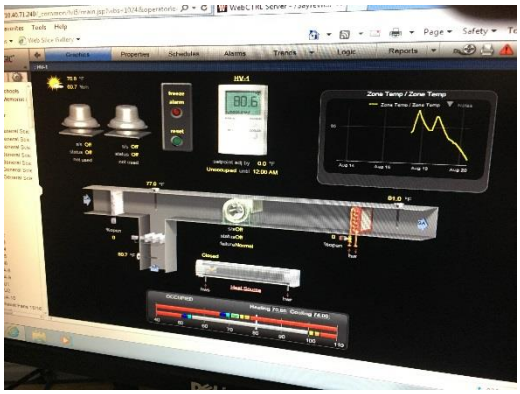
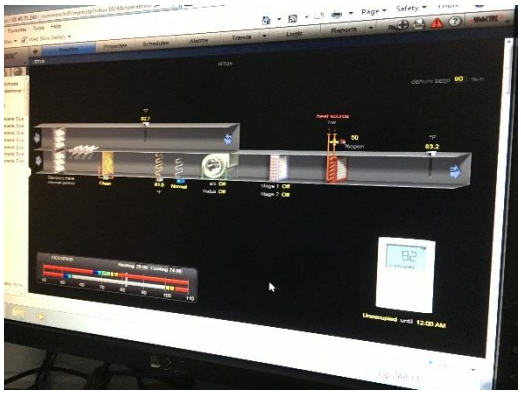


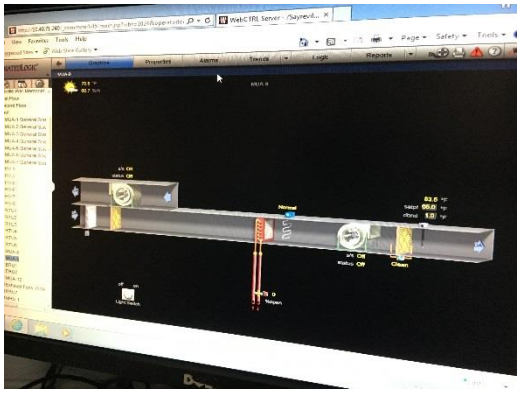
EMS Graphic of UV



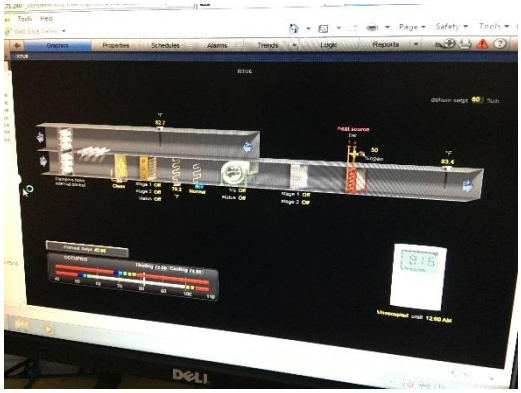
EMS Graphic of HV



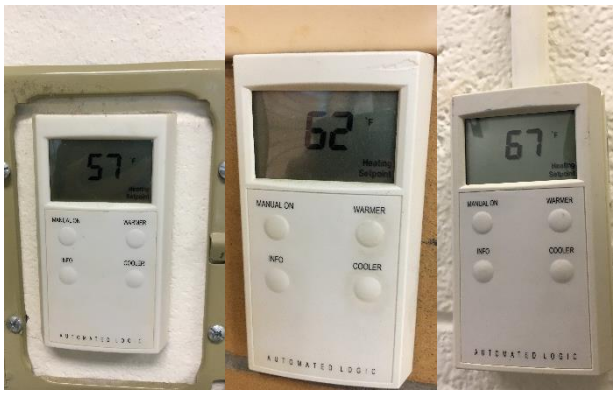
EMS Graphic of RTU



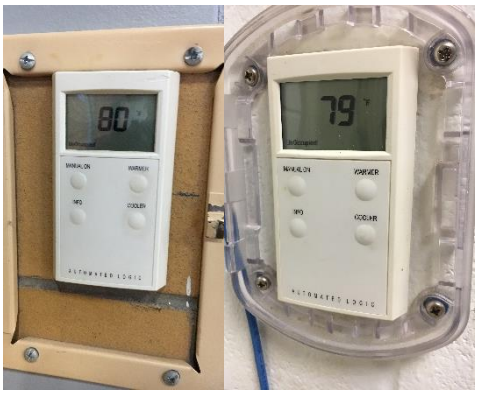
EMS Graphic of MUA



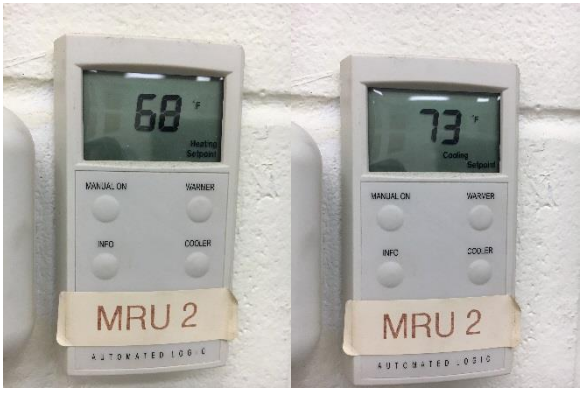
EMS Graphic of RTU



Range in Occupied Heating Set Points on Thermostats



Unoccupied Cooling Set Points on Thermostats



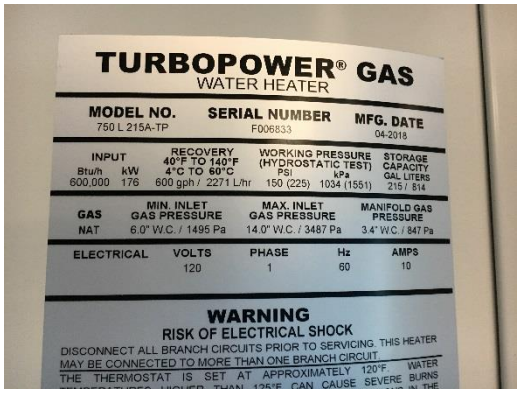
Heating and Cooling Set Points on Thermostat

Broken Thermostat

2.8 Domestic Hot Water

Hot water is produced with two 215-gallon, 600 MBH gas-fired storage water heaters with an 80% thermal efficiency. These serve the majority of domestic hot water needs throughout the facility including restrooms and locker room showerheads. They are new and in good condition. The storage tank temperature was 146°F at the time of the audit. There are multiple fractional horsepower circulation pumps which distribute to end uses. They appear to operate continuously. The domestic hot water pipes are insulated and the insulation is in good condition. The kitchen hot water needs are provided by two 215-gallon, 399 MBH gas-fired storage water heaters with an 80% thermal efficiency. They are new and in good condition.

Main Storage Tank Water Heaters



Nameplate

Domestic Water Piping and Circulation Pumps

Athletics Area Storage Tank Water Heaters

Locker Room High Flow Showerheads

High Flow Faucet

2.9 Food Service Equipment

The kitchen has a mix of gas and electric food service equipment that is used to prepare meals for the students. Most cooking is done using a gas convention oven, gas rack oven and electric steamer. Bulk prepared foods are held in several electric holding cabinets. Equipment is high efficiency and is in good condition. The dishwasher is an ENERGY STAR® high temperature, single tank unit with a gas-fired booster heater. Visit https://www.energystar.gov/products/commercial_food_service_equipment for the latest information on high efficiency food service equipment.

Buffett Table

Gas Ovens

Gas Stove Tops

Electric Steamer and Oven

Dishwasher

Gas Ovens

2.10 Refrigeration

The kitchen has many stand-up refrigerators with either solid or glass doors. These are all high efficiency and in good condition. There is also a refrigeration chest that is standard efficiency and in fair condition. The walk-in equipment includes a medium temperature freezer, low temperature freezer and two coolers. There is an estimated 5 tons of compressors located on the roof and a total of nine fan evaporator motors.

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

Refrigeration Equipment

Stand up Refrigerator and Ice Maker

Walk-in Refrigeration Equipment

Indoor Evaporator

2.11 Plug Load & Vending Machines

The utility bill analysis indicates that plug loads consume approximately 4.12% percent of total building energy use. This is higher than a typical building. You may wish to consider paying particular attention to minimizing your plug load usage. This report makes suggestions for ECMs in this area as well as Energy Efficient Best Practices.

There are approximately 226 desktop computer work stations throughout the facility. Plug loads include general café and office equipment. There are classroom typical loads such as smart boards, projectors, and fans. There are several residential style refrigerators throughout the building which vary in condition and efficiency. There are two refrigerated beverage vending machines which are not currently equipped with occupancy-based controls.

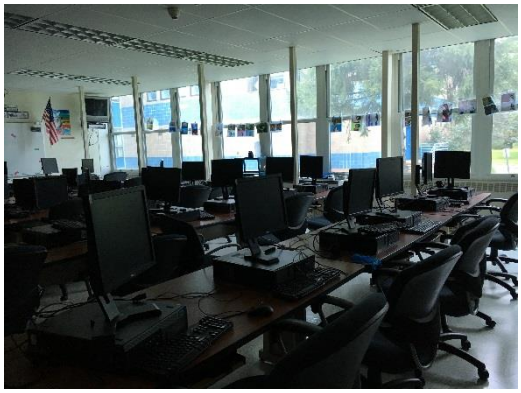
Laptop Storage Charging Cart

Classroom Desktop Computers

Refrigerated Drink Vending Machines

Residential Fridge and Operating but Unused Unit

Café Equipment



Computer Lab

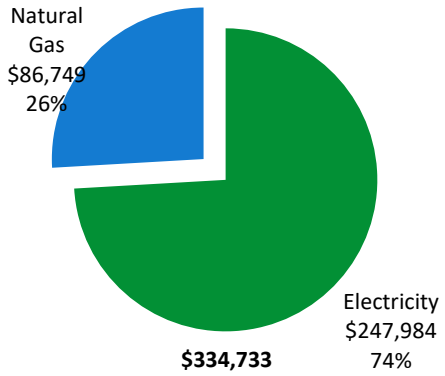
2.12 Water-Using Systems

There are restrooms with toilets, urinals, and sinks throughout the facility as well as locker rooms with showerheads. Faucet flow rates are either low flow 0.5 gallons per minute (gpm) or higher. High flow devices are between 1.5 and 2.2 gpm. Showerheads are rated at 2.5 gpm.

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	1,910,391 kWh	$247,984
Natural Gas	96,686 Therms	$86,749
Total		**$334,733**



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.

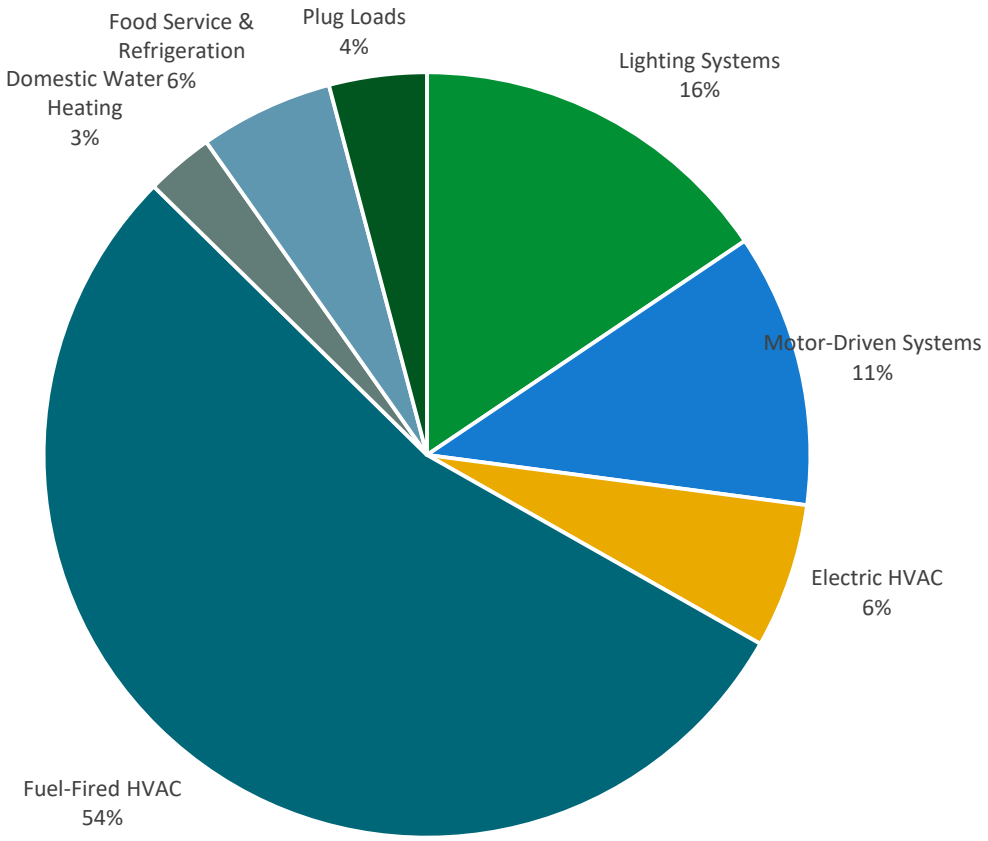
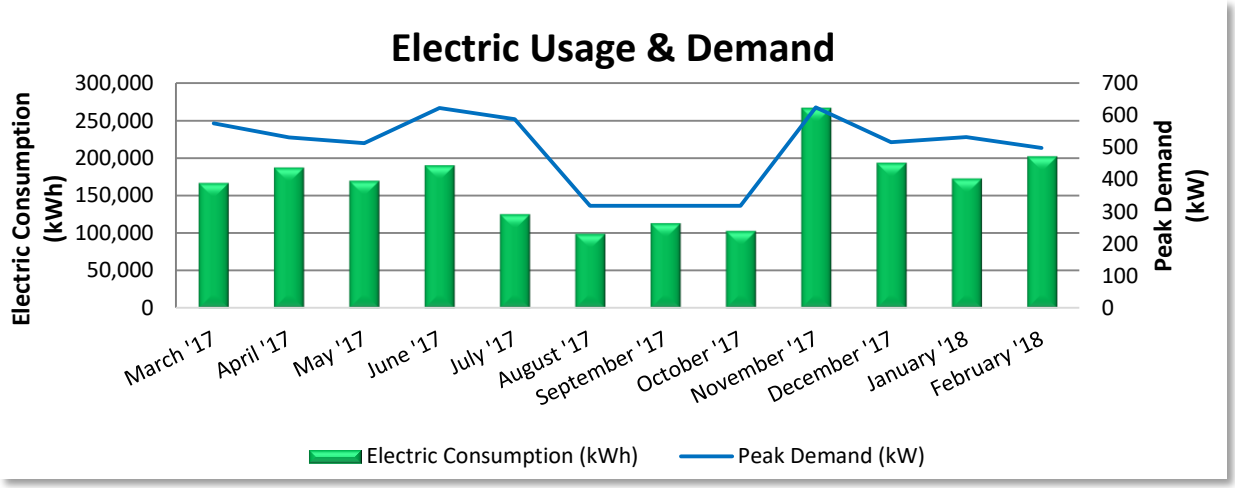


Figure 5 - Energy Balance

3.1 Electricity

JCP&L delivers electricity under rate class Service Secondary 3 Phase JC_GS3_01D, with electric production provided by Constellation New Energy, a third-party supplier.



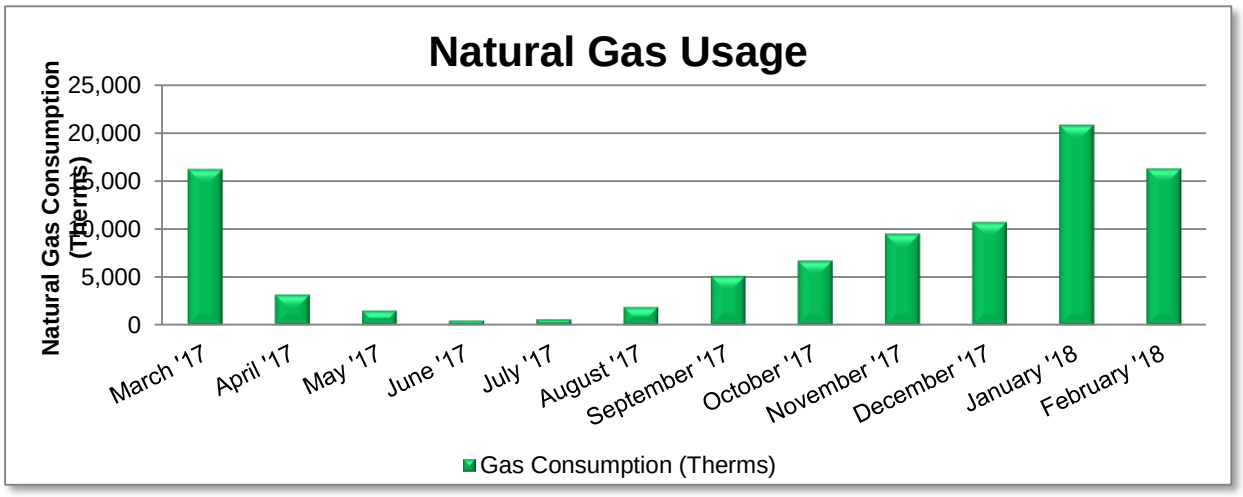
Electric Billing Data					
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**
3/17/17	27	166,800	575	$3,807	$23,205
4/17/17	58	187,200	531	$3,517	$35,681
5/17/17	29	169,500	514	$3,401	$20,971
6/19/17	32	189,900	622	$4,419	$23,907
7/19/17	29	125,400	588	$4,172	$17,070
8/17/17	28	99,300	318	$2,255	$12,550
9/19/17	32	113,100	318	$2,255	$13,981
10/19/17	29	102,900	318	$2,103	$12,735
11/16/17	27	266,600	625	$4,134	$33,045
12/19/17	32	193,500	517	$3,419	$22,972
1/17/18	28	172,500	532	$3,516	$19,759
2/16/18	29	202,200	498	$3,288	$22,301
Totals	**380**	**1,988,900**	**625**	**$40,286**	**$258,175**
Annual	**365**	**1,910,391**	**625**	**$38,695**	**$247,984**

Notes:

- Peak demand of 625 kW occurred in November 2017.
- 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.
- Peak in November is reported to be due to night sports activities.

3.2 Natural Gas

PSE&G delivers natural gas under rate class LVG, with natural gas supply provided by Direct Energy, a third-party supplier.



Gas Billing Data				
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**	**TRC Estimated Usage?**
4/4/17	28	16,264	$14,270	Yes
5/3/17	28	3,200	$2,808	No
6/2/17	29	1,560	$1,368	No
7/5/17	32	529	$464	No
8/2/17	27	638	$560	No
9/1/17	29	1,925	$1,758	No
10/3/17	31	5,156	$4,709	No
11/3/17	30	6,747	$6,163	No
12/1/17	27	9,549	$8,421	No
1/3/18	32	10,746	$9,340	No
2/1/18	28	20,864	$18,755	No
3/6/18	32	16,330	$15,281	No
Totals	**353**	**93,508**	**$83,897**	
Annual	**365**	**96,686**	**$86,749**	

Notes:

- The average gas cost for the past 12 months is $0.897/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 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.

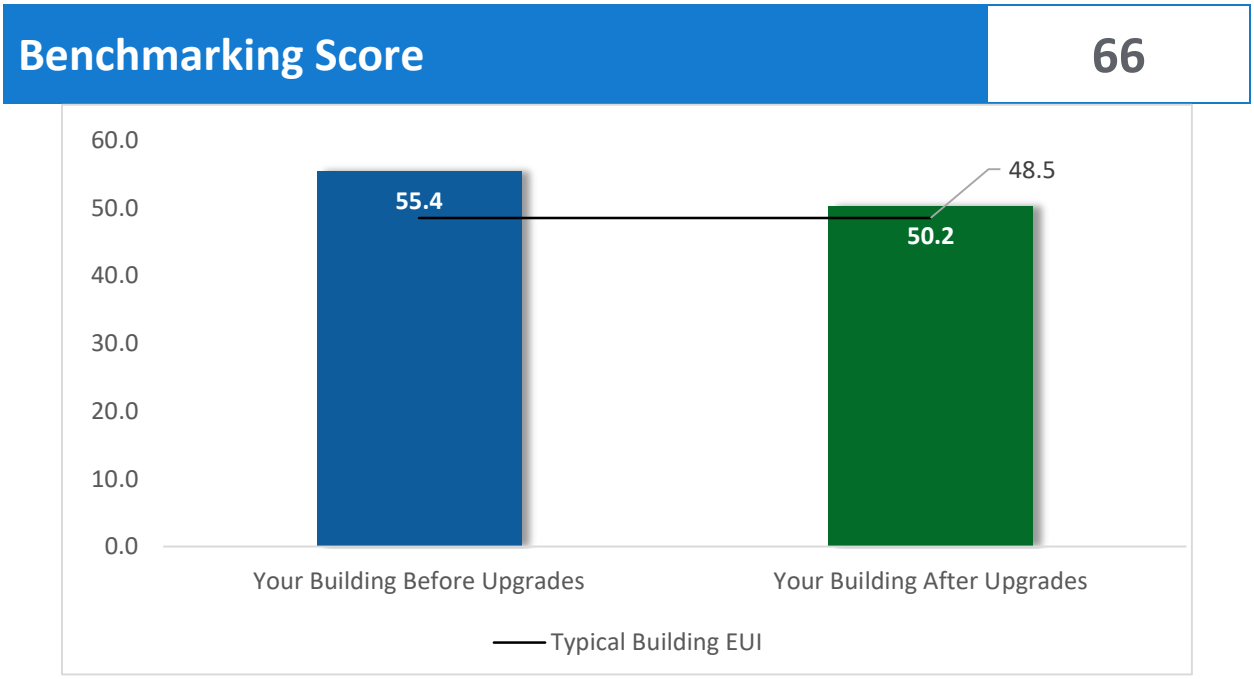


Figure 6 - Energy Use Intensity Comparison

Congratulations, your building performs better than the national average. This report has suggestions about how to keep your building running efficiently, further improve performance, and lower your energy bills even more.

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 as 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.

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[3].

[3] 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 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.

Appendix A: Equipment Inventory & Recommendations provides a detailed list of the locations and recommended upgrades for each energy conservation measure.

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Lifetime Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**358,802**	**86.9**	**-75**	**$45,907**	**$688,599**	**$294,320**	**$41,486**	**$252,834**	**5.5**	**352,582**
ECM 1	Install LED Fixtures	128,253	0.7	-1	$16,643	$249,640	$147,783	$6,980	$140,803	8.5	129,076
ECM 2	Retrofit Fixtures with LED Lamps	230,549	86.3	-74	$29,264	$438,959	$146,537	$34,506	$112,031	3.8	223,506
Lighting Control Measures		**10,424**	**2.9**	**-3**	**$1,324**	**$10,592**	**$21,320**	**$1,930**	**$19,390**	**14.6**	**10,117**
ECM 3	Install Occupancy Sensor Lighting Controls	6,692	2.2	-2	$849	$6,794	$15,320	$1,930	$13,390	15.8	6,485
ECM 4	Install Daylight Dimming Controls	412	0.0	0	$53	$428	$400	$0	$400	7.5	415
ECM 5	Install High/Low Lighting Controls	3,320	0.7	-1	$421	$3,370	$5,600	$0	$5,600	13.3	3,217
Motor Upgrades		**3,107**	**0.7**	**0**	**$403**	**$6,050**	**$14,794**	**$0**	**$14,794**	**36.7**	**3,129**
ECM 6	Premium Efficiency Motors	3,107	0.7	0	$403	$6,050	$14,794	$0	$14,794	36.7	3,129
Variable Frequency Drive (VFD) Measures		**75,229**	**21.6**	**0**	**$9,765**	**$146,480**	**$46,956**	**$6,040**	**$40,916**	**4.2**	**75,755**
ECM 7	Install VFDs on Constant Volume (CV) Fans	75,229	21.6	0	$9,765	$146,480	$46,956	$6,040	$40,916	4.2	75,755
Electric Unitary HVAC Measures		**98,285**	**47.6**	**0**	**$12,758**	**$191,372**	**$470,428**	**$10,749**	**$459,679**	**36.0**	**98,972**
	Install High Efficiency Air Conditioning Units	81,432	45.3	0	$10,571	$158,558	$422,689	$8,152	$414,537	39.2	82,001
	Install High Efficiency Heat Pumps	16,852	2.4	0	$2,188	$32,814	$47,739	$2,597	$45,142	20.6	16,970
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**1,551**	**$13,916**	**$278,321**	**$360,703**	**$10,000**	**$350,703**	**25.2**	**181,605**
	Install High Efficiency Hot Water Boilers	0	0.0	1,085	$9,739	$194,780	$214,790	$0	$214,790	22.1	127,094
	Install High Efficiency Furnaces	0	0.0	466	$4,177	$83,541	$145,913	$10,000	$135,913	32.5	54,511
Domestic Water Heating Upgrade		**0**	**0.0**	**57**	**$508**	**$5,077**	**$2,029**	**$0**	**$2,029**	**4.0**	**6,625**
ECM 8	Install Low-Flow DHW Devices	0	0.0	57	$508	$5,077	$2,029	$0	$2,029	4.0	6,625
Food Service & Refrigeration Measures		**4,230**	**0.5**	**0**	**$549**	**$3,660**	**$2,576**	**$0**	**$2,576**	**4.7**	**4,260**
	Replace Refrigeration Equipment	1,007	0.1	0	$131	$1,568	$2,116	$0	$2,116	16.2	1,014
ECM 9	Vending Machine Control	3,224	0.4	0	$418	$2,092	$460	$100	$360	0.9	3,246
TOTALS		**550,077**	**160.3**	**1,530**	**$85,130**	**$1,330,150**	**$1,213,126**	**$70,205**	**$1,142,921**	**13.4**	**733,045**

* - 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 ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**358,802**	**86.9**	**-75**	**$45,907**	**$294,320**	**$41,486**	**$252,834**	**5.5**	**352,582**
ECM 1	Install LED Fixtures	128,253	0.7	-1	$16,643	$147,783	$6,980	$140,803	8.5	129,076
ECM 2	Retrofit Fixtures with LED Lamps	230,549	86.3	-74	$29,264	$146,537	$34,506	$112,031	3.8	223,506
Lighting Control Measures		**10,424**	**2.9**	**-3**	**$1,324**	**$21,320**	**$1,930**	**$19,390**	**14.6**	**10,117**
ECM 3	Install Occupancy Sensor Lighting Controls	6,692	2.2	-2	$849	$15,320	$1,930	$13,390	15.8	6,485
ECM 4	Install Daylight Dimming Controls	412	0.0	0	$53	$400	$0	$400	7.5	415
ECM 5	Install High/Low Lighting Controls	3,320	0.7	-1	$421	$5,600	$0	$5,600	13.3	3,217
Motor Upgrades		**3,107**	**0.7**	**0**	**$403**	**$14,794**	**$0**	**$14,794**	**36.7**	**3,129**
ECM 6	Premium Efficiency Motors	3,107	0.7	0	$403	$14,794	$0	$14,794	36.7	3,129
Variable Frequency Drive (VFD) Measures		**75,229**	**21.6**	**0**	**$9,765**	**$46,956**	**$6,040**	**$40,916**	**4.2**	**75,755**
ECM 7	Install VFDs on Constant Volume (CV) Fans	75,229	21.6	0	$9,765	$46,956	$6,040	$40,916	4.2	75,755
Domestic Water Heating Upgrade		**0**	**0.0**	**57**	**$508**	**$2,029**	**$0**	**$2,029**	**4.0**	**6,625**
ECM 8	Install Low-Flow DHW Devices	0	0.0	57	$508	$2,029	$0	$2,029	4.0	6,625
Food Service & Refrigeration Measures		**3,224**	**0.4**	**0**	**$418**	**$460**	**$100**	**$360**	**0.9**	**3,246**
ECM 9	Vending Machine Control	3,224	0.4	0	$418	$460	$100	$360	0.9	3,246
TOTALS		**450,786**	**112.5**	**-21**	**$58,325**	**$379,878**	**$49,556**	**$330,322**	**5.7**	**451,455**

* - All incentives presented in this table are based on NJ SmartStart equipment incentives and assume proposed equipment meets minimum performance criteria

** - 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 ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**358,802**	**86.9**	**-75**	**$45,907**	**$294,320**	**$41,486**	**$252,834**	**5.5**	**352,582**
ECM 1	Install LED Fixtures	128,253	0.7	-1	$16,643	$147,783	$6,980	$140,803	8.5	129,076
ECM 2	Retrofit Fixtures with LED Lamps	230,549	86.3	-74	$29,264	$146,537	$34,506	$112,031	3.8	223,506

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 exterior fixtures containing metal halide and high pressure sodium lamps with new LED light fixtures. This measure also includes replacement of exterior compact fluorescent wall pack fixtures and interior poor condition T5 fluorescent fixtures in the kitchen. 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: kitchen, loading dock, parking lot, stadium lighting and exterior fixtures

ECM 2: Retrofit Fixtures with LED Lamps

Replace linear fluorescent, compact fluorescent and incandescent 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.

Second floor classrooms were over lit and light levels ranged between 45 – 65 FC and the A-wing classrooms ranged between 38 – 52 FC. The minimum light levels required for classroom space by IES standards is 30 FC. However, additional considerations must be investigated during design to determine the cost effectiveness of reducing the number of lamps. Some classrooms have bi-level switching and therefore, it is uncertain as to how often these fixtures operate at each level of switching (number of lamps). Reducing the light output would require a level of design, beyond the scope of this energy audit, to determine the feasibility. Options may include upgrading to 1-LED lamp fixtures, 2x4 LED retrofit kits, change in number of fixtures, etc. The options range too much to provide an analysis and cost would vary drastically on the proposed approach. We do recommend that this be investigated further by an electrical contractor if lighting upgrades moves forward to implementation.

Affected building areas: all areas with fluorescent fixtures and general purpose screw in lamp fixtures

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**10,424**	**2.9**	**-3**	**$1,324**	**$21,320**	**$1,930**	**$19,390**	**14.6**	**10,117**
ECM 3	Install Occupancy Sensor Lighting Controls	6,692	2.2	-2	$849	$15,320	$1,930	$13,390	15.8	6,485
ECM 4	Install Daylight Dimming Controls	412	0.0	0	$53	$400	$0	$400	7.5	415
ECM 5	Install High/Low Lighting Controls	3,320	0.7	-1	$421	$5,600	$0	$5,600	13.3	3,217

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 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, classrooms, music rooms, library and restrooms

ECM 4: Install Photocell Controls

Install photocell controls that use photosensors to reduce electric lighting when ample daylight lighting is present. Use photosensor controls for exterior fixtures. This measure reduces energy use in spaces where ambient daylight provides sufficient lighting levels. This will ensure that these exterior fixtures will not operate during the day time.

Affected building areas: exterior fixtures

ECM 5: 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 requirements. 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. 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. This measure provides energy savings by reducing the light fixture power draw when reduced light output is appropriate.

Affected building areas: hallways

4.3 Motors

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Motor Upgrades		**3,107**	**0.7**	**0**	**$403**	**$14,794**	**$0**	**$14,794**	**36.7**	**3,129**
ECM 6	Premium Efficiency Motors	3,107	0.7	0	$403	$14,794	$0	$14,794	36.7	3,129

ECM 6: Premium Efficiency Motors

Replace standard efficiency motors with IHP 2014 efficiency motors. This evaluation assumes that existing motors will be replaced with motors of equivalent size and type. In some cases, additional savings may be possible by downsizing motors to better meet the motor's current load requirements.

Affected motors:

Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor
Roof	HV-3 through HV-5	3	Supply Fan	3.0
Roof	HV-6 through HV-8	3	Supply Fan	1.5
Roof	Gymnasium	4	Supply Fan	3.0
Roof	ERU-7	2	Supply Fan	15.0
Roof	ERU-1 & 2	2	Supply Fan	10.0

Savings are based on the difference between baseline and proposed efficiencies and the assumed annual operating hours. The base case motor energy consumption is estimated using the efficiencies found on nameplates or estimated based on the age of the motor and our best estimates of motor run hours. Efficiencies of proposed motor upgrades are obtained from the current *New Jersey's Clean Energy Program Protocols to Measure Resource Savings*.

4.4 Variable Frequency Drives (VFD)

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**75,229**	**21.6**	**0**	**$9,765**	**$46,956**	**$6,040**	**$40,916**	**4.2**	**75,755**
ECM 7	Install VFDs on Constant Volume (CV) Fans	75,229	21.6	0	$9,765	$46,956	$6,040	$40,916	4.2	75,755

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 motor —unless the existing motor meets or exceeds IHP 2014 standards—to conservatively account for the cost of an inverter duty rated motor. The savings and cost associated with the new motor are presented with the Premium Efficiency Motor measures. If the proposed VFD measure is not selected for implementation the motor replacement should be reevaluated.

ECM 7: Install VFDs on Constant Volume (CV) Fans

Install VFDs to control constant volume fan motor speeds. This converts a constant-volume, single-zone air handling system into a variable-air-volume (VAV) system. A separate VFD is usually required to control the return fan motor or dedicated exhaust fan motor, if the air handler has one.

Zone thermostats signal the VFD to adjust fan speed to maintain the appropriate temperature in the zone, while maintaining a constant supply air temperature.

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

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

This measure is part of a measure to replace motors and as such must be considered in combination with ECM 6: Premium Efficiency Motors.

4.5 Electric Unitary HVAC

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Electric Unitary HVAC Measures		**98,285**	**47.6**	**0**	**$12,758**	**$470,428**	**$10,749**	**$459,679**	**36.0**	**98,972**
	Install High Efficiency Air Conditioning Units	81,432	45.3	0	$10,571	$422,689	$8,152	$414,537	39.2	82,001
	Install High Efficiency Heat Pumps	16,852	2.4	0	$2,188	$47,739	$2,597	$45,142	20.6	16,970

Replacing the 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 equipment is eventually replaced, consider purchasing equipment that exceeds the minimum efficiency required by building codes.

Install High Efficiency Air Conditioning Units

Replace standard efficiency packaged air conditioning units with high efficiency packaged 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 load, and the estimated annual operating hours.

System Types Included: Packaged AC Units and Split AC Systems

Install High Efficiency Heat Pumps

Replace standard efficiency heat pumps with high efficiency heat pumps. A higher EER or SEER rating indicates a more efficient cooling system and a higher HPSF rating indicates more efficient heating mode. 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 heating and cooling loads, and the estimated annual operating hours.

4.6 Gas-Fired Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**1,551**	**$13,916**	**$360,703**	**$10,000**	**$350,703**	**25.2**	**181,605**
	Install High Efficiency Hot Water Boilers	0	0.0	1,085	$9,739	$214,790	$0	$214,790	22.1	127,094
	Install High Efficiency Furnaces	0	0.0	466	$4,177	$145,913	$10,000	$135,913	32.5	54,511

Replacing the boilers and furnaces has a long payback and may not be justifiable based simply on energy considerations. However, the non-condensing boilers 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.

ECM 8: Install High Efficiency Hot Water Boilers

Replace 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.

ECM 9: Install High Efficiency Furnaces

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

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

4.7 Domestic Water Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**57**	**$508**	**$2,029**	**$0**	**$2,029**	**4.0**	**6,625**
ECM 8	Install Low-Flow DHW Devices	0	0.0	57	$508	$2,029	$0	$2,029	4.0	6,625

ECM 8: 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
Showerhead	2.0 gpm

Low-flow devices reduce the overall water flow from the fixture, while still providing adequate pressure for washing. Additional cost savings may result from reduced water usage.

4.8 Food Service & Refrigeration Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Food Service & Refrigeration Measures		**4,230**	**0.5**	**0**	**$549**	**$2,576**	**$0**	**$2,576**	**4.7**	**4,260**
	Replace Refrigeration Equipment	1,007	0.1	0	$131	$2,116	$0	$2,116	16.2	1,014
ECM 9	Vending Machine Control	3,224	0.4	0	$418	$460	$100	$360	0.9	3,246

Replace Refrigeration Equipment

Replace existing commercial refrigerator chest with new ENERGY STAR® rated equipment. The energy savings associated with this measure come from reduced energy usage, due to more efficient technology, and reduced run times. Replacing this has a long payback and may not be justifiable based simply on energy considerations.

ECM 9: 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.

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. 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.[4] Your account has already been established. Now you can continue to keep tabs on your energy performance every month.

Weatherization

Caulk or weather strip leaky doors and windows to reduce drafts and loss of heated or cooled air. Sealing cracks and openings can reduce heating and cooling costs, improve building durability, and create a healthier indoor environment.

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.

Window Treatments/Coverings

Use high-reflectivity films or cover windows with shades or shutters to reduce solar heat gain and reduce the load on cooling and heating systems. Older, single pane windows and east or west-facing windows are especially prone to solar heat gain. In addition, use shades or shutters at night during cold weather to reduce heat loss.

Lighting Controls

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

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

Motor Controls

Electric motors often run unnecessarily, and this is an overlooked opportunity to save energy. These motors should be identified and turned off when appropriate. For example, exhaust fans often run unnecessarily when ventilation requirements are already met. Whenever possible, use automatic devices such as twist timers or occupancy sensors to turn off motors when they are not needed.

Motor Short Cycling Reduction

Frequent stopping and starting of motors places substantial stress on rotors and other parts. This leads to wear and tear, lower efficiency, and higher maintenance costs. Adjust the load on the motor to limit the amount of unnecessary stopping and starting to improve motor performance.

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.

Fans to Reduce Cooling Load

Install ceiling fans to supplement your cooling system. Thermostat settings can typically be increased by 4°F with no change in overall occupant comfort due to the wind chill effect of moving air.

Destratification Fans

For areas with high ceilings, destratification fans f air balance the air temperature from floor to ceiling. They help reduce the recovery time needed to warm the space after nightly temperature setbacks and will increase occupants' the comfort level.

Areas with high ceilings require the heating system to heat a larger volume of space than that which is occupied. As the warm air rises, the warmest space is at the ceiling level, rather than floor level. Higher temperatures at the ceiling accelerate heat loss through the roof, which requires additional energy consumption by the heating equipment to compensate for this accelerated heat transfer.

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 5-10°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.

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.

Duct Sealing

Duct leakage in commercial buildings can account for five to twenty-five percent of the supply airflow. In the case of rooftop air handlers, duct leakage can occur to the outside of the building wasting conditioned air. Eliminating duct leaks can improve ventilation system performance and reduce heating and cooling system operation.

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. Boilers should be cleaned according to the manufacturer's instructions to remove soot and scale from the water side or fire side of the boiler.

Furnace Maintenance

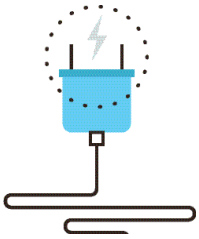
Preventative maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. Following the manufacturer's instructions, a yearly tune-up should : check for gas / carbon monoxide leaks; change the air and fuel filters; check components for cracks, corrosion, dirt,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

Water Heater Maintenance

Preventative maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. At least once a year, follow manufacturer instructions to drain a few gallons out of the water heater using the drain valve. If there is a lot of sediment or debris, then a full flush is recommended. Turn the temperature down and then completely drain the tank. Annual checks should include checks for:

- Leaks or heavy corrosion on the pipes and valves.
- Corrosion or wear on the gas line and on the piping. If you noticed any black residue, soot, or charred metal, this is a sign you may be having combustion issues and you should have the unit serviced by a professional.
- For electric water heaters, look for signs of leaking such as rust streaks or residue around the upper and lower panels covering the electrical components on the tank.
- For water heaters more than three years old, have a technician inspect the sacrificial anode annually.

Plug Load Controls



Reducing plug loads is a common way to decrease your electrical use. Limiting the energy use of plug loads can include increasing occupant awareness, removing under-used equipment, installing hardware controls, and using software controls. Consider enabling the most aggressive power settings on existing devices or install load sensing or occupancy sensing (advanced) power strips[5]. Your local utility may offer incentives or rebates for this equipment.

Computer Power Management Software

Many computers consume power during nights, weekends, and holidays. Screen savers are commonly confused as a power management strategy. This contributes to avoidable, excessive electrical energy consumption. There are innovative power management software packages available that are designed to deliver significant energy saving and provide ongoing tracking measurements. A central power management platform helps enforce energy savings policies as well as identify and eliminate underutilized devices

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).

[5] For additional information refer to "Plug Load Best Practices Guide" http://www.advancedbuildings.net/plug-load-best-practices-guide-offices.

For more information regarding water conservation go to the EPA's WaterSense™ website[6] or download a copy of EPA's "WaterSense at Work: Best Management Practices for Commercial and Institutional Facilities"[7] to get ideas for creating a water management plan and best practices for a wide range of water using systems.

Water conservation devices that do not reduce hot water consumption will not provide energy savings at the site level, but they may significantly affect your water and sewer usage costs. Any reduction in water use does however ultimately reduce grid-level electricity use since a significant amount of electricity is used to deliver water from reservoirs to end users.

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

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

Procurement Strategies

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

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

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

6 On-site Generation

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

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

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

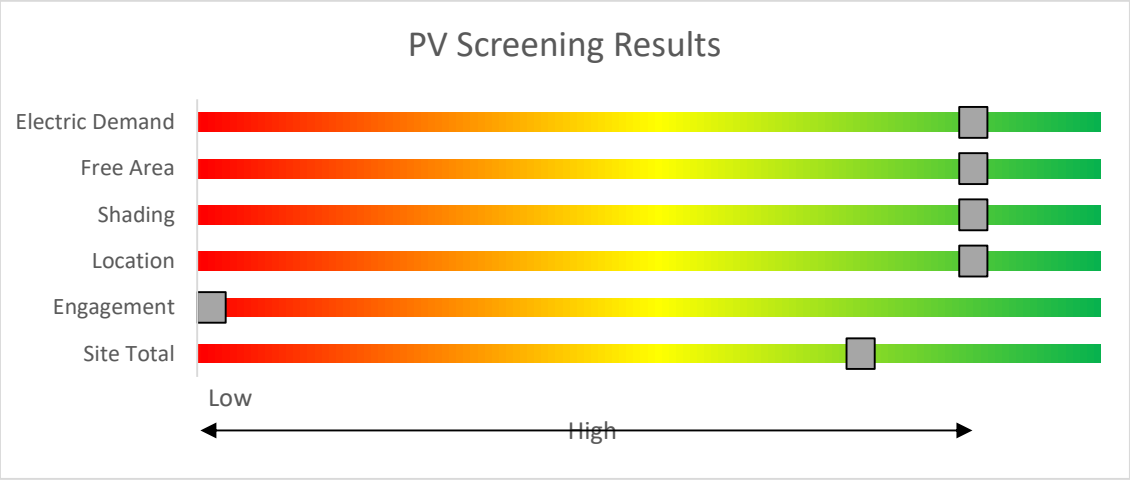


Figure 9 - Photovoltaic Screening

Solar Renewable Energy Certificate (SREC) Registration Program (SRP)

Rebates are not available for solar projects, but owners of solar projects MUST register their projects in the SREC Registration Program (SRP) before starting construction. Once your PV system is up and running, you periodically earn credits, which can then be sold on the open market for up to 15 years.

If you are considering installing solar photovoltaics on your building, visit www.njcleanenergy.com/srec for more information about the SREC Registration Program.

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:

- **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.

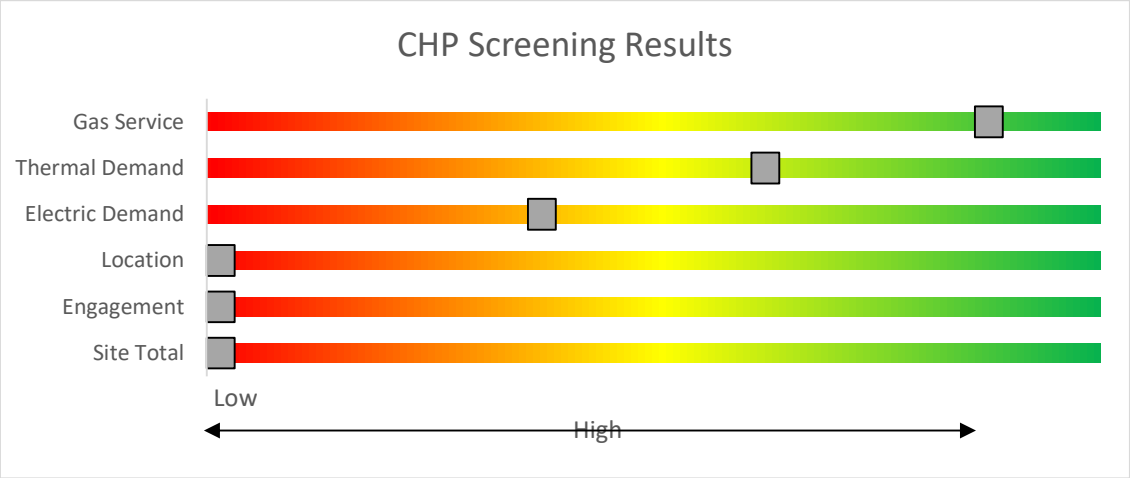


Figure 10 - Combined Heat and Power Screening

7 PROJECT FUNDING AND INCENTIVES

Ready to improve your building's performance? NJ 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 in NJ 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 efficiency equipment based on market trends and new technologies.

Equipment with Prescriptive Incentives Currently Available:

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

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.

Incentives

The program pays up to 70% 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% of eligible costs are covered by the program, subject to program caps and eligibility, while the remaining 30% 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% 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 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 descriptions 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.

7.5 SREC Registration Program

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

After the registration is accepted, construction is complete, and final paperwork has been submitted and is deemed complete, the project is issued a New Jersey certification number, which enables it to generate New Jersey SRECs. SREC's are generated once the solar project has been authorized to be energized by the Electric Distribution Company (EDC).

Each time a solar installation generates 1,000 kilowatt-hours (kWh) of electricity, an SREC is earned. Solar project owners report the energy production to the SREC Tracking System. This reporting allows SREC's to be placed in the customer's electronic account. SRECs can then be sold on the SREC Tracking System, providing revenue for the first 15 years of the project's life.

Electricity suppliers, the primary purchasers of SRECs, are required to pay a Solar Alternative Compliance Payment (SACP) if they do not meet the requirements of New Jersey's Solar Renewable Portfolio Standard. Purchasing SRECs can help them meet those requirements. As SRECs are traded in a competitive market, the price may vary significantly. The actual price of an SREC during a trading period fluctuates depending on supply and demand.

Information about the SRP can be found at: www.njcleanenergy.com/srec.

8 Energy Purchasing and Procurement Strategies

8.1 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[8].

8.2 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[9].

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

[9] 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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,080	2	Relamp	No	8	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,080	0.2	662	0	$84	$584	$160	5.1
Cafeteria #1	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,860	2	Relamp	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,860	0.2	670	0	$85	$365	$100	3.1
Cafeteria #1	40	Linear Fluorescent - T5: 4' T5 (28W) - 4L	Occupancy Sensor	S	120	2,860	2	Relamp	No	40	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,860	1.2	5,036	-2	$639	$2,921	$800	3.3
Kitchen	41	Linear Fluorescent - T5: Poor Condition, 3L 2' T5 Troffer Fixtures	Wall Switch	S	72	2,080	1	Fixture Replacement	No	41	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	40	2,080	0.7	1,938	-1	$246	$8,203	$615	30.9
Kitchen	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,080	2	Relamp	No	12	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,080	0.3	992	0	$126	$876	$240	5.1
Receiving	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	67	0	$9	$73	$20	6.2
Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.0	50	0	$6	$55	$15	6.2
Locker Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.0	50	0	$6	$55	$15	6.2
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, 3	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	62	0	$8	$153	$10	18.1
Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	186	0	$24	$226	$50	7.4
Entrance	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,860	2	Relamp	No	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	0.2	670	0	$85	$365	$100	3.1
Cafeteria #2	40	Linear Fluorescent - T5: 4' T5 (28W) - 3L	Occupancy Sensor	S	90	2,860	2	Relamp	No	40	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,860	0.9	3,777	-1	$479	$2,191	$600	3.3
Snack Bar	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,860	2, 3	Relamp	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,973	0.2	751	0	$95	$481	$120	3.8
Storage A110	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,080	2	Relamp	No	6	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,080	0.2	496	0	$63	$438	$120	5.1
Gym	40	Linear Fluorescent - T5HO: 4' T5HO (54W) - 4L	Occupancy Sensor	S	234	3,215	2	Relamp	No	40	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,215	3.5	16,070	-5	$2,039	$2,921	$800	1.0
Locker Room Hall	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,215	2, 5	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,218	0.1	671	0	$85	$456	$70	4.5
Locker Room	21	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	3,215	2	Relamp	No	21	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,215	0.6	2,684	-1	$341	$1,534	$420	3.3
Showers	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,080	2	Relamp	No	3	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,080	0.1	248	0	$31	$219	$60	5.1
Office/Storage (2 Total)	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	97	0	$12	$73	$20	4.3
Restroom (2 Total)	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	2,080	2	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	2,080	0.0	40	0	$5	$33	$6	5.2
Locker Room Hall	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,215	2, 5	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,218	0.2	719	0	$91	$474	$75	4.4
Locker Room	27	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	3,215	2	Relamp	No	27	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,215	0.8	3,451	-1	$438	$1,972	$540	3.3
Showers	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	1,435	2	Relamp	No	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.1	228	0	$29	$292	$80	7.3
Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.0	101	0	$13	$110	$30	6.2

	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.0	101	0	$13	$110	$30	6.2
Hallway	26	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,215	2, 5	Relamp	Yes	26	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,218	0.5	2,492	-1	$316	$1,749	$260	4.7
Vestibule	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	97	0	$12	$73	$20	4.3
Team Room A108	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,080	2, 3	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.4	1,311	0	$166	$1,146	$275	5.2
Showers	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,080	2	Relamp	No	8	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,080	0.2	662	0	$84	$584	$160	5.1
Showers	5	Compact Fluorescent: Plug in Lamps	Wall Switch	S	14	2,080	2	Relamp	No	5	LED Screw-In Lamps: Plug in Lamps	Wall Switch	10	2,080	0.0	30	0	$4	$172	$0	46.0
Trainer's Room	2	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	S	53	3,215	2	Relamp	No	2	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	26	3,215	0.0	126	0	$16	$98	$18	5.0
Trainer's Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,215	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,218	0.1	383	0	$49	$262	$60	4.2
Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	S	53	2,080	2	Relamp	No	1	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	26	2,080	0.0	41	0	$5	$49	$9	7.7
Offices (3 Total)	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,215	2, 3	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,218	0.3	1,150	0	$146	$786	$180	4.2
Locker Room A102	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,215	2, 3	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,218	0.3	1,150	0	$146	$708	$155	3.8
Restroom	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	186	0	$24	$380	$65	13.3
Showers	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,080	2	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,080	0.1	165	0	$21	$146	$40	5.1
Auxilary Gym	15	Linear Fluorescent - T5HO: 4' T5HO (54W) - 4L	Occupancy Sensor	S	234	3,215	2	Relamp	No	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,215	1.3	6,026	-2	$765	$1,095	$300	1.0
Fitness Room	37	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	3,215	2	Relamp	No	37	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,215	0.9	4,181	-1	$531	$2,027	$555	2.8
Offices (2 Total)	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	3,215	2	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,215	0.1	452	0	$57	$219	$60	2.8
Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	97	0	$12	$73	$20	4.3
Auxilary Gym	24	Linear Fluorescent - T5HO: 4' T5HO (54W) - 4L	Occupancy Sensor	S	234	3,215	2	Relamp	No	24	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,215	2.1	9,642	-3	$1,224	$1,753	$480	1.0
Storage	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.2	585	0	$74	$438	$120	4.3
Hallway	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,215	2, 5	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,218	0.2	767	0	$97	$692	$80	6.3
Hallway	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,215	2, 5	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,218	0.3	1,342	0	$170	$911	$140	4.5
Classroom D3	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	404	0	$51	$438	$120	6.2
Classroom D4	16	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	16	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.2	473	0	$60	$1,159	$160	16.7
Classroom D5	16	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	16	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.2	473	0	$60	$1,159	$160	16.7
Classroom D6	16	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	16	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.2	473	0	$60	$1,159	$160	16.7

	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Electric Room D9	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.1	292	0	$37	$219	$60	4.3
Storage Rooms (2 Total)	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	97	0	$12	$73	$20	4.3
Server Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$6	$37	$10	4.3
Hallway	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,215	2, 5	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,218	0.4	1,917	-1	$243	$1,330	$200	4.6
Classroom D18	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	605	0	$77	$657	$180	6.2
Classroom D17	18	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	18	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.4	908	0	$115	$986	$270	6.2
Storage Prep Room	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.1	390	0	$49	$292	$80	4.3
Classroom D16	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	605	0	$77	$657	$180	6.2
Storage Prep Room	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.1	390	0	$49	$292	$80	4.3
Classroom D15	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	605	0	$77	$657	$180	6.2
Classroom D14	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	605	0	$77	$657	$180	6.2
Classroom D14	11	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	11	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.2	325	0	$41	$797	$110	16.7
Hallway	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,215	2, 5	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,218	0.3	1,534	0	$195	$1,184	$160	5.3
Classroom B22	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.4	807	0	$102	$876	$240	6.2
Classroom B23	16	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	16	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.2	473	0	$60	$1,159	$160	16.7
Classroom B24	12	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	12	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.2	355	0	$45	$870	$120	16.7
Restroom	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	837	0	$106	$763	$170	5.6
Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$6	$37	$10	4.3
Restroom	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	837	0	$106	$763	$170	5.6
Hallway	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,215	2, 5	Relamp	Yes	13	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,218	0.3	1,246	0	$158	$1,075	$130	6.0
Classroom B4	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	605	0	$77	$657	$180	6.2
Classroom B5	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	605	0	$77	$657	$180	6.2
Classroom B6	16	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	16	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.2	473	0	$60	$1,159	$160	16.7
Classroom B7	16	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	16	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.2	473	0	$60	$1,159	$160	16.7

	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Classroom B8	16	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	16	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.2	473	0	$60	$1,159	$160	16.7
Classroom B9	16	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	16	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.2	473	0	$60	$1,159	$160	16.7
Classroom B10	16	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	16	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.2	473	0	$60	$1,159	$160	16.7
Classroom B11	16	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	16	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.2	473	0	$60	$1,159	$160	16.7
Hallway	19	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,215	2, 5	Relamp	Yes	19	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,218	0.4	1,821	-1	$231	$1,294	$190	4.8
Office B1	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,080	0.0	73	0	$9	$55	$15	4.3
Office B2	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,080	0.0	73	0	$9	$55	$15	4.3
Child Study Office Hall	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,215	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,215	0.0	151	0	$19	$73	$20	2.8
Offices (4 Total)	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	404	0	$51	$438	$120	6.2
Conference Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	97	0	$12	$73	$20	4.3
Library	6	Compact Fluorescent: Plug in Lamps	Wall Switch	S	13	2,080	2	Relamp	No	6	LED Screw-In Lamps: Plug in Lamps	Wall Switch	9	2,080	0.0	35	0	$4	$103	$0	23.0
Library	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	2,080	2	Relamp	No	5	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,080	0.0	129	0	$16	$91	$25	4.0
Library	22	Compact Fluorescent: Plug in Lamps	Wall Switch	S	26	2,080	2, 3	Relamp	Yes	22	LED Screw-In Lamps: Plug in Lamps	Occupancy Sensor	18	1,435	0.1	441	0	$56	$1,028	$35	17.7
Library Stacks	144	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	2,080	2, 3	Relamp	Yes	144	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,435	1.6	4,677	-2	$594	$6,409	$1,210	8.8
Library	28	Linear Fluorescent - T5: 4' T5 (28W) - 3L	Wall Switch	S	90	2,080	2, 3	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	1.0	3,101	-1	$394	$1,307	$280	2.6
Library	6	Compact Fluorescent: Plug in Lamps	Wall Switch	S	46	2,080	2, 3	Relamp	Yes	6	LED Screw-In Lamps: Plug in Lamps	Occupancy Sensor	32	1,435	0.1	212	0	$27	$477	$35	16.4
Office	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, 3	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	372	0	$47	$335	$80	5.4
Office	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, 3	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	372	0	$47	$335	$80	5.4
Storage	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.1	390	0	$49	$292	$80	4.3
Storage	5	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	2,080	2	Relamp	No	5	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	2,080	0.0	100	0	$13	$81	$15	5.2
Office	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	496	0	$63	$408	$100	4.9
Conference Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	202	0	$26	$219	$60	6.2
Guidiance Hallway	6	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	S	53	3,215	2, 5	Relamp	Yes	6	LED - Linear Tubes: (3) 2' Lamps	High/Low Control	26	2,218	0.1	485	0	$62	$493	$54	7.1
Offices (5 Total)	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.1	244	0	$31	$183	$50	4.3

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Offices (2 Total)	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.1	195	0	$25	$146	$40	4.3
Office	16	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Occupancy Sensor	S	53	1,435	2	Relamp	No	16	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,435	0.2	448	0	$57	$780	$144	11.2
Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	67	0	$9	$73	$20	6.2
Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$6	$37	$10	4.3
Hallway	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	3,215	2	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,215	0.3	1,356	0	$172	$657	$180	2.8
Classroom A89	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	303	0	$38	$329	$90	6.2
Classroom A90	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	303	0	$38	$329	$90	6.2
Classroom A91	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	303	0	$38	$329	$90	6.2
Classroom A92	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	303	0	$38	$329	$90	6.2
Classroom A93	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	303	0	$38	$329	$90	6.2
Classroom A63	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	303	0	$38	$329	$90	6.2
Classroom A64	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	303	0	$38	$329	$90	6.2
Classroom A53	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	303	0	$38	$329	$90	6.2
Classroom A54	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	303	0	$38	$329	$90	6.2
Classroom A55	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	303	0	$38	$329	$90	6.2
Classroom A56	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	303	0	$38	$329	$90	6.2
Copy Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	248	0	$31	$262	$60	6.4
Hallway	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,215	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,215	0.0	75	0	$10	$37	$10	2.8
Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,080	0.0	24	0	$3	$33	$6	8.8
Nurses Office A65	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.1	195	0	$25	$146	$40	4.3
Nurses Office A65	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.0	43	0	$5	$72	$10	11.5
Nurses Office A65	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.1	195	0	$25	$146	$40	4.3
Storage A83	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$6	$37	$10	4.3
Electric Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	97	0	$12	$73	$20	4.3
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	34	0	$4	$37	$10	6.2

	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Restroom	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	202	0	$26	$219	$60	6.2
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	34	0	$4	$37	$10	6.2
Restroom	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	202	0	$26	$219	$60	6.2
Hallway	21	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	3,215	2	Relamp	No	21	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,215	0.3	1,582	-1	$201	$767	$210	2.8
Computer Lab A80	25	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	25	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.6	1,261	0	$160	$1,369	$375	6.2
Computer Lab A81	25	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	25	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.6	1,261	0	$160	$1,369	$375	6.2
Computer Lab A82	25	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	25	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.6	1,261	0	$160	$1,369	$375	6.2
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$6	$37	$10	4.3
Restroom	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	279	0	$35	$434	$80	10.0
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, 3	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	62	0	$8	$37	$10	3.4
Restroom	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	279	0	$35	$434	$80	10.0
Hallway	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	3,215	2	Relamp	No	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,215	0.4	1,808	-1	$229	$876	$240	2.8
Main Entrance	4	Compact Fluorescent: Plug in Lamps	Wall Switch	S	26	3,215	2	Relamp	No	4	LED Screw-In Lamps: Plug in Lamps	Wall Switch	18	3,215	0.0	73	0	$9	$138	$0	14.9
Main Entrance	6	Compact Fluorescent: Plug in Lamps	Wall Switch	S	13	3,215	2	Relamp	No	6	LED Screw-In Lamps: Plug in Lamps	Wall Switch	9	3,215	0.0	55	0	$7	$103	$0	14.9
Copy Room A8	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	303	0	$38	$329	$90	6.2
Main Office	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	555	0	$70	$602	$165	6.2
Offices (4 Total)	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	404	0	$51	$438	$120	6.2
Kitchenette	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.0	101	0	$13	$110	$30	6.2
Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	2,080	2, 3	Relamp	Yes	1	LED - Linear Tubes: (1) 2' Lamp	Occupancy Sensor	9	1,435	0.0	24	0	$3	$132	$3	42.7
Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	2,080	2, 3	Relamp	Yes	1	LED - Linear Tubes: (1) 2' Lamp	Occupancy Sensor	9	1,435	0.0	24	0	$3	$132	$3	42.7
Main Office	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	303	0	$38	$329	$90	6.2
Office A20 & A22	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	202	0	$26	$219	$60	6.2
Transition Spaces	45	Exit Signs: LED - 2 W Lamp	None	S	6	8,760		None	No	45	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Auditorium	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,215	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,215	0.3	1,243	0	$158	$602	$165	2.8
Auditorium	6	Compact Fluorescent: Plug in Lamps	Wall Switch	S	23	8,760	2	Relamp	No	6	LED Screw-In Lamps: Plug in Lamps	Wall Switch	16	8,760	0.0	261	0	$33	$103	$0	3.1

	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Stage	7	Halogen Incandescent: Flood Lamp	High/Low Control	S	150	1,435	2	Relamp	No	7	LED Screw-In Lamps: Screw in Lamp	High/Low Control	23	1,435	0.4	906	0	$115	$163	$7	1.4
Auditorium	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,215	2	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,215	0.1	301	0	$38	$146	$40	2.8
Auditorium	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,215	2	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,215	0.1	603	0	$76	$292	$80	2.8
Auditorium	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	3,215	2	Relamp	No	4	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,215	0.0	160	0	$20	$73	$20	2.6
Auditorium	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	3,215	2	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	3,215	0.0	62	0	$8	$33	$6	3.4
Stage	200	Halogen Incandescent: Flood Lamp	Breaker Panel	S	300	1,040	2	Relamp	No	200	LED Screw-In Lamps: Flood Lamps	Breaker Panel	45	1,040	25.5	37,658	-12	$4,779	$6,042	$200	1.2
Hallway	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	3,215	2	Relamp	No	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,215	0.2	979	0	$124	$475	$130	2.8
Band Room A41	36	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	3,215	2	Relamp	No	36	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,215	0.6	2,712	-1	$344	$1,315	$360	2.8
Hallway	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	3,215	2	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,215	0.1	301	0	$38	$146	$40	2.8
Practice Room A42A	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	496	0	$63	$408	$100	4.9
Practice Room A42B	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	496	0	$63	$408	$100	4.9
Practice Room A42C	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	248	0	$31	$262	$60	6.4
Band Room A43	36	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	3,215	2	Relamp	No	36	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,215	1.0	4,602	-1	$584	$2,629	$720	3.3
Band Room A43	23	Compact Fluorescent: Plug in Lamps	Occupancy Sensor	S	26	3,215	2	Relamp	No	23	LED Screw-In Lamps: Plug in Lamps	Occupancy Sensor	18	3,215	0.1	420	0	$53	$792	$0	14.9
Office A43A	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	3,215	2	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,215	0.0	226	0	$29	$110	$30	2.8
Storage A43B	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	454	0	$58	$493	$135	6.2
Storage A42	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.0	101	0	$13	$110	$30	6.2
Hallway	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	3,215	2	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,215	0.0	226	0	$29	$110	$30	2.8
Studio Rooms (3 Total)	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	101	0	$13	$110	$30	6.2
Library A45	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.0	101	0	$13	$110	$30	6.2
Choral Room A47	36	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	3,215	2	Relamp	No	36	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,215	1.0	4,602	-1	$584	$2,629	$720	3.3
Choral Room A47	26	Compact Fluorescent: Plug in Lamps	Occupancy Sensor	S	26	3,215	2	Relamp	No	26	LED Screw-In Lamps: Plug in Lamps	Occupancy Sensor	18	3,215	0.1	475	0	$60	$896	$0	14.9
Office A46A	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.0	101	0	$13	$110	$30	6.2
Office A47A	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.0	101	0	$13	$110	$30	6.2
Office A47B	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	135	0	$17	$146	$40	6.2

	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Storage A47C	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	168	0	$21	$183	$50	6.2
Hallway	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	3,215	2	Relamp	No	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,215	0.2	1,055	0	$134	$511	$140	2.8
Art Room E2	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.5	1,009	0	$128	$1,095	$300	6.2
Art Room E3	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.5	1,009	0	$128	$1,095	$300	6.2
Art Room E4	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.5	1,009	0	$128	$1,095	$300	6.2
Storage E1	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	202	0	$26	$219	$60	6.2
Hallway	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	3,215	2	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,215	0.0	226	0	$29	$110	$30	2.8
Hallway	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	3,215	2	Relamp	No	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,215	0.2	829	0	$105	$402	$110	2.8
Computer Lab C9	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.4	807	0	$102	$876	$240	6.2
Classroom C22	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.3	538	0	$68	$584	$160	6.2
Classroom C6	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	303	0	$38	$329	$90	6.2
Classroom C6	2	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Occupancy Sensor	S	53	1,435	2	Relamp	No	2	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,435	0.0	56	0	$7	$98	$18	11.2
Storage C7 & C8	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.1	195	0	$25	$146	$40	4.3
Classroom C19	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.5	1,009	0	$128	$1,095	$300	6.2
Auto Shop C16	35	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	35	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.6	1,177	0	$149	$1,278	$350	6.2
Wood Shop C2	28	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	28	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.5	1,365	0	$173	$1,022	$280	4.3
Storage Rooms (3 Total)	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.1	439	0	$56	$329	$90	4.3
CAD Room C23	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.5	1,009	0	$128	$1,095	$300	6.2
Storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	146	0	$19	$110	$30	4.3
Restrooms (2 Total)	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	97	0	$12	$73	$20	4.3
Restrooms (2 Total)	2	Compact Fluorescent: Plug in Lamps	Wall Switch	S	26	2,080	2	Relamp	No	2	LED Screw-In Lamps: Plug in Lamps	Wall Switch	18	2,080	0.0	24	0	$3	$69	$0	23.0
Maintenance Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	248	0	$31	$262	$60	6.4
Hallway	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,215	2, 5	Relamp	Yes	11	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,218	0.2	1,054	0	$134	$802	$110	5.2
Classroom C26	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	605	0	$77	$657	$180	6.2
Hallway	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,215	2, 5	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,218	0.3	1,438	0	$182	$1,148	$150	5.5

	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Faculty Lounge B14	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	370	0	$47	$402	$110	6.2
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.0	93	0	$12	$171	$15	13.2
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.0	93	0	$12	$171	$15	13.2
Office B13	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	303	0	$38	$329	$90	6.2
Stairwells	27	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	27	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.4	1,316	0	$167	$986	$270	4.3
Stairwells	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.2	585	0	$74	$438	$120	4.3
Stairwells	6	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Wall Switch	S	63	2,080	2	Relamp	No	6	LED - Linear Tubes: (4) 2' Lamps	Wall Switch	34	2,080	0.1	257	0	$33	$390	$72	9.8
2nd Floor Hallways	108	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	3,215	2	Relamp	No	108	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,215	1.8	8,135	-3	$1,032	$3,944	$1,080	2.8
2nd Floor Hallways	6	Compact Fluorescent: Plug in Lamps	Occupancy Sensor	S	23	3,215	2	Relamp	No	6	LED Screw-In Lamps: Plug in Lamps	Occupancy Sensor	16	3,215	0.0	96	0	$12	$103	$0	8.5
Classroom L208	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	504	0	$64	$548	$150	6.2
Office L209	8	LED Screw-In Lamps: PAR Lamps	Occupancy Sensor	S	7	1,435		None	No	8	LED Screw-In Lamps: PAR Lamps	Occupancy Sensor	7	1,435	0.0	0	0	$0	$0	$0	0.0
Storage L211	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	146	0	$19	$110	$30	4.3
Office L221	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,080	2, 3	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.1	437	0	$55	$408	$100	5.6
Server Room L220	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	97	0	$12	$73	$20	4.3
Classroom L219	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, 3	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.3	868	0	$110	$781	$175	5.5
Office L218	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	496	0	$63	$408	$100	4.9
Studio L215	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.1	439	0	$56	$329	$90	4.3
Control Rooms (2 Total)	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	97	0	$12	$73	$20	4.3
Classroom L206	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.3	605	0	$77	$657	$180	6.2
Classroom L204	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.3	605	0	$77	$657	$180	6.2
Lounge L203	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	269	0	$34	$292	$80	6.2
Lounge L203	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	S	33	1,435	2	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,435	0.0	16	0	$2	$33	$6	12.8
Restrooms L201 & L202	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	2,080	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,435	0.0	63	0	$8	$297	$12	35.8
Classroom A228	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	558	0	$71	$599	$125	6.7
Classroom A201	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	558	0	$71	$599	$125	6.7

	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Classroom A202	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	558	0	$71	$599	$125	6.7
Classroom A203	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	558	0	$71	$599	$125	6.7
Classroom A204	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	558	0	$71	$599	$125	6.7
Classroom A205	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	558	0	$71	$599	$125	6.7
Classroom A206	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	558	0	$71	$599	$125	6.7
Classroom A208	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	558	0	$71	$599	$125	6.7
Classroom A209	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	558	0	$71	$599	$125	6.7
Classroom A210	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	558	0	$71	$599	$125	6.7
Classroom A211	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	558	0	$71	$599	$125	6.7
Classroom A212	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	558	0	$71	$599	$125	6.7
Classroom A222	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	558	0	$71	$599	$125	6.7
Classroom A223	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	558	0	$71	$599	$125	6.7
Classroom A224	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	558	0	$71	$599	$125	6.7
Classroom A225	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	558	0	$71	$599	$125	6.7
Classroom A228	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	558	0	$71	$599	$125	6.7
Classroom A229	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	558	0	$71	$599	$125	6.7
Classroom A230	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	558	0	$71	$599	$125	6.7
Classroom A231	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	558	0	$71	$599	$125	6.7
Work Room A232	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	97	0	$12	$73	$20	4.3
Work Room A220	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,080	0.0	146	0	$19	$110	$30	4.3
Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	2,080	2	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	2,080	0.0	20	0	$3	$16	$3	5.2
Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$6	$37	$10	4.3
Closets (2 Total)	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	97	0	$12	$73	$20	4.3
Offices B201-B204	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	404	0	$51	$438	$120	6.2
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.0	93	0	$12	$171	$15	13.2

	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,080	2, 3	Relamp	Yes	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.0	93	0	$12	$171	$15	13.2
Faculty Lounge D201	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.2	404	0	$51	$438	$120	6.2
Classroom D202	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.2	404	0	$51	$438	$120	6.2
Classroom D203	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	605	0	$77	$657	$180	6.2
Classroom D204	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	605	0	$77	$657	$180	6.2
Classroom D206	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	605	0	$77	$657	$180	6.2
Storage D205	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.1	244	0	$31	$183	$50	4.3
Storage D207	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.1	390	0	$49	$292	$80	4.3
Electric Room D208	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	97	0	$12	$73	$20	4.3
IDF Room D209	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$6	$37	$10	4.3
Classroom D212	18	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	18	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.4	908	0	$115	$986	$270	6.2
Classroom D213	18	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	18	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.4	908	0	$115	$986	$270	6.2
Classroom D214	18	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	18	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.4	908	0	$115	$986	$270	6.2
Classroom D215	18	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	18	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.4	908	0	$115	$986	$270	6.2
Classroom D216	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	605	0	$77	$657	$180	6.2
Prep Rooms (2 Total)	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.3	538	0	$68	$584	$160	6.2
Classroom D218	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	605	0	$77	$657	$180	6.2
Classroom D219	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	605	0	$77	$657	$180	6.2
Classroom D210	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	252	0	$32	$274	$75	6.2
Classroom B224	8	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	8	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.1	236	0	$30	$580	$80	16.7
Computer Lab B223	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.4	807	0	$102	$876	$240	6.2
Classroom B222	16	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	16	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.2	473	0	$60	$1,159	$160	16.7
Restroom	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	252	0	$32	$274	$75	6.2
Restroom	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.1	252	0	$32	$274	$75	6.2
Closet B214	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$6	$37	$10	4.3

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Closet B215	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	49	0	$6	$37	$10	4.3
Closet B216	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.1	292	0	$37	$219	$60	4.3
Computer Lab B217	24	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	24	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.6	1,211	0	$154	$1,315	$360	6.2
Office B218	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.0	101	0	$13	$110	$30	6.2
Storage B213	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.1	195	0	$25	$146	$40	4.3
Classroom B207	16	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	16	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.2	473	0	$60	$1,159	$160	16.7
Classroom B208	16	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	16	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.2	473	0	$60	$1,159	$160	16.7
Classroom B209	16	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	16	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.2	473	0	$60	$1,159	$160	16.7
Classroom B210	16	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	16	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.2	473	0	$60	$1,159	$160	16.7
Classroom B211	16	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	16	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.2	473	0	$60	$1,159	$160	16.7
Classroom B212	16	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	1,435	2	Relamp	No	16	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.2	473	0	$60	$1,159	$160	16.7
Classroom B205	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	605	0	$77	$657	$180	6.2
Classroom B206	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,435	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,435	0.3	605	0	$77	$657	$180	6.2
Pump Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	2	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.1	292	0	$37	$219	$60	4.3
Exterior	2	Compact Fluorescent: Wall Pack	Timeclock	S	46	8,760	1, 4	Fixture Replacement	Yes	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	32	4,380	0.0	806	0	$105	$2,132	$200	18.5
Exterior	42	Compact Fluorescent: Wall Pack	Timeclock	S	46	4,380	1	Fixture Replacement	No	42	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	32	4,380	0.0	2,575	0	$334	$40,571	$4,200	108.8
Exterior	2	Incandescent: Recessed Can	Timeclock	S	100	8,760	2, 4	Relamp	Yes	2	LED Screw-In Lamps: Screw in Lamp	Daylight Dimming	15	4,380	0.0	1,752	0	$227	$234	$2	1.0
Exterior	2	Incandescent: Recessed Can	Timeclock	S	100	4,380	2	Relamp	No	2	LED Screw-In Lamps: Screw in Lamp	Timeclock	15	4,380	0.0	745	0	$97	$34	$2	0.3
Exterior	1	High-Pressure Sodium: (1) 70W Lamp	Timeclock	S	95	4,380	1	Fixture Replacement	No	1	LED - Fixtures: Other	Timeclock	25	4,380	0.0	307	0	$40	$199	$5	4.9
Loading Dock	4	High-Pressure Sodium: (1) 70W Lamp	Timeclock	S	95	4,380	1	Fixture Replacement	No	4	LED - Fixtures: Other	Timeclock	25	4,380	0.0	1,226	0	$159	$795	$20	4.9
Exterior	2	Metal Halide: (1) 400W Lamp	Timeclock	S	458	4,380	1	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	78	4,380	0.0	3,329	0	$432	$1,932	$200	4.0
Exterior	4	Metal Halide: (1) 50W Lamp	Timeclock	S	72	4,380	1	Fixture Replacement	No	4	LED - Fixtures: Other	Timeclock	25	4,380	0.0	823	0	$107	$795	$20	7.2
Parking Lot	7	High-Pressure Sodium: (1) 250W Lamp	Timeclock	S	295	4,380	1	Fixture Replacement	No	7	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock	90	4,380	0.0	6,285	0	$816	$6,514	$700	7.1
Stadium Lighting	12	Metal Halide: (1) 1500W Lamp	Breaker Panel	S	1,610	2,080	1	Fixture Replacement	No	12	LED - Fixtures: Other	Breaker Panel	450	2,080	0.0	28,954	0	$3,758	$21,577	$60	5.7

	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Stadium Lighting	12	Metal Halide: (1) 1500W Lamp	Breaker Panel	S	1,610	2,080	1	Fixture Replacement	No	12	LED - Fixtures: Other	Breaker Panel	450	2,080	0.0	28,954	0	$3,758	$21,577	$60	5.7
Stadium Lighting	10	Metal Halide: (1) 1500W Lamp	Breaker Panel	S	1,610	2,080	1	Fixture Replacement	No	10	LED - Fixtures: Other	Breaker Panel	450	2,080	0.0	24,128	0	$3,132	$17,981	$50	5.7
Stadium Lighting	10	Metal Halide: (1) 1500W Lamp	Breaker Panel	S	1,610	2,080	1	Fixture Replacement	No	10	LED - Fixtures: Other	Breaker Panel	450	2,080	0.0	24,128	0	$3,132	$17,981	$50	5.7
Pole Mounted	8	Metal Halide: (1) 150W Lamp	Breaker Panel	S	190	4,380	1	Fixture Replacement	No	8	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Breaker Panel	45	4,380	0.0	5,081	0	$660	$7,728	$800	10.5

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?	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Hydronic Heating	2	Heating Hot Water Pump	10.0	91.7%	Yes	N	1,696		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Hydronic Heating	2	Heating Hot Water Pump	100.0	95.4%	Yes	N	2,665		No	95.4%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Boiler Burners	2	Boiler Feed Water Pump	5.0	87.5%	No	W	2,745		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Hot Water Circulator	2	Boiler Feed Water Pump	1.0	75.5%	No	W	2,745		No	75.5%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	DHW Circulator	3	Water Supply Pump	0.2	74.0%	No	W	2,745		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	DHW Burner	2	Water Supply Pump	0.3	74.0%	No	W	2,745		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Elevator	Elevator	2	Other	10.0	72.0%	No	W	183		No	72.0%	No		0.0	0	0	$0	$0	$0	0.0
Kitchen	DHW Circulator & Burner	4	Water Supply Pump	0.3	74.0%	No	W	2,745		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	MUA-1	1	Supply Fan	1.0	85.5%	No	W	2,745		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	MUA-2 through MUA-7	6	Supply Fan	1.5	86.5%	No	W	2,745		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HV-2	1	Supply Fan	0.8	74.0%	No	W	2,745		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HV-3 through HV-5	3	Supply Fan	3.0	86.5%	No	W	2,745	6, 7	Yes	89.5%	Yes	3	2.7	8,472	0	$1,100	$11,437	$720	9.7
Roof	HV-6 through HV-8	3	Supply Fan	1.5	84.0%	No	W	2,745	6, 7	Yes	86.5%	Yes	3	1.3	4,328	0	$562	$10,140	$360	17.4
Roof	MUA-8 & MUA-9	2	Supply Fan	5.0	89.5%	No	W	2,745		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	MUA-10	1	Supply Fan	3.0	89.5%	No	W	2,745		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Gymnasium	4	Supply Fan	3.0	86.5%	No	W	2,745	6, 7	Yes	89.5%	Yes	4	3.6	11,296	0	$1,466	$15,250	$960	9.7
Roof	ERU-7	2	Supply Fan	15.0	91.0%	No	W	3,391	6, 7	Yes	92.4%	Yes	2	8.8	32,127	0	$4,170	$14,172	$2,400	2.8
Roof	ERU-7	2	Exhaust Fan	10.0	91.7%	No	W	3,391		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0
Roof	ERU-7	1	Other	0.5	74.0%	No	W	2,745		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	ERU-1 & 2	2	Supply Fan	10.0	89.5%	No	W	3,391	6, 7	Yes	91.7%	Yes	2	5.9	22,114	0	$2,871	$10,750	$1,600	3.2

		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?	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	ERU-1 & 2	2	Exhaust Fan	10.0	91.7%	No	W	3,391		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0
Roof	ERU-1 & 2	2	Other	0.5	74.0%	No	W	2,745		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Exhaust Fans	80	Exhaust Fan	0.2	74.0%	No	W	2,745		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Exhaust Fans	7	Exhaust Fan	0.3	74.0%	No	W	2,745		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Exhaust Fans	9	Exhaust Fan	1.0	85.5%	No	W	2,745		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
High School	New Unit Ventilators	40	Supply Fan	0.3	74.0%	No	W	2,745		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
High School	Old Unit Ventilators	40	Supply Fan	0.2	74.0%	No	B	2,745		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0

Electric HVAC Inventory & Recommendations

		Existing Conditions					Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	ERU-1	1	Packaged AC	30.00		W	NR	Yes	1	Packaged AC	30.00		18.00		7.1	12,761	0	$1,656	$66,479	$0	40.1
Roof	ERU-2	1	Packaged AC	30.00		W	NR	Yes	1	Packaged AC	30.00		18.00		7.1	12,761	0	$1,656	$66,479	$0	40.1
Roof	ERU-7	1	Packaged AC	60.00		W	NR	Yes	1	Packaged AC	60.00		18.00		14.2	25,522	0	$3,313	$132,958	$0	40.1
Roof	RTU-1	1	Packaged AC	7.50		W	NR	Yes	1	Packaged AC	7.50		11.50		0.8	1,527	0	$198	$13,366	$548	64.7
Roof	RTU-2	1	Packaged AC	7.50		W	NR	Yes	1	Packaged AC	7.50		11.50		0.8	1,527	0	$198	$13,366	$548	64.7
Roof	RTU-3	1	Packaged AC	5.00		W	NR	Yes	1	Packaged AC	5.00		14.00		1.0	1,856	0	$241	$11,345	$460	45.2
Roof	RTU-4	1	Packaged AC	5.00		W	NR	Yes	1	Packaged AC	5.00		14.00		1.0	1,856	0	$241	$11,345	$460	45.2
Roof	RTU-5	1	Packaged AC	5.00		W	NR	Yes	1	Packaged AC	5.00		14.00		1.0	1,856	0	$241	$11,345	$460	45.2
Roof	RTU-6	1	Packaged AC	5.00		W	NR	Yes	1	Packaged AC	5.00		14.00		1.0	1,856	0	$241	$11,345	$460	45.2
Roof	Split Heat Pump System	3	Split-System AC	1.00		W	NR	Yes	3	Split-System AC	1.00		14.00		0.4	685	0	$89	$4,489	$276	47.4
Roof	Split Heat Pump System	2	Split-System Air-Source HP	3.00	36.00	W	NR	Yes	2	Split-System Air-Source HP	3.00	36.00	14.00	3.80	0.8	3,972	0	$516	$10,145	$552	18.6
Roof	Split AC System	2	Split-System AC	1.00		W	NR	Yes	2	Split-System AC	1.00		14.00		0.3	457	0	$59	$2,992	$184	47.4
Roof	Split AC System	1	Split-System AC	1.00		W	NR	Yes	1	Split-System AC	1.00		14.00		0.2	319	0	$41	$1,496	$92	33.9
Roof	Split AC System	1	Split-System AC	7.50		W	NR	Yes	1	Split-System AC	7.50		11.50		0.6	1,138	0	$148	$8,728	$548	55.4
Roof	Split AC System	1	Split-System AC	3.00		W	NR	Yes	1	Split-System AC	3.00		14.00		0.5	958	0	$124	$4,489	$276	33.9
Roof	Split AC System	1	Split-System AC	3.00		W	NR	Yes	1	Split-System AC	3.00		14.00		0.7	1,285	0	$167	$4,489	$276	25.3
Roof	Split Heat Pump System	2	Split-System Air-Source HP	4.00	54.50	W	NR	Yes	2	Split-System Air-Source HP	4.00	54.40	14.00	3.80	0.6	4,981	0	$647	$13,527	$736	19.8
Roof	Split AC System	1	Split-System AC	0.75		W	NR	Yes	1	Split-System AC	0.75		14.00		0.2	278	0	$36	$1,122	$69	29.1
Roof	Split AC System	2	Split-System AC	5.00		W	NR	Yes	2	Split-System AC	5.00		14.00		2.1	3,712	0	$482	$14,962	$920	29.1
Roof	Split AC System	2	Split-System AC	2.00		W	NR	Yes	2	Split-System AC	2.00		14.00		0.8	1,485	0	$193	$5,985	$368	29.1

		Existing Conditions					Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	ACCU-1	1	Split-System AC	4.00		W	NR	Yes	1	Split-System AC	4.00		14.00		0.8	1,485	0	$193	$5,985	$368	29.1
Roof	ACCU-2	1	Split-System AC	4.00		W	NR	Yes	1	Split-System AC	4.00		14.00		0.8	1,485	0	$193	$5,985	$368	29.1
Roof	ACCU-3	1	Split-System AC	4.00		W	NR	Yes	1	Split-System AC	4.00		14.00		0.8	1,485	0	$193	$5,985	$368	29.1
Roof	MRC-1	1	Split-System AC	3.00		W	NR	Yes	1	Split-System AC	3.00		14.00		0.7	1,285	0	$167	$4,489	$276	25.3
Roof	MRC-2	1	Split-System AC	3.00		W	NR	Yes	1	Split-System AC	3.00		14.00		0.7	1,285	0	$167	$4,489	$276	25.3
Roof	MRC-3	1	Split-System AC	3.00		W	NR	Yes	1	Split-System AC	3.00		14.00		0.7	1,285	0	$167	$4,489	$276	25.3
Roof	MRC-4	1	Split-System AC	3.00		W	NR	Yes	1	Split-System AC	3.00		14.00		0.7	1,285	0	$167	$4,489	$276	25.3
Exterior	Offices	2	Split-System Air-Source HP	2.62	33.60	W	NR	Yes	2	Split-System Air-Source HP	2.62	33.60	14.00	3.80	0.4	3,101	0	$403	$8,849	$481	20.8
Exterior	B-14, B-10 & B-8	3	Split-System Air-Source HP	3.00	33.60	W	NR	Yes	3	Split-System Air-Source HP	3.00	33.60	14.00	3.80	0.6	4,799	0	$623	$15,218	$828	23.1

Fuel Heating Inventory & Recommendations

		Existing Conditions				Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Hydronic Heating	1	Non-Condensing Hot Water Boiler	######	W	NR	Yes	1	Condensing Hot Water Boiler	######	93.00%	Ec	0.0	0	814	$7,304	$107,395	$0	14.7
Boiler Room	Hydronic Heating	1	Non-Condensing Hot Water Boiler	######	W	NR	Yes	1	Condensing Hot Water Boiler	######	93.00%	Ec	0.0	0	271	$2,435	$107,395	$0	44.1
Boiler Room	Hydronic Heating	1	Condensing Hot Water Boiler	######	N		No						0.0	0	0	$0	$0	$0	0.0
Boiler Room	Hydronic Heating	1	Condensing Hot Water Boiler	######	N		No						0.0	0	0	$0	$0	$0	0.0
Boiler Room	Hydronic Heating	1	Condensing Hot Water Boiler	######	N		No						0.0	0	0	$0	$0	$0	0.0
Roof	MUA-1	1	Furnace	80.00	W	NR	Yes	1	Furnace	80.00	95.00%	AFUE	0.0	0	7	$64	$1,813	$400	22.1
Roof	MUA-2 through MUA-7	6	Furnace	120.00	W	NR	Yes	6	Furnace	120.00	95.00%	AFUE	0.0	0	64	$575	$16,313	$2,400	24.2
Roof	HV-2	1	Furnace	320.00	W	NR	Yes	1	Furnace	320.00	95.00%	AFUE	0.0	0	28	$256	$7,250	$400	26.8
Roof	HV-3 through HV-5	3	Furnace	320.00	W	NR	Yes	3	Furnace	320.00	95.00%	AFUE	0.0	0	85	$767	$21,751	$1,200	26.8
Roof	HV-6 through HV-8	3	Furnace	120.00	W	NR	Yes	3	Furnace	120.00	95.00%	AFUE	0.0	0	32	$287	$8,157	$1,200	24.2
Roof	MUA-8 & MUA-9	2	Furnace	640.00	W	NR	Yes	2	Furnace	640.00	95.00%	AFUE	0.0	0	114	$1,022	$29,001	$800	27.6
Roof	MUA-10	1	Furnace	320.00	W	NR	Yes	1	Furnace	320.00	95.00%	AFUE	0.0	0	28	$256	$7,250	$400	26.8
Roof	ERU-1	2	Furnace	300.00	W	NR	Yes	2	Furnace	300.00	95.00%	AFUE	0.0	0	27	$238	$13,594	$800	53.8
Roof	ERU-2	3	Furnace	300.00	W	NR	Yes	3	Furnace	300.00	95.00%	AFUE	0.0	0	40	$357	$20,392	$1,200	53.8
Roof	ERU-7	3	Furnace	300.00	W	NR	Yes	3	Furnace	300.00	95.00%	AFUE	0.0	0	40	$357	$20,392	$1,200	53.8

DHW Inventory & Recommendations

		Existing Conditions			Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Domestic Hot Water	1	Storage Tank Water Heater (> 50 Gal)	N		No						0.0	0	0	$0	$0	$0	0.0
Boiler Room	Domestic Hot Water	1	Storage Tank Water Heater (> 50 Gal)	N		No						0.0	0	0	$0	$0	$0	0.0
Kitchen	Domestic Hot Water	2	Storage Tank Water Heater (> 50 Gal)	N		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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Restrooms	8	1	Faucet Aerator (Lavatory)	2.20	0.50	0.0	0	3	$26	$7	$0	0.3
Restrooms	8	7	Faucet Aerator (Lavatory)	2.00	0.50	0.0	0	18	$158	$50	$0	0.3
Restrooms	8	1	Faucet Aerator (Lavatory)	1.50	0.50	0.0	0	2	$15	$7	$0	0.5
Locker Rooms	8	22	Showerhead	2.50	2.00	0.0	0	34	$309	$1,965	$0	6.4

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions		Proposed Conditions				Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Medium Temp Freezer (0F to 30F)		No	No	No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Low Temp Freezer (-35F to -5F)		No	No	No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Cooler (35F to 55F)		No	No	No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Cooler (35F to 55F)		No	No	No	0.0	0	0	$0	$0	$0	0.0

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions			Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer 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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Refrigerator Chest	No	NR	Yes	0.1	1,007	0	$131	$2,116	$0	16.2
Kitchen	3	Stand-Up Refrigerator, Glass Door (16 - 30 cu. ft.)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	3	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	4	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Snack Bar	2	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Yes		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	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Electric Convection Oven (Half Size)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Gas Griddle (4 Feet Width)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	3	Insulated Food Holding Cabinet (Full Size)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Gas Rack Oven (Double)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	2	Gas Convection Oven (Full Size)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Gas Convection Oven (Full Size)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Electric Steamer	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	4	Insulated Food Holding Cabinet (Full Size)	Yes		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	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	Total Installation Cost	Total Incentives	Payback w/ Incentives in Years
Kitchen	1	Single Tank Conveyor (High Temp)	Natural Gas	Electric	Yes		No	0.0	0	0	$0	$0	$0	0.0

Plug Load Inventory

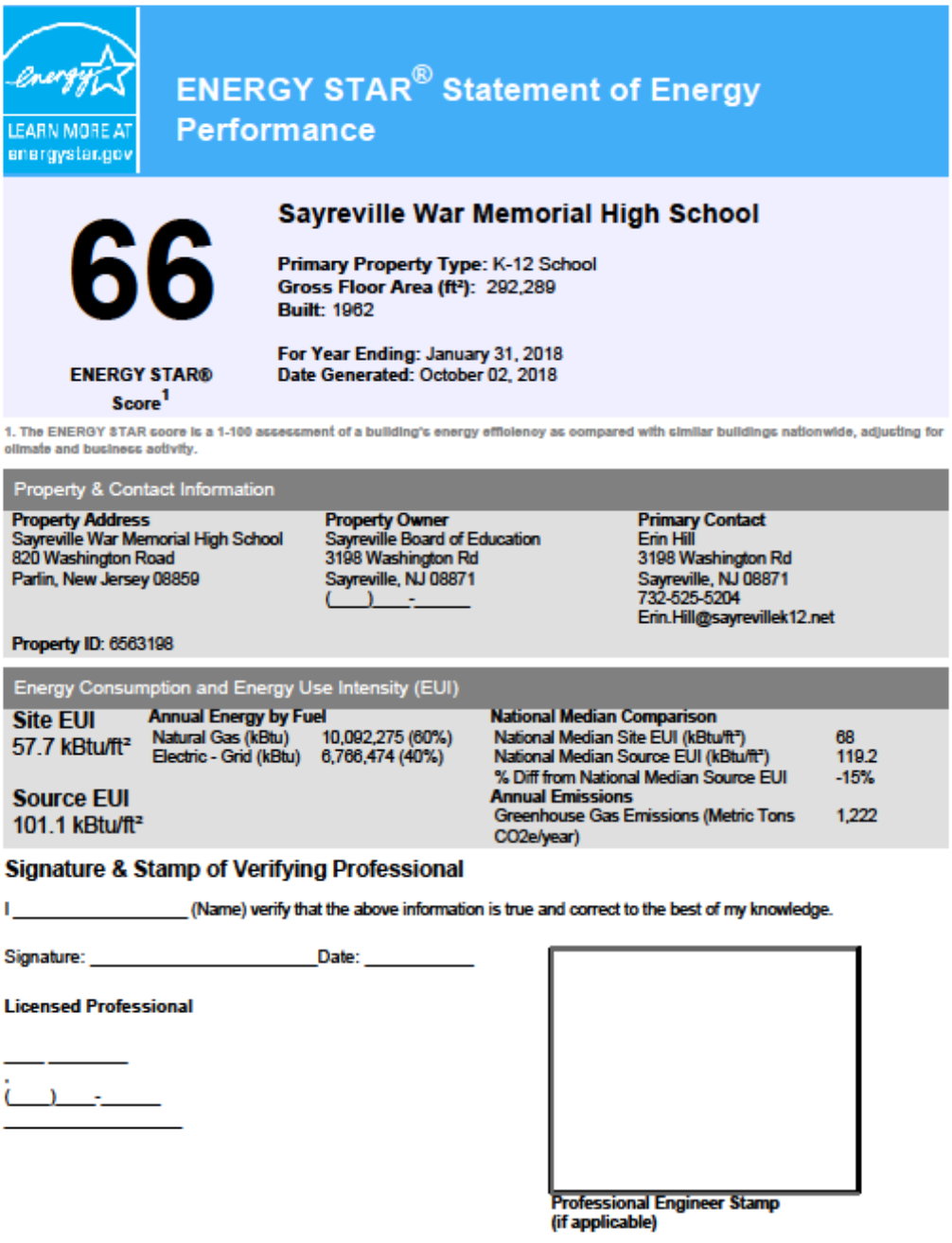
	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
High School	226	Desktop Computer	120.0	
High School	35	Laptop Cart	2,160.0	
High School	51	Fan	100.0	
High School	85	TV	150.0	
High School	74	Smart Board / Projector	300.0	
High School	23	Small Office Printers	50.0	
High School	6	Large Xerox- Type Printers	515.0	
High School	5	Coffee Maker	400.0	
High School	22	Microwave	1,100.0	
High School	1	Residential Freezer	990.0	
High School	8	Residential Refrigerator	690.0	
High School	8	Mini Fridge	260.0	
High School	5	Water Dispenser	300.0	
High School	1	Wheelchair Elevator	600.0	
High School	3	Large Floor Fans	185.0	
High School	2	Kiln	10,000.0	
High School	6	Speakers	100.0	
Auditorium	6	Large Speakers	500.0	
High School	1	Misc. Sound Equipment	3,500.0	
High School	1	Misc. IT Equipment	4,500.0	
High School	1	Misc Shop Equipment	5,500.0	
Home Economics	8	Electric Stove	1,500.0	

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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Copy Room	1	Refrigerated	9	Yes	0.2	1,612	0	$209	$230	$50	0.9
Hallway	1	Refrigerated	9	Yes	0.2	1,612	0	$209	$230	$50	0.9

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.



ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

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ENERGY STAR® Score[1]

Sayreville War Memorial High School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 292,289
Built: 1962

For Year Ending: January 31, 2018
Date Generated: October 02, 2018

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
Sayreville War Memorial High School 820 Washington Road Parlin, New Jersey 08859	Sayreville Board of Education 3198 Washington Rd Sayreville, NJ 08871 (____)____-_____	Erin Hill 3198 Washington Rd Sayreville, NJ 08871 732-525-5204 Erin.Hill@sayrevillek12.net

Property ID: 6563198

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
57.7 kBtu/ft²

Source EUI
101.1 kBtu/ft²

Annual Energy by Fuel		National Median Comparison	
Natural Gas (kBtu)	10,092,275 (60%)	National Median Site EUI (kBtu/ft²)	68
Electric - Grid (kBtu)	6,766,474 (40%)	National Median Source EUI (kBtu/ft²)	119.2
		% Diff from National Median Source EUI	-15%
		Annual Emissions	
		Greenhouse Gas Emissions (Metric Tons CO2e/year)	1,222

Signature & Stamp of Verifying Professional

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

Signature: _____ Date: _____

Licensed Professional

____ _____
:
(____)____-_____
_____

Professional Engineer Stamp (if applicable)

APPENDIX C: GLOSSARY

TERM	DEFINITION
Blended Rate	Used to calculate financial savings. 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	A British thermal unit is the amount of heat required to increase the temperature of one pound water by one-degree Fahrenheit. Commonly used to measure natural gas consumption.
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.
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 energy management systems.
Generation	The process of generating electric power from sources of primary energy (e.g., natural gas, the sun, oil).
HVAC	Heating, ventilation, and air conditioning.
kW	Kilowatt. Equal to 1,000 Watts.
Load	The total amount of power used by a building system 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.
MMBtu	One million British thermal units.
psig	Pounds per square inch.
Plug Load	Refers to the amount of energy used in a space by products that are powered by means of an ordinary AC plug.
Simple Payback	The amount of time needed to recoup the funds expended in an investment, or to reach the break-even point.
Temperature Setpoint	The temperature at which a temperature regulating device (thermostat, for example) has been set.
Turnkey	Provision of a complete product or service that is ready for immediate use
Watt (W)	Unit of power commonly used to measure electricity use.