



Local Government Energy Audit Report

Matawan Aberdeen High School

November 4, 2020

Prepared for:

Matawan Aberdeen Regional School District
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Disclaimer

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

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

TRC bases estimated installation costs on our experience at similar facilities, pricing from local contractors and vendors, and/or cost estimates from RS Means. Cost estimates include material and labor pricing associated with installation of primary recommended equipment only. Cost estimates do not include demolition or removal of hazardous waste. We encourage the owner of the facility 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.

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

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

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Appendix A: Equipment Inventory & Recommendations A-1

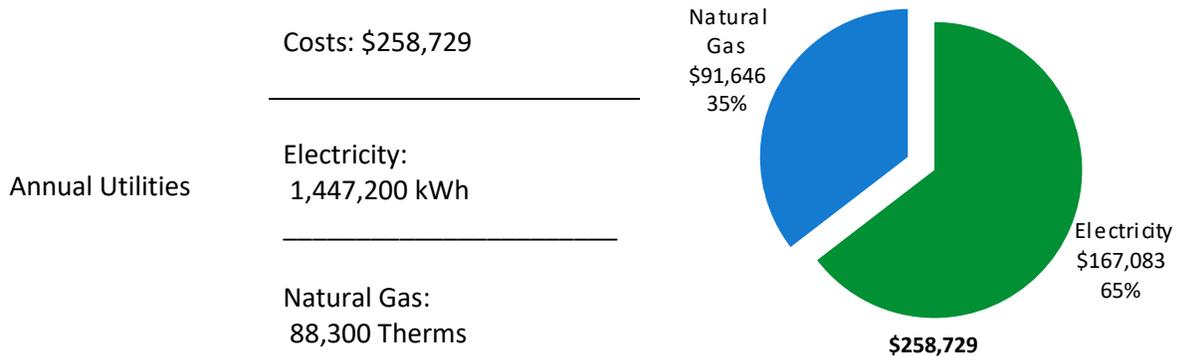
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1 EXECUTIVE SUMMARY

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

BUILDING PERFORMANCE REPORT



<p>ENERGY STAR® Benchmarking Score</p>	<p>48 <i>(1-100 scale)</i></p>	<p>This building performs slightly below the national average. This report contains suggestions about how to improve building performance and reduce energy costs.</p>
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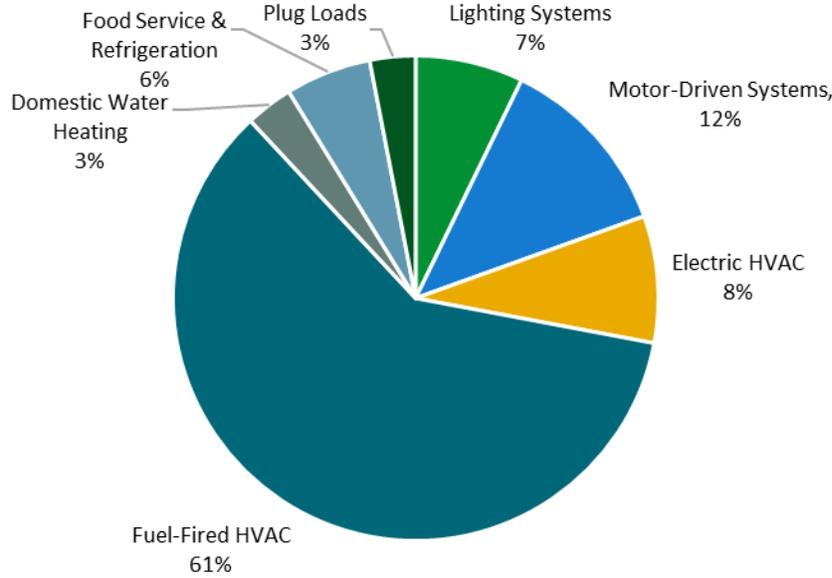


Figure 1 - Energy Use by System

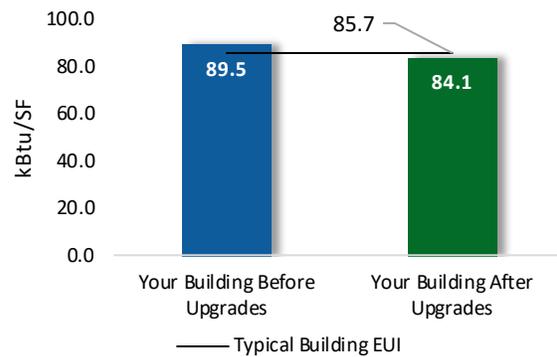
POTENTIAL IMPROVEMENTS



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.

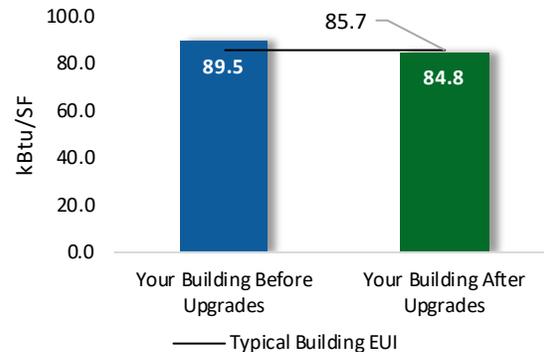
Scenario 1: Full Package (all evaluated measures)

Installation Cost	\$259,532
Potential Rebates & Incentives ¹	\$60,756
Annual Cost Savings	\$25,394
Annual Energy Savings	Electricity: 210,635 kWh Natural Gas: 1,037 Therms
Greenhouse Gas Emission Savings	112 Tons
Simple Payback	7.8 Years
Site Energy Savings (all utilities)	6%



Scenario 2: Cost Effective Package²

Installation Cost	\$115,424
Potential Rebates & Incentives	\$46,840
Annual Cost Savings	\$22,581
Annual Energy Savings	Electricity: 190,110 kWh Natural Gas: 609 Therms
Greenhouse Gas Emission Savings	99 Tons
Simple Payback	3.0 Years
Site Energy Savings (all utilities)	5%



On-site Generation Potential

Photovoltaic	High
Combined Heat and Power	None

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

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			137,449	44.7	-28	\$15,579	\$54,784	\$27,108	\$27,676	1.8	135,145
ECM 1	Install LED Fixtures	Yes	3,878	0.0	0	\$448	\$949	\$0	\$949	2.1	3,906
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	348	0.2	0	\$39	\$267	\$52	\$215	5.4	342
ECM 3	Retrofit Fixtures with LED Lamps	Yes	133,222	44.4	-28	\$15,092	\$53,568	\$27,056	\$26,512	1.8	130,897
Lighting Control Measures			27,889	6.2	-6	\$3,159	\$30,345	\$12,970	\$17,375	5.5	27,402
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	16,691	4.4	-3	\$1,891	\$20,220	\$3,970	\$16,250	8.6	16,399
ECM 5	Install High/Low Lighting Controls	Yes	11,198	1.8	-2	\$1,269	\$10,125	\$9,000	\$1,125	0.9	11,002
Variable Frequency Drive (VFD) Measures			16,305	5.1	21	\$2,099	\$19,123	\$5,950	\$13,173	6.3	18,861
ECM 6	Install VFDs on Constant Volume (CV) Fans	Yes	15,252	5.1	0	\$1,761	\$16,113	\$5,800	\$10,313	5.9	15,358
ECM 7	Install VFDs on Kitchen Hood Fan Motors	Yes	1,053	0.0	21	\$338	\$3,010	\$150	\$2,860	8.5	3,502
Electric Unitary HVAC Measures			8,020	8.6	0	\$926	\$94,964	\$9,316	\$85,648	92.5	8,076
ECM 8	Install High Efficiency Air Conditioning Units	No	8,020	8.6	0	\$926	\$94,964	\$9,316	\$85,648	92.5	8,076
Gas Heating (HVAC/Process) Replacement			0	0.0	43	\$444	\$33,488	\$4,000	\$29,488	66.5	5,004
ECM 9	Install High Efficiency Furnaces	No	0	0.0	43	\$444	\$33,488	\$4,000	\$29,488	66.5	5,004
HVAC System Improvements			3,538	0.0	69	\$1,123	\$8,157	\$0	\$8,157	7.3	11,629
ECM 10	Implement Demand Control Ventilation (DCV)	Yes	3,538	0.0	69	\$1,123	\$8,157	\$0	\$8,157	7.3	11,629
Domestic Water Heating Upgrade			0	0.0	5	\$51	\$129	\$72	\$57	1.1	572
ECM 11	Install Low-Flow DHW Devices	Yes	0	0.0	5	\$51	\$129	\$72	\$57	1.1	572
Food Service & Refrigeration Measures			17,434	1.6	0	\$2,013	\$18,542	\$1,340	\$17,202	8.5	17,556
ECM 12	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	2,974	0.3	0	\$343	\$2,426	\$640	\$1,786	5.2	2,995
ECM 13	Refrigeration Controls	No	4,186	0.1	0	\$483	\$6,696	\$600	\$6,096	12.6	4,215
ECM 14	Replace Refrigeration Equipment	No	8,320	0.9	0	\$961	\$8,960	\$0	\$8,960	9.3	8,378
ECM 15	Vending Machine Control	Yes	1,954	0.2	0	\$226	\$460	\$100	\$360	1.6	1,968
TOTALS (COST EFFECTIVE MEASURES)			190,110	56.6	61	\$22,581	\$115,424	\$46,840	\$68,584	3.0	198,571
TOTALS (ALL MEASURES)			210,635	66.2	104	\$25,394	\$259,532	\$60,756	\$198,776	7.8	224,244

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

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

Figure 2 – Evaluated Energy Improvements

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

1.1 Planning Your Project

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

- ◆ How will the project be funded and/or financed?
- ◆ Is it best to pursue individual ECMs, groups of ECMs, or use a comprehensive approach where all ECMs are installed together?
- ◆ Are there other facility improvements that should happen at the same time?

Pick Your Installation Approach

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

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

Energy Conservation Measure		SmartStart	Direct Install	Pay For Performance
ECM 1	Install LED Fixtures			
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	X		
ECM 3	Retrofit Fixtures with LED Lamps	X		
ECM 4	Install Occupancy Sensor Lighting Controls	X		
ECM 5	Install High/Low Lighting Controls	X		
ECM 6	Install VFDs on Constant Volume (CV) Fans			
ECM 7	Install VFDs on Kitchen Hood Fan Motors	X		
ECM 8	Install High Efficiency Air Conditioning Units	X		
ECM 9	Install High Efficiency Furnaces	X		
ECM 10	Implement Demand Control Ventilation (DCV)	X		
ECM 11	Install Low-Flow DHW Devices			
ECM 12	Refrigerator/Freezer Case Electrically Commutated Motors	X		
ECM 13	Refrigeration Controls	X		
ECM 14	Replace Refrigeration Equipment	X		
ECM 15	Vending Machine Control			

Figure 3 – Funding Options



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

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

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

Individual Measures with SmartStart

For facilities wishing to pursue only selected individual measures (or planning to phase implementation of selected measures over multiple years), incentives are available through the SmartStart program. To participate, you can use internal resources or an outside firm or contractor to perform the final design of the ECM(s) and install the equipment. Program pre-approval is required for some SmartStart incentives, so only after receiving pre-approval should you proceed with ECM installation.

Turnkey Installation with Direct Install

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

Whole Building Approach with Pay for Performance

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

More Options from Around the State

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

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the ESIP. Supported directly by the NJBPU, ESIP provides government agencies with project development, design, and implementation support services, as well as, attractive financing for implementing ECMs. You have already taken the first step as an LGEA customer, because this report is required to participate in ESIP.

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

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

Ongoing Electric Savings with Demand Response

The Demand Response Energy Aggregator program reduces electric loads at commercial facilities when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak power demand. By enabling commercial facilities to reduce electric demand during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment service providers provide regular payments to medium and large consumers of electric power for their participation in demand response (DR) programs. Program participation is voluntary, and facilities receive payments regardless of whether they are called upon to curtail their load during times of peak demand.

2 EXISTING CONDITIONS

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

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

2.1 Site Overview

On July 15, 2020, TRC performed an energy audit at Matawan Aberdeen High School located in Aberdeen, New Jersey. TRC met with Joe Czimcharo to review the facility operations and help focus our investigation on specific energy-using systems.

Matawan Aberdeen High School is a one-story, 153,914 square foot building built in 1960. Spaces include classrooms, gymnasiums, cafetorium, media center, offices, corridors, kitchen, locker rooms, boiler/mechanical rooms. and storage rooms.

2.2 Building Occupancy

The facility is occupied regular hours from September through June (school season - 10 months) and has reduced occupancy during July and August. The facility is open on weekends for athletic and other activities. Typical weekday occupancy is approximately 157 staff and 1,110 students.

During summer (late June, July and August), the school is closed except for the offices and athletic spaces.

Building Name	Weekday/Weekend	Operating Schedule
High School (School Hours)	Weekday	7:00:00 AM - 4:00 PM
	Weekend	7:00:00 AM - 3:00 PM
	Summer	Varies
High School (Custodial Hours)	Weekday	6:00:00 AM - 11:00 PM
	Weekend	6:00:00 AM - 3:00 PM
	Summer	Varies

Figure 4 - Building Occupancy Schedule

2.3 Building Envelope

The building walls are made of concrete masonry units (CMUs) with a brick veneer. The roof is flat and has a white EPDM finish and is in good condition. Site staff did not report any issues with the building envelope.

The windows are double glazed with aluminum frames. The glass-to-frame seals are in good condition.

Exterior doors have aluminum frames with fire reinforced plastic (FRP) and double pane glazing in the center. All doors are in good condition with undamaged weather stripping.



Roof



Exterior wall with brick facade



Exterior door



Exterior wall with brick facade

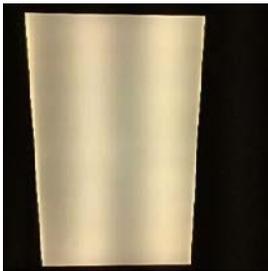
2.4 Lighting Systems

The primary interior lighting system uses 32-Watt linear fluorescent T8 lamps. There are also several 25-Watt and 40-Watt 2-foot x 4-foot LED fixtures in hallways, locker room, and the cafeteria. In addition, there are some incandescent lamps, compact fluorescent lamps (CFL), general purpose LED lamps, a few 32-Watt U-shaped T8 fluorescent lamps, and some 40-watt T12 linear fluorescent lamps.

The gymnasiums have 54-Watt 4-foot high output T5 linear fluorescent lamps.

Fixture types include 1-lamp, 2-lamp, 3-lamp, and 4-lamp, 4-foot long troffer, recessed and surface mounted fixtures. There are also some 2-foot fixtures with linear T8 and U-bend fluorescent lamps. Most fixtures are in good condition.

All exit signs are LED type.



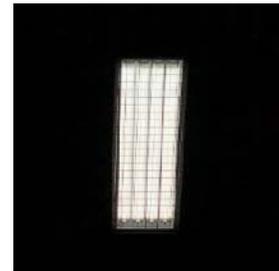
2' x 4' LED fixture



2' x 4' T8 1-lamp fixture



2' x 4' T8 2-lamp fixture



2' x 4' T5 4-lamp fixture

Lighting fixtures in most classrooms, both locker rooms, nurse's office, prep rooms, and weight room are controlled by occupancy sensors. All the remaining interior lighting is manually controlled by wall switches.



Recessed can fixture with CFL



Ceiling-mounted occupancy sensor

Exterior fixtures include pole-mounted LED fixtures, ground-mounted LED fixtures, and LED wall-mounted fixtures. Also, there are wall-mounted fixtures with metal halide lamps, under canopy fixtures with CFL and wall-mounted fixtures with CFL. All exterior fixtures are controlled by timeclocks.



Wall-mounted fixture with metal halide lamp



Wall-mounted LED fixture



Wall-mounted LED fixture



Ground-mounted LED fixture

2.5 Air Handling Systems

Single Packaged Vertical Units (Unit Ventilators)

There are 40 classrooms with Airedale single packaged vertical units which have replaced older unit ventilators. These self-contained units are equipped with direct expansion (DX) coils for cooling and hot water coils for heating. The units have either 3-ton or 4-ton cooling capacity. These units were installed over the last five years (2015, 2018, and 2019).

Packaged Rooftop Units

There are 25 packaged rooftop units (RTUs) which include two dedicated outside air units (DOAS). All RTUs have direct expansion (DX) coils for cooling. Out of the 25 RTUs, four RTUs provide only cooling and the rest use gas-fired furnaces for heating. Also, all RTUs except the two DOAS units and four cooling-only units are variable air volume (VAV) type units. Heating capacity of the gas-fired furnaces range from 81 MBh to 864 MBh and their efficiency ranges from 77% to 81%.

Nine packaged RTUs are beyond their useful life. They are RTU 1 (Chem labs), RTU 2 (Marine biology room), RTU serving principal's office, RTU 4, the 31-ton unit serving media center and nearby classrooms, RTU 6, RTU 7, the 3-ton Lennox RTU serving corridors and the 5-ton Trane unit serving IT equipment room.

The table below lists the RTU tag names, areas served by these units, their cooling EER and the manufacturer:

	Unit Tag Name	Area Served	Cooling Capacity ^[1] (Tons)	Cooling EER ^[2]	Manufacturer
1	DOAS 15	Corridor	8.00	10.77	Aaon
2	DOAS 16	Corridor	4.00	14.60	Aaon
3	No tag name	Principal office 600s	5.00	9.77	York
4	No tag name	Media Center & classrooms	31.00	9.07	Aaon
5	No tag name	Corridor	3.00	12.06	Lennox
6	No tag name	IT eqp. room near library	5.00	13.00	Trane
7	RTU - 41	Auditorium	50.00	10.78	Aaon
8	RTU #1	Classrooms & Home Econ.	11.00	11.77	Aaon
9	RTU #1 HS	Cafeteria	40.00	10.19	Aaon
10	RTU -1	New Chem Labs	20.00	10.12	Aaon
11	RTU 2	Marine biology room	13.00	8.98	Aaon
12	RTU 39	Wood workshop	13.00	9.99	Aaon

List continued from above					
	Unit Tag Name	Area Served	Cooling Capacity ^[1] (Tons)	Cooling EER ^[2]	Manufacturer
13	RTU 4	Room B0-B2	20.00	10.12	Aaon
14	RTU 40	Dance room	11.00	11.38	Aaon
15	RTU 43A	Main Office	11.00	11.38	Aaon
16	RTU 43B	Student services	11.00	11.38	Aaon
17	RTU 45	Classrooms 207-211	10.00	11.90	Aaon
18	RTU 46	Science rooms (617-623)	18.00	11.95	Aaon
19	RTU 48	Classrooms 520-524	13.00	10.40	Aaon
20	RTU 49	Offices 510-517	5.00	14.30	Aaon
21	RTU 50	Art Room (Class 507)	4.00	14.60	Aaon
22	RTU 51	Art Room (Class 505)	5.00	14.30	Aaon
23	RTU 52	Art Room (Class 503)	5.00	14.30	Aaon
24	RTU 6	Media Center	25.00	9.00	Aaon
25	RTU 7	Control Room	5.00	8.29	Aaon

[1] Cooling capacity of RTUs is based on information available in equipment brochures or on the equipment itself.

[2] Cooling EER for all RTUs was estimated based on information available from RTU nameplates.

Refer to Appendix A for detailed information about each unit.

Air Conditioners

There are five window air conditioners (AC) installed in the classrooms and a copy room (1-ton and 2-ton capacity). There are six ductless mini-split air-source heat pumps (0.75-ton to 1-ton capacity) and one 7.5-ton split air-source heat pump for the weight room. The SEER values for the window ACs range from 8.5 to 11.8. The SEER values for the six ductless mini-split air-source heat pumps range from 19.5 to 23.5, and the heating COP values are between 4.5 and 4.6. The SEER value for the 7.5-ton split air-source heat pump serving the weight room is 11.3 and its COP value is 3.9.

Also, there are four ductless mini-split ACs (0.8-ton to 1-ton capacity) and seven split ACs ranging between 3 tons and 20-tons. The SEER values for the four ductless mini-split ACs range from 10.2 and 16. The SEER values for the 3-ton split ACs are between 9.8 and 13. The EER value for the two 20-ton split ACs (serving new gym) is 9.8.

Four split ACs, the Mitsubishi and York units, and three EMI ductless mini-split ACs are beyond their useful life and should be replaced.

Air Handling Units and Energy Recovery Ventilator Units

The newer gymnasium is served by two air handling units (AHUs) and the older gymnasium is served by one AHU located in the Girls locker room. Two AHUs serving the newer gymnasium are equipped with DX coils from 20-ton split AC units for cooling and from hot water coils for heating. Each AHU has two 7.2 hp direct drive motors powering the supply fans.

The AHUs serving the older gymnasium and two locker rooms provide only heating and are equipped with hot water coils and a 5 hp supply fan motor. Hot water to all AHUs is supplied from the hot water boilers.

Also, there are two energy recovery ventilator (ERV) units installed on the roof. Each ERV unit has a 2 hp supply fan motor, 2 hp exhaust fan motor, and one-third hp fan for the heat wheel.

Exhaust Fans

There are approximately 30 exhaust fans installed on the roof. The exhaust fans provide ventilation for hallways, kitchen cooking area, restrooms, gymnasium, and boiler rooms. Exhaust fan motors range from 0.16 hp to 2 hp. The exhaust fans are in fair condition.



Packaged rooftop unit



Ductless mini-split heat pump



Exhaust fan



Air handling unit



Single packaged vertical unit



Window AC

2.6 Heating Hot Water Systems

Four Patterson Kelley 2,335 MBh output, hot water boilers serve the building space heating load. The boilers are condensing type with a nominal efficiency of 93.4%. The boilers are configured in an automated lead-lag control scheme. The boilers were installed in 2014 and are in good condition.

Heating hot water is supplied throughout the building by two 10 hp pumps and two 5 hp pumps equipped with variable frequency drives for the pump motors. Another set of four 0.75 hp constant speed pumps are also part of the hot water circulation system. The pumps operate in an automated lead-lag control scheme. The boilers and pumps provide hot water to hot water coils in the packaged vertical units classrooms and AHUs.

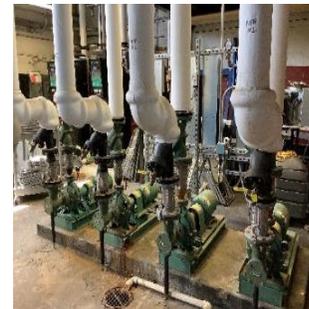
The hot water supply temperature remains between 170°F and 180°F during peak winter periods and is reduced to 120°F or lower during summer for supplying reheat for the VAV system. The boilers are locked out at an outside air temperature of 85°F.



Condensing hot water boilers



Boilers and pumps

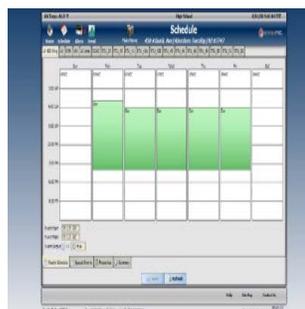


Hot water pumps

2.7 Building Energy Management Systems (EMS)

A new Honeywell Tritium EMS controls approximately 80% of the HVAC equipment, boilers, RTUs, and AHUs. The remaining HVAC equipment is controlled by an old Johnson Controls Metasys EMS and associated pneumatic controls. Both EMS's provide equipment scheduling, monitoring and controlling space temperatures, supply air temperatures, humidity, and heating water loop temperatures. Some spaces and classrooms have occupancy-controlled HVAC systems.

The facility manager expressed an interest in expanding the level of control provided by the Honeywell Tritium EMS to include 100% of the HVAC equipment.



Equipment schedule



RTU graphics

2.8 Domestic Hot Water

Domestic hot water (DHW) for use in kitchen, restrooms, and other areas of the building is produced by two 130-gallon, 600 Mbh gas-fired Conquest storage water heaters. The water heaters are condensing type with a maximum efficiency of 95%. Both water heaters were installed in 2018 and are in good condition.



Condensing domestic hot water heater



Domestic hot water circulation pump

2.9 Food Service Equipment

The kitchen has a mix of gas and electric equipment that is used to prepare and store meals for students. Most of the cooking is done using the convection gas-fired ovens and gas-fired cooktops. Also, there is one electric insulated food holding cabinet, two electric steamers, and an electric conveyer oven.

There is no dishwasher in this school.

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



Gas-fired ovens



Electric conveyer oven



Gas cooktop with oven



Electric heated cabinet

2.10 Refrigeration

The kitchen has one reach-in cooler, one walk-in cooler, two walk-in low temperature (-35°F to -5°F) freezers, and one walk-in medium temperature (0°F to 30°F) freezer.

There is also a stand-up, glass door refrigerator and four stand-up, solid door refrigerators, a refrigerator chest and a freezer chest. All equipment is in good condition. The stand-up, glass door refrigerator is ENERGY STAR® rated.

There are four ice makers in total at the high school.

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



Glass door stand-up refrigerator



Freezer chest



Refrigerator chest



Ice maker

2.11 Plug Load & Vending Machines

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

There are 700 desktop and laptop computers throughout the facility. Other plug loads throughout the building include general cafe, office equipment and home economics class equipment such as clothes dryers and clothes washers. Café equipment includes heated/chilled serving tables in the kitchen, microwave ovens and toaster ovens, residential style refrigerators and coffee makers. Office and other equipment include printers, copiers and a paper shredder. There is also typical classroom plug load equipment such as smart boards, projectors, televisions and fans. In the wood workshop, there are power tools such as lathe machines and drill machines and there are four electric kilns in total.

There is one refrigerated beverage vending machine and one non-refrigerated snack vending machine in the cafeteria.



Residential style refrigerator



Television



Electric cooktop and oven



Electric kiln

2.12 Water-Using Systems

Faucet flow rate in most restrooms is at 0.5 gallons per minute (gpm). Faucet flow rates in the kitchen, classrooms and faculty break room are at 2.5 gpm.



Restroom faucet

2.13 Process Equipment

Some HVAC equipment in the school is controlled by a pneumatic control system and the air compressor provides compressed air for it. It has two 7.5 hp motors to run the air compressor. It runs intermittently and as much as needed to maintain the required air pressure in the pneumatic system.

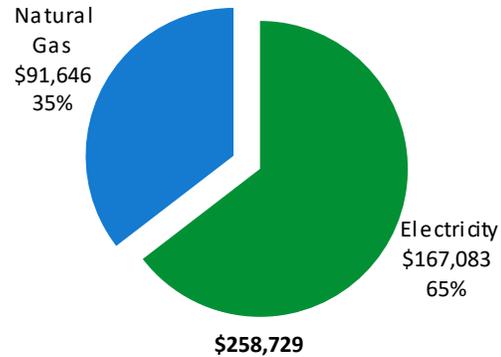


Air Compressor

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	1,447,200 kWh	\$167,083
Natural Gas	88,300 Therms	\$91,646
Total		\$258,729



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.

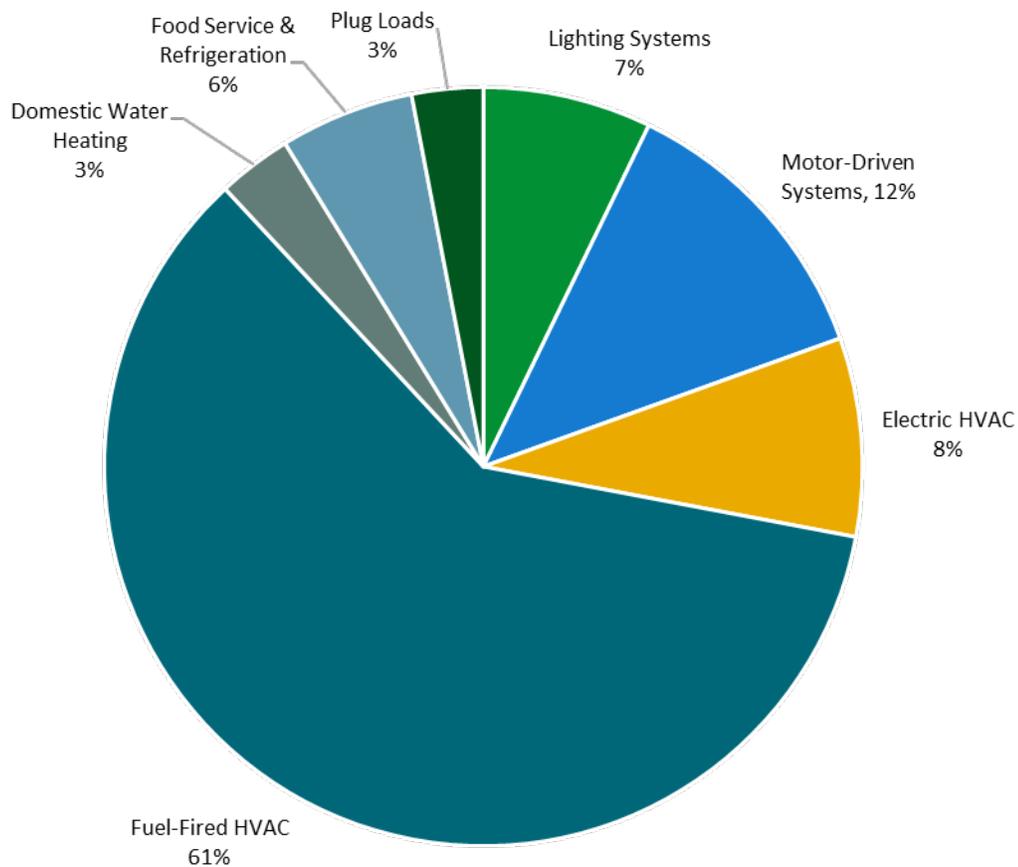
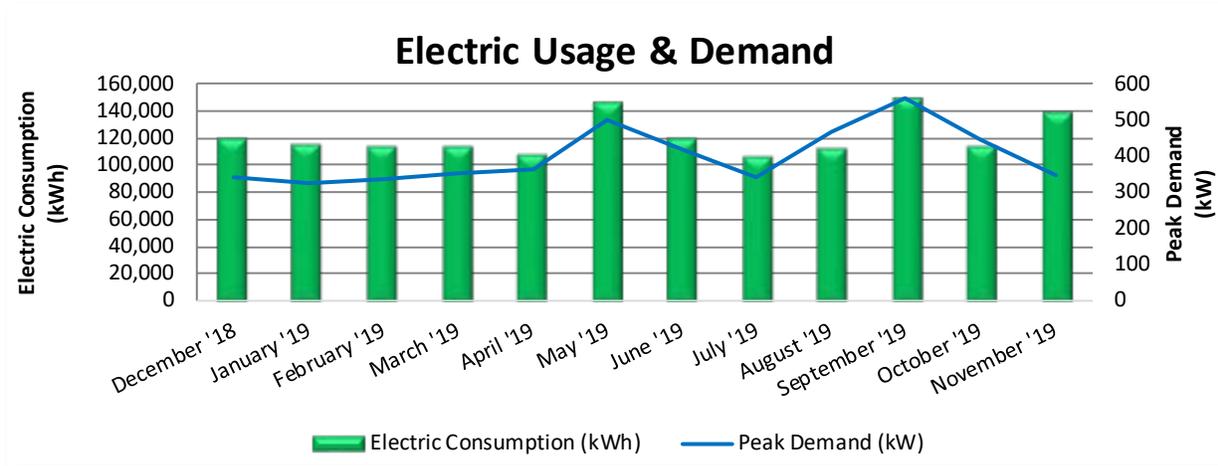


Figure 5 - Energy Balance

3.1 Electricity

JCP&L delivers electricity under rate class General Service Secondary Day/Night Service, with electric production provided by East Coast Power & Gas, a third-party supplier.



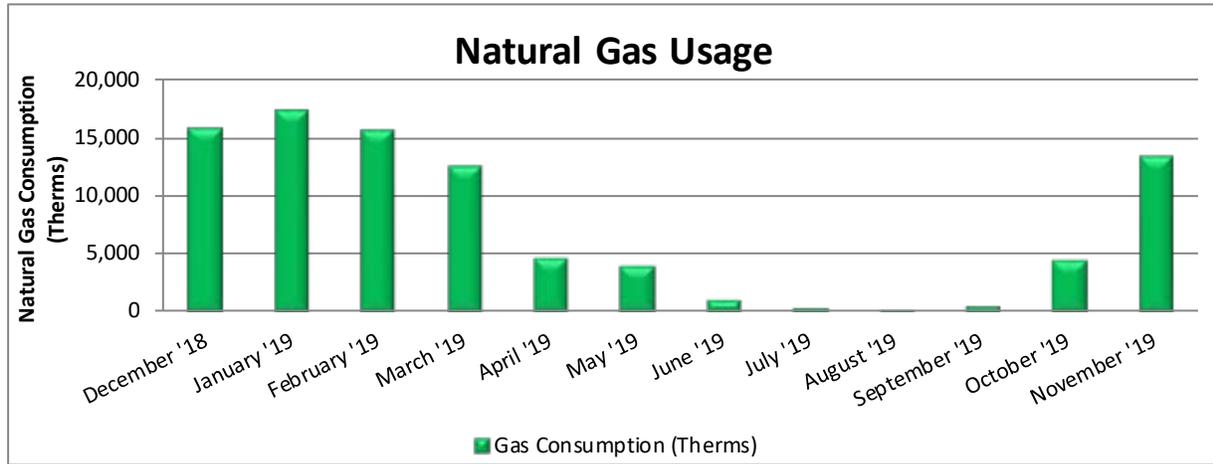
Electric Billing Data					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
1/14/19	33	118,500	341	\$2,078	\$13,095
2/12/19	29	115,200	326	\$1,982	\$12,902
3/13/19	29	113,700	338	\$2,053	\$12,576
4/10/19	28	113,700	355	\$2,164	\$12,687
5/9/19	29	107,100	364	\$2,221	\$12,483
6/11/19	33	144,600	500	\$2,757	\$16,606
7/11/19	30	119,100	419	\$2,714	\$14,147
8/12/19	32	105,600	343	\$2,209	\$12,404
9/11/19	30	111,900	466	\$3,021	\$13,820
10/10/19	29	147,600	558	\$3,383	\$17,601
11/8/19	29	112,800	444	\$2,678	\$13,565
12/12/19	34	137,400	348	\$2,087	\$15,196
Totals	365	1,447,200	558	\$29,348	\$167,083
Annual	365	1,447,200	558	\$29,348	\$167,083

Notes:

- Peak demand of 558 kW occurred in September 2019.
- Average demand over the past 12 months was 400 kW.
- The average electric cost over the past 12 months was \$0.115/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.

3.2 Natural Gas

NJ Natural Gas delivers natural gas under rate class Monthly 004CNN2G, with natural gas supply provided by UGI Energy Services, a third-party supplier.



Gas Billing Data			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
1/8/19	34	15,636	\$17,236
2/5/19	28	17,200	\$17,168
3/7/19	30	15,506	\$14,688
4/8/19	32	12,373	\$11,244
5/7/19	29	4,523	\$4,718
6/6/19	30	3,906	\$4,153
7/10/19	34	964	\$1,818
8/7/19	28	223	\$1,214
9/9/19	33	117	\$1,131
10/4/19	25	522	\$1,306
11/5/19	32	4,316	\$4,664
12/6/19	31	13,256	\$12,556
Totals	366	88,542	\$91,897
Annual	365	88,300	\$91,646

Notes:

- The average gas cost for the past 12 months is \$1.038/therm, which is the blended rate used throughout the analysis.

3.3 Benchmarking

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

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

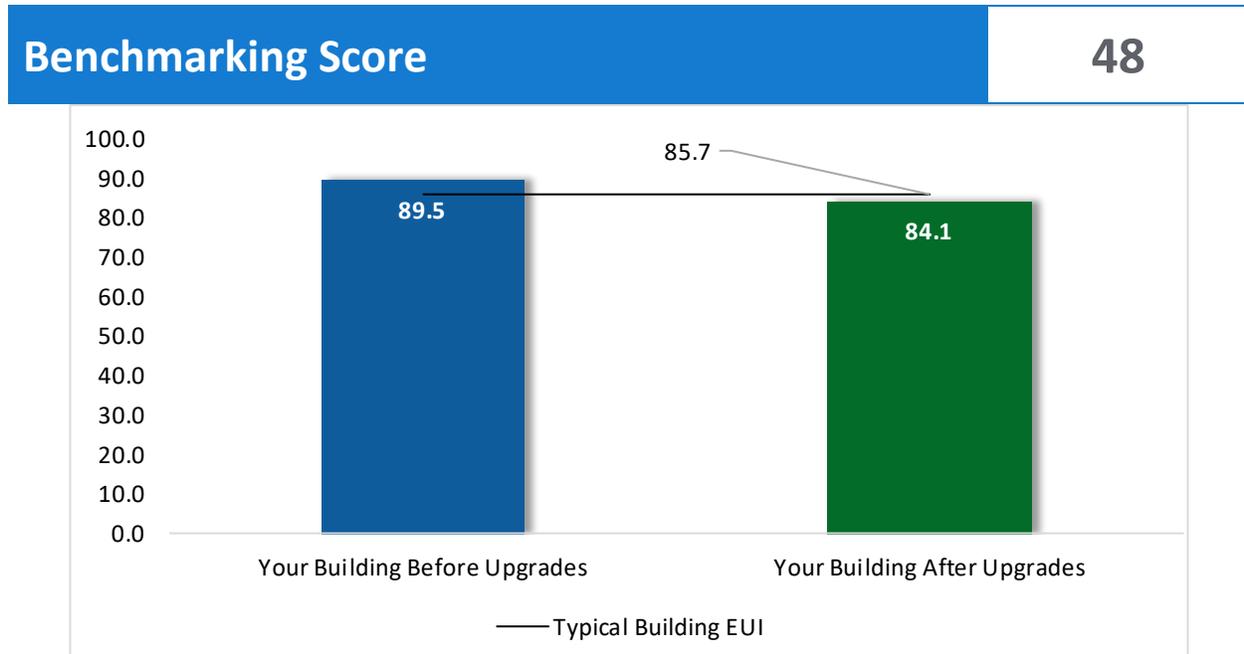


Figure 6 - Energy Use Intensity Comparison³

At 89.5 kBTU/ft², this building's energy usage slightly exceeds the national average of 85.7 kBTU/ft² for schools, meaning building performance is slightly below the national average.

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

³ Based on all evaluated ECMs

Tracking Your Energy Performance

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

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

Free online training is available to help you use ENERGY STAR® Portfolio Manager® to track your building's performance at: <https://www.energystar.gov/buildings/training>.

For more information on ENERGY STAR® and Portfolio Manager®, visit their website⁴.

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

4 ENERGY CONSERVATION MEASURES

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

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

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

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

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			137,449	44.7	-28	\$15,579	\$54,784	\$27,108	\$27,676	1.8	135,145
ECM 1	Install LED Fixtures	Yes	3,878	0.0	0	\$448	\$949	\$0	\$949	2.1	3,906
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	348	0.2	0	\$39	\$267	\$52	\$215	5.4	342
ECM 3	Retrofit Fixtures with LED Lamps	Yes	133,222	44.4	-28	\$15,092	\$53,568	\$27,056	\$26,512	1.8	130,897
Lighting Control Measures			27,889	6.2	-6	\$3,159	\$30,345	\$12,970	\$17,375	5.5	27,402
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	16,691	4.4	-3	\$1,891	\$20,220	\$3,970	\$16,250	8.6	16,399
ECM 5	Install High/Low Lighting Controls	Yes	11,198	1.8	-2	\$1,269	\$10,125	\$9,000	\$1,125	0.9	11,002
Variable Frequency Drive (VFD) Measures			16,305	5.1	21	\$2,099	\$19,123	\$5,950	\$13,173	6.3	18,861
ECM 6	Install VFDs on Constant Volume (CV) Fans	Yes	15,252	5.1	0	\$1,761	\$16,113	\$5,800	\$10,313	5.9	15,358
ECM 7	Install VFDs on Kitchen Hood Fan Motors	Yes	1,053	0.0	21	\$338	\$3,010	\$150	\$2,860	8.5	3,502
Electric Unitary HVAC Measures			8,020	8.6	0	\$926	\$94,964	\$9,316	\$85,648	92.5	8,076
ECM 8	Install High Efficiency Air Conditioning Units	No	8,020	8.6	0	\$926	\$94,964	\$9,316	\$85,648	92.5	8,076
Gas Heating (HVAC/Process) Replacement			0	0.0	43	\$444	\$33,488	\$4,000	\$29,488	66.5	5,004
ECM 9	Install High Efficiency Furnaces	No	0	0.0	43	\$444	\$33,488	\$4,000	\$29,488	66.5	5,004
HVAC System Improvements			3,538	0.0	69	\$1,123	\$8,157	\$0	\$8,157	7.3	11,629
ECM 10	Implement Demand Control Ventilation (DCV)	Yes	3,538	0.0	69	\$1,123	\$8,157	\$0	\$8,157	7.3	11,629
Domestic Water Heating Upgrade			0	0.0	5	\$51	\$129	\$72	\$57	1.1	572
ECM 11	Install Low-Flow DHW Devices	Yes	0	0.0	5	\$51	\$129	\$72	\$57	1.1	572
Food Service & Refrigeration Measures			17,434	1.6	0	\$2,013	\$18,542	\$1,340	\$17,202	8.5	17,556
ECM 12	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	2,974	0.3	0	\$343	\$2,426	\$640	\$1,786	5.2	2,995
ECM 13	Refrigeration Controls	No	4,186	0.1	0	\$483	\$6,696	\$600	\$6,096	12.6	4,215
ECM 14	Replace Refrigeration Equipment	No	8,320	0.9	0	\$961	\$8,960	\$0	\$8,960	9.3	8,378
ECM 15	Vending Machine Control	Yes	1,954	0.2	0	\$226	\$460	\$100	\$360	1.6	1,968
TOTALS			210,635	66.2	104	\$25,394	\$259,532	\$60,756	\$198,776	7.8	224,244

* - 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 ₂ e Emissions Reduction (lbs)
Lighting Upgrades		137,449	44.7	-28	\$15,579	\$54,784	\$27,108	\$27,676	1.8	135,145
ECM 1	Install LED Fixtures	3,878	0.0	0	\$448	\$949	\$0	\$949	2.1	3,906
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	348	0.2	0	\$39	\$267	\$52	\$215	5.4	342
ECM 3	Retrofit Fixtures with LED Lamps	133,222	44.4	-28	\$15,092	\$53,568	\$27,056	\$26,512	1.8	130,897
Lighting Control Measures		27,889	6.2	-6	\$3,159	\$30,345	\$12,970	\$17,375	5.5	27,402
ECM 4	Install Occupancy Sensor Lighting Controls	16,691	4.4	-3	\$1,891	\$20,220	\$3,970	\$16,250	8.6	16,399
ECM 5	Install High/Low Lighting Controls	11,198	1.8	-2	\$1,269	\$10,125	\$9,000	\$1,125	0.9	11,002
Variable Frequency Drive (VFD) Measures		16,305	5.1	21	\$2,099	\$19,123	\$5,950	\$13,173	6.3	18,861
ECM 6	Install VFDs on Constant Volume (CV) Fans	15,252	5.1	0	\$1,761	\$16,113	\$5,800	\$10,313	5.9	15,358
ECM 7	Install VFDs on Kitchen Hood Fan Motors	1,053	0.0	21	\$338	\$3,010	\$150	\$2,860	8.5	3,502
HVAC System Improvements		3,538	0.0	69	\$1,123	\$8,157	\$0	\$8,157	7.3	11,629
ECM 10	Implement Demand Control Ventilation (DCV)	3,538	0.0	69	\$1,123	\$8,157	\$0	\$8,157	7.3	11,629
Domestic Water Heating Upgrade		0	0.0	5	\$51	\$129	\$72	\$57	1.1	572
ECM 11	Install Low-Flow DHW Devices	0	0.0	5	\$51	\$129	\$72	\$57	1.1	572
Food Service & Refrigeration Measures		4,929	0.6	0	\$569	\$2,886	\$740	\$2,146	3.8	4,963
ECM 12	Refrigerator/Freezer Case Electrically Commutated Motors	2,974	0.3	0	\$343	\$2,426	\$640	\$1,786	5.2	2,995
ECM 15	Vending Machine Control	1,954	0.2	0	\$226	\$460	\$100	\$360	1.6	1,968
TOTALS		190,110	56.6	61	\$22,581	\$115,424	\$46,840	\$68,584	3.0	198,571

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

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

Figure 8 – Cost Effective ECMs

4.1 Lighting

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades		137,449	44.7	-28	\$15,579	\$54,784	\$27,108	\$27,676	1.8	135,145
ECM 1	Install LED Fixtures	3,878	0.0	0	\$448	\$949	\$0	\$949	2.1	3,906
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	348	0.2	0	\$39	\$267	\$52	\$215	5.4	342
ECM 3	Retrofit Fixtures with LED Lamps	133,222	44.4	-28	\$15,092	\$53,568	\$27,056	\$26,512	1.8	130,897

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

ECM 1: Install LED Fixtures

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

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

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

Affected building areas: exterior fixtures with metal halides.

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

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

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

Affected building areas: nurse's office and prep room in wing 600.

ECM 3: Retrofit Fixtures with LED Lamps

Replace 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.

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

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Control Measures		27,889	6.2	-6	\$3,159	\$30,345	\$12,970	\$17,375	5.5	27,402
ECM 4	Install Occupancy Sensor Lighting Controls	16,691	4.4	-3	\$1,891	\$20,220	\$3,970	\$16,250	8.6	16,399
ECM 5	Install High/Low Lighting Controls	11,198	1.8	-2	\$1,269	\$10,125	\$9,000	\$1,125	0.9	11,002

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

ECM 4: Install Occupancy Sensor Lighting Controls

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

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

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

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

Affected building areas: old gymnasium, cafeteria, kitchen, media center, locker rooms, some classrooms, main gymnasium, offices, restrooms and some storage areas.

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

The controller lowers the light level by dimming the fixture output. Therefore, the controlled fixtures need to have a dimmable ballast or driver. This will need to be considered when selecting retrofit lamps and bulbs for the areas proposed for high/low control. 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 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 ₂ e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		16,305	5.1	21	\$2,099	\$19,123	\$5,950	\$13,173	6.3	18,861
ECM 6	Install VFDs on Constant Volume (CV) Fans	15,252	5.1	0	\$1,761	\$16,113	\$5,800	\$10,313	5.9	15,358
ECM 7	Install VFDs on Kitchen Hood Fan Motors	1,053	0.0	21	\$338	\$3,010	\$150	\$2,860	8.5	3,502

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

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

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

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

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

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

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

Affected air handlers: AHUs for old gymnasium, girls and boy's locker rooms and packaged unit for weight room.

ECM 7: Install VFDs on Kitchen Hood Fan Motors

Install VFDs and sensors to control the kitchen hood fan motors. The air flow of the hood is varied based on two key inputs: temperature and smoke/cooking fumes. The VFD controls the amount of exhaust (and kitchen make-up air) based on temperature—the lower the temperature the lower the flow. If the optic sensor is triggered by smoke or cooking fumes, the speed of the fan ramps up to 100%.

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

4.4 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 ₂ e Emissions Reduction (lbs)
Electric Unitary HVAC Measures		8,020	8.6	0	\$926	\$94,964	\$9,316	\$85,648	92.5	8,076
ECM 8	Install High Efficiency Air Conditioning Units	8,020	8.6	0	\$926	\$94,964	\$9,316	\$85,648	92.5	8,076

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

ECM 8: Install High Efficiency Air Conditioning Units

We evaluated replacing 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.

This measure is part of a measure to replace package units at this site and as such must be considered in combination with ECM 9.

Affected units: one York split AC system, three EMI ductless mini-split ACs, RTU for marine biology room, RTU for principal's office, RTU 6, and RTU 7.

4.5 Gas-Fired Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Gas Heating (HVAC/Process) Replacement		0	0.0	43	\$444	\$33,488	\$4,000	\$29,488	66.5	5,004
ECM 9	Install High Efficiency Furnaces	0	0.0	43	\$444	\$33,488	\$4,000	\$29,488	66.5	5,004

ECM 9: Install High Efficiency Furnaces

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

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

This measure is part of a measure to replace package units at this site and as such must be considered in combination with ECM 8.

Affected units: RTU for marine biology room, RTU 1, RTU 4, RTU for media center, and RTU 6.

4.6 HVAC Improvements

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
HVAC System Improvements		3,538	0.0	69	\$1,123	\$8,157	\$0	\$8,157	7.3	11,629
ECM 10	Implement Demand Control Ventilation (DCV)	3,538	0.0	69	\$1,123	\$8,157	\$0	\$8,157	7.3	11,629

ECM 10: Implement Demand Control Ventilation (DCV)

Demand control ventilation (DCV) monitors the indoor air's carbon dioxide (CO₂) content to measure room occupancy. This data is used to regulate the amount of outdoor air provided to the space for ventilation.

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

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

Affected building areas: gymnasium, cafeteria, and auditorium.

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 ₂ e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		0	0.0	5	\$51	\$129	\$72	\$57	1.1	572
ECM 11	Install Low-Flow DHW Devices	0	0.0	5	\$51	\$129	\$72	\$57	1.1	572

ECM 11: Install Low-Flow DHW Devices

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

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

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

Additional cost savings may result from reduced water usage.

4.8 Food Service & Refrigeration Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Food Service & Refrigeration Measures		17,434	1.6	0	\$2,013	\$18,542	\$1,340	\$17,202	8.5	17,556
ECM 12	Refrigerator/Freezer Case Electrically Commutated Motors	2,974	0.3	0	\$343	\$2,426	\$640	\$1,786	5.2	2,995
ECM 13	Refrigeration Controls	4,186	0.1	0	\$483	\$6,696	\$600	\$6,096	12.6	4,215
ECM 14	Replace Refrigeration Equipment	8,320	0.9	0	\$961	\$8,960	\$0	\$8,960	9.3	8,378
ECM 15	Vending Machine Control	1,954	0.2	0	\$226	\$460	\$100	\$360	1.6	1,968

ECM 12: Refrigerator/Freezer Case Electrically Commutated Motors

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

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

ECM 13: Refrigeration Controls

We evaluated installing evaporator fan motor controls for walk-in cooler and freezers. Many walk-in coolers and freezers have continuously operating electric heaters on the doors to prevent condensation formation. This measure adds a control system feature to shut off the door heaters when the humidity level is low enough that condensation will not occur if the heaters are off. This is done by measuring the ambient humidity and temperature of the store, comparing that to the dewpoint, and using pulse width modulation to control the anti-sweat door heaters.

ECM 14: Replace Refrigeration Equipment

We evaluated replacing existing commercial cooler and freezer chests 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.

ECM 15: Vending Machine Control

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

4.9 Measures for Future Consideration

There are additional opportunities for improvement that Matawan Aberdeen Regional School District may wish to consider. These potential upgrades typically require further analysis, involve substantial capital investment and/or include significant system reconfiguration. These measure(s) are therefore beyond the scope of this energy audit. These measure(s) are described here to support a whole building approach to energy efficiency and sustainability.

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

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

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

Retro-Commissioning Study

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

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

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

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

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



Finally, site staff has expressed an interest in consolidating EMS controls into a single system, the Honeywell Tritium EMS, which currently controls about 80% of the HVAC equipment. A retro-commissioning process should be included as part of the control function mapping from the legacy Johnson Controls Metasys system to the new Honeywell system.

5 ENERGY EFFICIENT BEST PRACTICES

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

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

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

Energy Tracking with ENERGY STAR® Portfolio Manager®



You've heard it before - you can't manage what you don't measure. ENERGY STAR® Portfolio Manager® is an online tool that you can use to measure and track energy and water consumption, as well as greenhouse gas emissions⁵. Your account has already been established. Now you can continue to keep tabs on your energy performance every month.

Lighting Maintenance



- Clean lamps, reflectors and lenses of dirt, dust, oil, and smoke buildup every six to twelve months. Light levels decrease over time due to lamp aging, lamp and ballast failure, and buildup of dirt and dust. Together, this can reduce total light output by up to 60% while still drawing full power.
- In addition to routine cleaning, developing a maintenance schedule can ensure that maintenance is performed regularly, and it can reduce the overall cost of fixture re-lamping and re-ballasting. Group re-lamping and re-ballasting maintains lighting levels and minimizes the number of site visits by a lighting technician or contractor, decreasing the overall cost of maintenance.

Lighting Controls

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

⁵ <https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager>.

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.

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.

Ductwork Maintenance

Duct maintenance has two primary goals: keep the ducts clean to avoid air quality problems and seal leaks to save energy. Check for cleanliness, obstructions that block airflow, water damage, and leaks. Ducts should be inspected at least every two years.

The biggest symptoms of clogged air ducts are differing temperatures throughout the building and areas with limited airflow from supply registers. If a particular air duct is clogged, then air flow will only be cut off to some rooms in the building - not all of them. The reduced airflow will make it more difficult for those areas to reach the temperature setpoint which will cause the HVAC system to run longer to cool or heat that area properly. If you suspect clogged air ducts, ensure that all areas in front of supply registers are clear of items that may block or restrict air flow, and check for fire dampers or balancing dampers that have failed closed.

Duct leakage in commercial buildings can account for 5% to 25% of the supply airflow. In the case of rooftop air handlers, duct leakage can occur to the outside of the building wasting conditioned air. Check

ductwork for leakage. Eliminating duct leaks can improve ventilation system performance and reduce heating and cooling system operation.

Distribution system losses are dependent on air system temperature, the size of the distribution system, and the level of insulation of the ductwork. Significant energy savings can be achieved when insulation has not been well maintained. When the insulation is missing or worn, the system efficiency can be significantly reduced. This measure saves energy by reducing heat transfer in the distribution system.

Boiler Maintenance

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

Furnace Maintenance

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

Water Heater Maintenance

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

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

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

Compressed Air System Maintenance

Compressed air systems require periodic maintenance to operate at peak efficiency. A maintenance plan for compressed air systems should include:

- Inspection, cleaning, and replacement of inlet filter cartridges
- Cleaning of drain traps
- Daily inspection of lubricant levels to reduce unwanted friction
- Inspection of belt condition and tension
- Check for leaks and adjust loose connections
- Overall system cleaning

Contact a qualified technician for help with setting up periodic maintenance schedule.

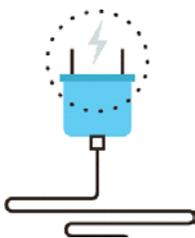
Refrigeration Equipment Maintenance

Preventative maintenance keeps commercial refrigeration equipment running reliably and efficiently. Commercial refrigerators and freezers are mission-critical equipment that can cost a fortune when they go down. Even when they appear to be working properly, refrigeration units can be consuming too much energy. Have walk-in refrigeration and freezer and other commercial systems serviced at least annually. This practice will allow systems to perform to their highest capabilities and will help identify system issues if they exist.

Maintaining your commercial refrigeration equipment can save between 5 and 10 percent on energy costs. When condenser coils are dirty, your commercial refrigerators and freezers work harder to maintain the temperature inside. Worn gaskets, hinges, door handles or faulty seals cause cold air to leak from the unit, forcing the unit to run longer and use more electricity.

Regular cleaning and maintenance also help your commercial refrigeration equipment to last longer.

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 strips⁶. Your local utility may offer incentives or rebates for this equipment.

⁶ For additional information refer to “Assessing and Reducing Plug and Process Loads in Office Buildings” <http://www.nrel.gov/docs/fy13osti/54175.pdf>, or “Plug Load Best Practices Guide” <http://www.advancedbuildings.net/plug-load-best-practices-guide-offices>.

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).

For more information regarding water conservation go to the EPA's WaterSense® website⁷ or download a copy of EPA's "WaterSense® at Work: Best Management Practices for Commercial and Institutional Facilities"⁸ to get ideas for creating a water management plan and best practices for a wide range of water using systems.

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

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

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.

⁷ <https://www.epa.gov/watersense>.

⁸ <https://www.epa.gov/watersense/watersense-work-0>.

6 ON-SITE GENERATION

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

Preliminary screenings were performed to determine if an on-site generation measure could be a cost-effective solution for your facility. Before deciding to install an on-site generation system, we recommend conducting a feasibility study to analyze existing energy profiles, siting, interconnection, and the costs associated with the generation project including interconnection costs, departing load charges, and any additional special facilities charges.

6.1 Solar Photovoltaic

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

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

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

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

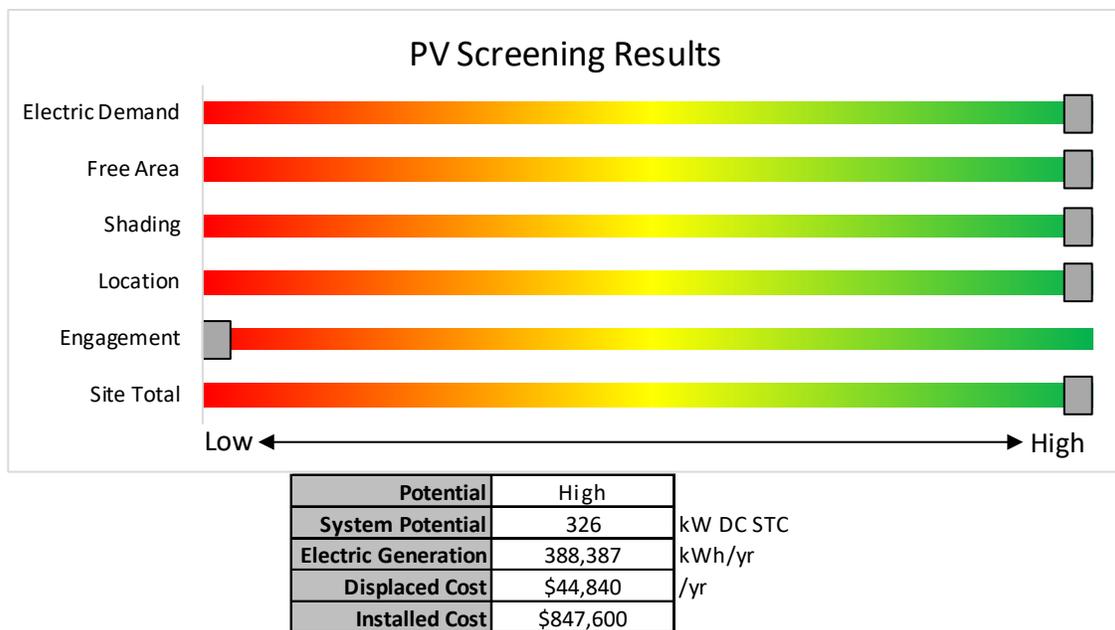


Figure 9 - Photovoltaic Screening

Transition Incentive (TI) Program

The TI program is a bridge between the Legacy SREC Program and a to-be determined Successor Incentive Program. The program is used to register the intent to install solar projects in New Jersey. Rebates are not available for solar projects, but owners of solar projects *must* register their projects prior to the start of construction to establish the project's eligibility to earn TRECs (Transition Incentive Renewable Energy Certificates). The Transition Incentive is structured as a factorized renewable energy certificate. The factors allow the TI Program to provide differentiated financial incentives for different types of solar installation.

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

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

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

6.2 Combined Heat and Power

Combined heat and power (CHP) generates electricity at the facility and puts waste heat energy to good use. Common types of CHP systems are reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines.

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

The key criteria used for screening is the amount of time that the CHP system would operate at full load and the facility's ability to use the recovered heat. Facilities with a continuous need for large quantities of waste heat are the best candidates for CHP.

A preliminary screening based on heating and electrical demand, siting, and interconnection shows that the facility has no potential for installing a cost-effective CHP system.

Based on a preliminary analysis, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation. Infrequent and low thermal load is the most significant factors contributing to the lack of CHP potential.

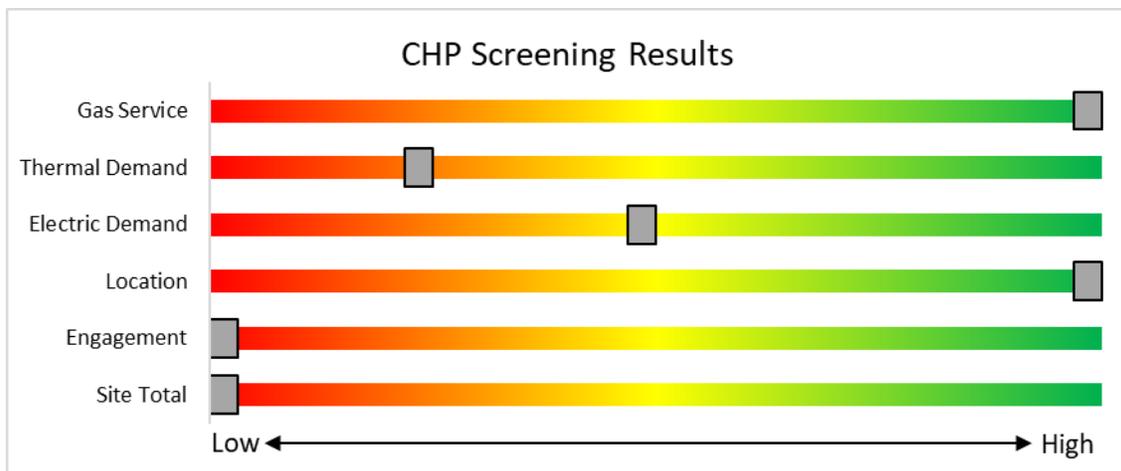


Figure 10 – CHP Screening

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

7 PROJECT FUNDING AND INCENTIVES

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

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

7.1 SmartStart



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

SmartStart routinely adds, removes, or modifies incentives from year-to-year for various energy-efficient equipment based on market trends and new technologies.

Equipment with Prescriptive Incentives Currently Available:

Electric Chillers
Electric Unitary HVAC
Gas Cooling
Gas Heating
Gas Water Heating
Ground Source Heat Pumps
Lighting

Lighting Controls
Refrigeration Doors
Refrigeration Controls
Refrigerator/Freezer Motors
Food Service Equipment
Variable Frequency Drives

Incentives

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

SmartStart Custom provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentives. Custom incentives are calculated at \$0.16/kWh and \$1.60/therm based on estimated annual savings. Incentives are capped at 50% of the total installed incremental project cost, or a project cost buy down to a one-year payback (whichever is less). Program incentives are capped at \$500,000 per electric account and \$500,000 per natural gas account, per fiscal year.

How to Participate

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

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

7.2 Direct Install



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

installation of selected measures. Energy efficiency measures may include lighting and lighting controls, refrigeration, HVAC, motors, variable speed drives, and controls.

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

Incentives

The program pays up to 70% 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.

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

Incentives

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

How to Participate

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

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

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

7.4 Combined Heat and Power

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

Incentives

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

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

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

How to Participate

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

7.5 Energy Savings Improvement Program

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

ESIP provides government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources. NJCEP incentive programs described above can also be used to help further reduce the total project cost of eligible measures.

How to Participate

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

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

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

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

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

7.6 Transition Incentive (TI) Program

The TI program is a bridge between the Legacy SREC Program and a to-be determined Successor Incentive Program. The program is used to register the intent to install solar projects in New Jersey. Rebates are not available for solar projects, but owners of solar projects *must* register their projects prior to the start of construction to establish the project's eligibility to earn TRECs (Transition Incentive Renewable Energy Certificates). The Transition Incentive is structured as a factorized renewable energy certificate. The factors allow the TI Program to provide differentiated financial incentives for different types of solar installations. NJBPU calculates the value of a Transition Renewable Energy Certificate (TREC) by multiplying the base compensation rate (\$152/MWh) by the project's assigned factor (i.e. $\$152 \times 0.85 = \$129.20/\text{MWh}$). The TREC factors are defined based on the chart below:

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

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

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

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

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

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

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

8 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 website⁹.

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 website¹⁰.

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

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

APPENDIX A: EQUIPMENT INVENTORY & RECOMMENDATIONS

Lighting Inventory & Recommendations

Location	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis								
	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
Audio / Video room 309	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Audio / Video room 309	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	968	3, 4	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	668	0.2	236	0	\$27	\$489	\$190	11.2
Auditorium - Stage	1	Compact Fluorescent: (1) 32W Plug-In Lamp	Wall Switch	S	32	968	3	Relamp	No	1	LED Lamps: (1) 23W Plug-in LED Lamp	Wall Switch	22	968	0.0	10	0	\$1	\$13	\$2	9.1
Auditorium	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Auditorium - Audience area	44	Halogen Incandescent: (1) 250W PAR38 Screw-In Lamp	Wall Switch	S	250	968	3, 4	Relamp	Yes	44	LED Lamps: (1) 40W PAR38 Lamp	Occupancy Sensor	38	668	7.1	10,501	-2	\$1,190	\$2,139	\$474	1.4
Auditorium - Stage LED fixtures	5	LED - Fixtures: 45W High Bay LED Fixtures	Wall Switch	S	45	968		None	No	5	LED - Fixtures: 45W High Bay LED Fixtures	Wall Switch	45	968	0.0	0	0	\$0	\$0	\$0	0.0
Auditorium - Auditorium	6	LED Lamps: (1) 9W A19 Screw-In Lamp	Wall Switch	S	9	2,760	4	None	Yes	6	LED Lamps: (1) 9W A19 Screw-In Lamp	Occupancy Sensor	9	1,904	0.0	51	0	\$6	\$270	\$0	46.9
Auditorium - Lighting control room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	968	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	968	0.0	35	0	\$4	\$37	\$20	4.1
Auditorium - Stage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,444	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,444	0.0	125	0	\$14	\$37	\$20	1.2
Auxiliary Gymnasium	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Auxiliary Gymnasium - Gym area	24	Linear Fluorescent - T5HO: 4' T5HO (54W) - 2L	Wall Switch	S	117	3,444	3, 4	Relamp	Yes	24	LED - Linear Tubes: (2) 4' T5HO (25W) Lamps	Occupancy Sensor	51	2,376	1.4	7,438	-2	\$843	\$1,910	\$620	1.5
Band Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,760	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,760	0.0	170	0	\$19	\$73	\$40	1.7
Book Storage 410	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	968	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	968	0.0	35	0	\$4	\$37	\$20	4.1
Book Storage 419	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	968	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	668	0.1	179	0	\$20	\$416	\$80	16.6
Cafeteria - Cafeteria main hall	42	LED - Fixtures: 50W Hard Ceiling LED Fixtures	Wall Switch	S	50	2,760	4	None	Yes	42	LED - Fixtures: 50W Hard Ceiling LED Fixtures	Occupancy Sensor	50	1,904	0.5	1,976	0	\$224	\$810	\$210	2.7
Cafeteria - Faculty dining	6	LED - Fixtures: 50W Hard Ceiling LED Fixtures	Wall Switch	S	50	2,760	4	None	Yes	6	LED - Fixtures: 50W Hard Ceiling LED Fixtures	Occupancy Sensor	50	1,904	0.1	282	0	\$32	\$270	\$70	6.3
Chemical Storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	968	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	668	0.1	134	0	\$15	\$380	\$60	21.0
Classroom - Home Econ	15	LED - Fixtures: 35W Prismatic (Acrylic Lensed) LED Fixtures	Occupancy Sensor	S	35	1,932		None	No	15	LED - Fixtures: 35W Prismatic (Acrylic Lensed) LED Fixtures	Occupancy Sensor	35	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 118	14	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	2,760	3, 4	Relamp	Yes	14	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,904	0.2	935	0	\$106	\$526	\$210	3.0
Classroom 119 - Band Room	27	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	27	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.3	1,004	0	\$114	\$493	\$270	2.0
Classroom 120	27	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	27	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.3	1,004	0	\$114	\$493	\$270	2.0
Classroom 121- instrumental Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,760	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,760	0.0	100	0	\$11	\$37	\$20	1.5
Classroom 121- instrumental Room	23	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,932	3	Relamp	No	23	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.8	2,420	-1	\$274	\$1,260	\$690	2.1
Classroom 121- instrumental Room	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,760	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,760	0.0	88	0	\$10	\$72	\$20	5.3
Classroom 123	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0

Location	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis								
	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 123	37	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	37	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.5	1,376	0	\$156	\$676	\$370	2.0
Classroom 123 - Locker room 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,760	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,904	0.1	255	0	\$29	\$189	\$40	5.2
Classroom 123 - Locker room 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,760	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,904	0.1	255	0	\$29	\$189	\$40	5.2
Classroom 123 - Small room 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,760	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,760	0.0	100	0	\$11	\$37	\$20	1.5
Classroom 123 - Small room 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,760	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,760	0.0	100	0	\$11	\$37	\$20	1.5
Classroom 124 - Wood workshop	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 124 - Wood workshop - Finishing room	2	LED Lamps: (1) 16W A21 Screw-In Lamp	Wall Switch	S	16	2,760	4	None	Yes	2	LED Lamps: (1) 16W A21 Screw-In Lamp	Occupancy Sensor	16	1,904	0.0	30	0	\$3	\$116	\$0	34.0
Classroom 124 - Wood workshop - Main area	40	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	40	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.5	1,488	0	\$169	\$730	\$400	2.0
Classroom 124 - Wood workshop - Office 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,760	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,760	0.0	100	0	\$11	\$37	\$20	1.5
Classroom 124 - Wood workshop - Wood workshop Office 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,760	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,760	0.0	100	0	\$11	\$37	\$20	1.5
Classroom 201 - Class area	15	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	558	0	\$63	\$274	\$150	2.0
Classroom 201 - Small room 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	968	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	668	0.1	89	0	\$10	\$189	\$40	14.7
Classroom 201 - Small room 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	968	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	968	0.0	35	0	\$4	\$37	\$20	4.1
Classroom 203	15	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	558	0	\$63	\$274	\$150	2.0
Classroom 204	23	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	23	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.3	855	0	\$97	\$420	\$230	2.0
Classroom 205	18	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	18	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	669	0	\$76	\$329	\$180	2.0
Classroom 207	15	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	558	0	\$63	\$274	\$150	2.0
Classroom 209	15	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	558	0	\$63	\$274	\$150	2.0
Classroom 211	12	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	446	0	\$51	\$219	\$120	2.0
Classroom 301	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 301	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,932	3	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.4	1,157	0	\$131	\$602	\$330	2.1
Classroom 303	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.4	1,052	0	\$119	\$548	\$300	2.1
Classroom 304	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 304	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.4	1,052	0	\$119	\$548	\$300	2.1
Classroom 305	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0

Location	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis								
	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 305	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.4	1,052	0	\$119	\$548	\$300	2.1
Classroom 306	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 306	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.4	1,052	0	\$119	\$548	\$300	2.1
Classroom 307	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 307	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.4	1,052	0	\$119	\$548	\$300	2.1
Classroom 308	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 308	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.3	771	0	\$87	\$402	\$220	2.1
Classroom 400	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	S	12	1,932		None	No	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	12	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 400	15	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	558	0	\$63	\$274	\$150	2.0
Classroom 401	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	S	12	1,932		None	No	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	12	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 401	15	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	558	0	\$63	\$274	\$150	2.0
Classroom 402	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	S	12	1,932		None	No	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	12	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 402	18	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	18	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	669	0	\$76	\$329	\$180	2.0
Classroom 403	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	S	12	1,932		None	No	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	12	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 403	18	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	18	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	669	0	\$76	\$329	\$180	2.0
Classroom 404	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	S	12	1,932		None	No	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	12	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 404	15	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	558	0	\$63	\$274	\$150	2.0
Classroom 405	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	S	12	1,932		None	No	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	12	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 405	15	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	558	0	\$63	\$274	\$150	2.0
Classroom 406	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	S	12	1,932		None	No	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	12	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 406	15	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	558	0	\$63	\$274	\$150	2.0
Classroom 407	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	S	12	1,932		None	No	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	12	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 407	15	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	558	0	\$63	\$274	\$150	2.0
Classroom 408	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	S	12	1,932		None	No	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	12	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 408	15	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	558	0	\$63	\$274	\$150	2.0

Location	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis								
	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 409	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	S	12	1,932		None	No	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	12	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 409	15	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	558	0	\$63	\$274	\$150	2.0
Classroom 411	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	S	12	1,932		None	No	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	12	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 411	15	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	1,932	3	Relamp	No	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,932	0.6	1,785	0	\$202	\$1,095	\$600	2.4
Classroom 413	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	S	12	1,932		None	No	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	12	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 413	15	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	558	0	\$63	\$274	\$150	2.0
Classroom 414	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	S	12	1,932		None	No	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	12	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 414	15	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	558	0	\$63	\$274	\$150	2.0
Classroom 415	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	S	12	1,932		None	No	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	12	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 415	15	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	558	0	\$63	\$274	\$150	2.0
Classroom 416	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	S	12	1,932		None	No	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	12	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 416	15	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	558	0	\$63	\$274	\$150	2.0
Classroom 417	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	S	12	1,932		None	No	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	12	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 417	15	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	558	0	\$63	\$274	\$150	2.0
Classroom 418	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	S	12	1,932		None	No	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	12	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 418	15	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	558	0	\$63	\$274	\$150	2.0
Classroom 420	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	S	12	1,932		None	No	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	12	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 420	15	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	558	0	\$63	\$274	\$150	2.0
Classroom 422	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	S	12	1,932		None	No	3	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	12	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Classroom 422	15	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	558	0	\$63	\$274	\$150	2.0
Classroom 502	24	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.3	893	0	\$101	\$438	\$240	2.0
Classroom 503	3	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Occupancy Sensor	S	53	1,932	3	Relamp	No	3	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,932	0.1	175	0	\$20	\$146	\$54	4.6
Classroom 503 - Hallway to Kin room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.0	140	0	\$16	\$73	\$40	2.1
Classroom 503 - Kin Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.0	140	0	\$16	\$73	\$40	2.1
Classroom 503 - Room next to Kin room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.0	70	0	\$8	\$37	\$20	2.1

Location	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis								
	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 503	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,932	3	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.3	947	0	\$107	\$493	\$270	2.1
Classroom 505 - Main room	3	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Occupancy Sensor	S	53	1,932	3	Relamp	No	3	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,932	0.1	175	0	\$20	\$146	\$54	4.6
Classroom 505	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.0	70	0	\$8	\$37	\$20	2.1
Classroom 505	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.0	140	0	\$16	\$73	\$40	2.1
Classroom 505 - Main room	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,932	3	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.3	947	0	\$107	\$493	\$270	2.1
Classroom 507	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,932	3	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.3	947	0	\$107	\$493	\$270	2.1
Classroom 508	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,760	3, 4	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,904	0.3	1,147	0	\$130	\$599	\$250	2.7
Classroom 518	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,932	3	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.2	631	0	\$72	\$329	\$180	2.1
Classroom 521	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,932	3	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.3	947	0	\$107	\$493	\$270	2.1
Classroom 522	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,932	3	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.3	947	0	\$107	\$493	\$270	2.1
Classroom 523	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,932	3	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.2	631	0	\$72	\$329	\$180	2.1
Classroom 524	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,932	3	Relamp	No	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.2	526	0	\$60	\$274	\$150	2.1
Classroom 606	18	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	18	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	669	0	\$76	\$329	\$180	2.0
Classroom 608	18	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	18	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	669	0	\$76	\$329	\$180	2.0
Classroom 609	20	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	20	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.3	744	0	\$84	\$365	\$200	2.0
Classroom 610	18	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	18	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	669	0	\$76	\$329	\$180	2.0
Classroom 611	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.1	421	0	\$48	\$219	\$120	2.1
Classroom 612	18	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	18	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	669	0	\$76	\$329	\$180	2.0
Classroom 613	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.1	421	0	\$48	\$219	\$120	2.1
Classroom 615	18	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	18	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	669	0	\$76	\$329	\$180	2.0
Classroom 616	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.4	1,262	0	\$143	\$657	\$360	2.1
Classroom 617	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.4	1,052	0	\$119	\$548	\$300	2.1
Classroom 618	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.4	1,262	0	\$143	\$657	\$360	2.1
Classroom 619	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.2	631	0	\$72	\$329	\$180	2.1
Classroom 620	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.4	1,262	0	\$143	\$657	\$360	2.1

Location	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis								
	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 621	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.2	631	0	\$72	\$329	\$180	2.1
Classroom 622	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,932	3	Relamp	No	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.5	1,578	0	\$179	\$822	\$450	2.1
Classroom 623	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,932	3	Relamp	No	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.5	1,578	0	\$179	\$822	\$450	2.1
Classroom 624	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,932	3	Relamp	No	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.5	1,578	0	\$179	\$822	\$450	2.1
Classroom 624	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,932	3	Relamp	No	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.5	1,578	0	\$179	\$822	\$450	2.1
Electrical Room Main	2	LED Lamps: (1) 15W R40 Screw-In Lamp	Wall Switch	S	15	968		None	No	2	LED Lamps: (1) 15W R40 Screw-In Lamp	Wall Switch	15	968	0.0	0	0	\$0	\$0	\$0	0.0
Electrical Room Wing 200	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,760	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,760	0.0	150	0	\$17	\$55	\$30	1.5
Electrical Room Wing 300	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	968	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	968	0.0	35	0	\$4	\$37	\$20	4.1
Electrical Room Wing 400	6	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	3,444	3, 4	Relamp	Yes	6	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,376	0.1	500	0	\$57	\$380	\$130	4.4
Electrical Room Wing 400	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,444	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,376	0.0	159	0	\$18	\$37	\$20	0.9
Electrical Room Wing 600	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	968	3, 4	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	668	0.1	158	0	\$18	\$262	\$120	8.0
Exterior Lighting	3	Compact Fluorescent: (1) 26W Plug-In Lamp	Timeclock		26	3,500	3	Relamp	No	3	LED Lamps: (1) 18.5W Plug-In Lamp	Timeclock	19	3,500	0.0	79	0	\$9	\$38	\$6	3.5
Exterior Lighting	4	Compact Fluorescent: (1) 32W Plug-In Lamp	Timeclock		32	3,500	3	Relamp	No	4	LED Lamps: (1) 23W Plug-in LED Lamp	Timeclock	22	3,500	0.0	134	0	\$16	\$50	\$8	2.7
Exterior Lighting	2	LED - Fixtures: 100W Wall Pack LED Fixtures	Timeclock		100	4,380		None	No	2	LED - Fixtures: 100W Wall Pack LED Fixtures	Timeclock	100	4,380	0.0	0	0	\$0	\$0	\$0	0.0
Exterior Lighting	2	LED - Fixtures: 120W Pole Light LED Fixtures	Timeclock		120	3,500		None	No	2	LED - Fixtures: 120W Pole Light LED Fixtures	Timeclock	120	3,500	0.0	0	0	\$0	\$0	\$0	0.0
Exterior Lighting	6	LED - Fixtures: 30W Flood Light LED Fixtures	Timeclock		30	3,500		None	No	6	LED - Fixtures: 30W Flood Light LED Fixtures	Timeclock	30	3,500	0.0	0	0	\$0	\$0	\$0	0.0
Exterior Lighting	8	LED - Fixtures: 50W Wall Pack LED Fixtures	Timeclock		50	4,380		None	No	8	LED - Fixtures: 50W Wall Pack LED Fixtures	Timeclock	50	4,380	0.0	0	0	\$0	\$0	\$0	0.0
Exterior Lighting	27	LED - Fixtures: 80W Wall Pack LED Fixtures	Timeclock		80	4,380		None	No	27	LED - Fixtures: 80W Wall Pack LED Fixtures	Timeclock	80	4,380	0.0	0	0	\$0	\$0	\$0	0.0
Exterior Lighting	2	Metal Halide: (1) 150W Lamp	Timeclock		190	4,380	1	Fixture Replacement	No	2	LED - Fixtures: (1) 60W LED wall mounted fixture	Timeclock	57	4,380	0.0	1,165	0	\$135	\$285	\$0	2.1
Exterior Lighting	3	Metal Halide: (1) 250W Lamp	Timeclock		295	4,380	1	Fixture Replacement	No	3	LED - Fixtures: (1) 90W LED wall mounted fixture	Timeclock	89	4,380	0.0	2,713	0	\$313	\$664	\$0	2.1
Faculty Lounge wing 300	9	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	2,760	3, 4	Relamp	Yes	9	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,904	0.1	581	0	\$66	\$563	\$178	5.8
IT Eqp. Room 310	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
IT Eqp. Room 310	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,444	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,376	0.4	1,909	0	\$216	\$708	\$310	1.8
Janitorial closet Wing 200	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	3,444	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,444	0.0	66	0	\$8	\$18	\$10	1.1
Janitorial closet Wing 300	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,444	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,444	0.0	125	0	\$14	\$37	\$20	1.2

Existing Conditions							Proposed Conditions							Energy Impact & Financial Analysis							
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Janitorial closet Wing 500	1	LED Lamps: (1) 15W R40 Screw-In Lamp	Wall Switch	S	15	3,444		None	No	1	LED Lamps: (1) 15W R40 Screw-In Lamp	Wall Switch	15	3,444	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	21	Incandescent: (1) 250W PAR38 Screw-In Lamp	Wall Switch	S	250	968	3, 4	Relamp	Yes	21	LED Lamps: (1) 40W PAR38 Lamp	Occupancy Sensor	38	668	3.4	5,012	-1	\$568	\$1,174	\$266	1.6
Kitchen	22	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Wall Switch	S	40	2,760	4	None	Yes	22	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	40	1,904	0.2	828	0	\$94	\$540	\$140	4.3
Kitchen - Storage room	6	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	3,444	3, 4	Relamp	Yes	6	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,376	0.1	500	0	\$57	\$380	\$60	5.6
Kitchen - Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,760	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,904	0.1	255	0	\$29	\$189	\$40	5.2
Library - Books stacks area	16	Halogen Incandescent: (1) 100W PAR38 Screw-In Lamp	Wall Switch	S	100	968	3, 4	Relamp	Yes	16	LED Lamps: (1) 15W PAR38 Lamp	Occupancy Sensor	15	668	1.0	1,527	0	\$173	\$1,023	\$236	4.6
Library	6	LED Lamps: (1) 12W Plug-In Lamp	Wall Switch	S	12	2,760	4	None	Yes	6	LED Lamps: (1) 12W Plug-In Lamp	Occupancy Sensor	12	1,904	0.0	68	0	\$8	\$270	\$70	26.1
Library - Books stacks area	6	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	2,760	3, 4	Relamp	Yes	6	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,904	0.1	401	0	\$45	\$380	\$130	5.5
Library - Main area	36	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	2,760	3, 4	Relamp	Yes	36	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,904	0.6	2,404	-1	\$272	\$1,467	\$570	3.3
Library - Additional room to 313	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,760	3, 4	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,904	0.3	1,275	0	\$144	\$635	\$270	2.5
Library - Computer desk space	28	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,760	3, 4	Relamp	Yes	28	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,904	0.8	3,569	-1	\$404	\$1,562	\$700	2.1
Library - Room 313	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,760	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,904	0.1	510	0	\$58	\$416	\$150	4.6
Library - Room 315	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,760	3, 4	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,904	0.2	765	0	\$87	\$489	\$190	3.5
Library - Room 316	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,760	3, 4	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,904	0.2	765	0	\$87	\$489	\$190	3.5
Lobby - Gym and 500 Wing	7	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	7	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Lobby - Gym and 500 Wing	26	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Wall Switch	S	40	4,133	5	None	Yes	26	LED - Fixtures: 40W Hard Ceiling LED Fixtures	High/Low Control	40	2,852	0.2	1,466	0	\$166	\$1,125	\$1,125	0.0
Lobby Main Entrance/ Main Office	29	Compact Fluorescent: (2) 13W Plug-In Lamps	Wall Switch	S	26	4,133	3, 5	Relamp	Yes	29	LED Lamps: (2) 10W Plug-In Lamp	High/Low Control	18	2,852	0.3	1,772	0	\$201	\$1,850	\$1,241	3.0
Lobby Main Entrance/ Main Office	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Lobby Main Entrance/ Main Office - Display wall	5	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,760	3, 5	Relamp	Yes	5	LED - Linear Tubes: (1) 2' Lamp	High/Low Control	9	6,044	0.1	777	0	\$88	\$306	\$30	3.1
Lobby Nurse office to Cafeteria end	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Lobby Nurse office to Cafeteria end	21	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Wall Switch	S	40	4,133	5	None	Yes	21	LED - Fixtures: 40W Hard Ceiling LED Fixtures	High/Low Control	40	2,852	0.2	1,184	0	\$134	\$900	\$900	0.0
Lobby Wing 100	27	Compact Fluorescent: (2) 13W Plug-In Lamps	Wall Switch	S	26	4,133	3, 5	Relamp	Yes	27	LED Lamps: (2) 10W Plug-In Lamp	High/Low Control	18	2,852	0.3	1,650	0	\$187	\$1,800	\$1,233	3.0
Lobby Wing 100	6	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Lobby Wing 100	18	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Wall Switch	S	40	4,133	5	None	Yes	18	LED - Fixtures: 40W Hard Ceiling LED Fixtures	High/Low Control	40	2,852	0.2	1,015	0	\$115	\$675	\$675	0.0
Lobby Wing 300	5	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0

Location	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis								
	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
Lobby Wing 300	16	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Wall Switch	S	40	4,133	5	None	Yes	16	LED - Fixtures: 40W Hard Ceiling LED Fixtures	High/Low Control	40	2,852	0.1	902	0	\$102	\$675	\$675	0.0
Lobby Wing 300	21	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,133	3, 5	Relamp	Yes	21	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,852	0.6	4,009	-1	\$454	\$1,667	\$1,320	0.8
Lobby Wing 400	6	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Lobby Wing 400	32	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Wall Switch	S	40	4,133	5	None	Yes	32	LED - Fixtures: 40W Hard Ceiling LED Fixtures	High/Low Control	40	2,852	0.3	1,804	0	\$204	\$1,350	\$1,350	0.0
Lobby Wing 600	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Lobby Wing 600	30	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Wall Switch	S	40	4,133	5	None	Yes	30	LED - Fixtures: 40W Hard Ceiling LED Fixtures	High/Low Control	40	2,852	0.3	1,691	0	\$192	\$1,125	\$1,125	0.0
Locker Room - Boys	6	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Locker Room - Boys - Locker room main area	30	LED - Fixtures: 25W Low Bay LED Fixtures	Occupancy Sensor	S	25	1,932		None	No	30	LED - Fixtures: 25W Low Bay LED Fixtures	Occupancy Sensor	25	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Locker Room - Boys - Locker room storage area	10	LED - Fixtures: 25W Low Bay LED Fixtures	Occupancy Sensor	S	25	1,932		None	No	10	LED - Fixtures: 25W Low Bay LED Fixtures	Occupancy Sensor	25	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Locker Room - Boys - Small locker room area	12	LED - Fixtures: 25W Low Bay LED Fixtures	Occupancy Sensor	S	25	1,932		None	No	12	LED - Fixtures: 25W Low Bay LED Fixtures	Occupancy Sensor	25	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Locker Room - Boys - Small storage space	1	LED - Fixtures: 25W Low Bay LED Fixture	Wall Switch	S	25	968		None	No	1	LED - Fixtures: 25W Low Bay LED Fixture	Wall Switch	25	968	0.0	0	0	\$0	\$0	\$0	0.0
Locker Room - Boys - Locker room office	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.1	210	0	\$24	\$110	\$60	2.1
Locker Room - Boys - Small Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,760	3, 4	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,904	0.2	898	0	\$102	\$562	\$230	3.3
Locker Room - Girls	7	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	7	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Locker Room - Girls - Locker room office	4	LED - Fixtures: 25W Hard Ceiling LED Fixtures	Occupancy Sensor	S	25	1,932		None	No	4	LED - Fixtures: 25W Hard Ceiling LED Fixtures	Occupancy Sensor	25	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Locker Room - Girls - Locker room office restroom and locker	2	LED - Fixtures: 11W Hard Ceiling LED Fixtures	Wall Switch	S	11	2,760	4	None	Yes	2	LED - Fixtures: 11W Hard Ceiling LED Fixtures	Occupancy Sensor	11	1,904	0.0	21	0	\$2	\$116	\$0	49.5
Locker Room - Girls - Small space to girls locker room	1	LED - Fixtures: 11W Hard Ceiling LED Fixture	Wall Switch	S	11	3,444		None	No	1	LED - Fixtures: 11W Hard Ceiling LED Fixture	Wall Switch	11	3,444	0.0	0	0	\$0	\$0	\$0	0.0
Locker Room - Girls - Main locker area	20	LED - Fixtures: 25W Low Bay LED Fixtures	Occupancy Sensor	S	25	1,932		None	No	20	LED - Fixtures: 25W Low Bay LED Fixtures	Occupancy Sensor	25	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Locker Room - Girls - Small Locker Area 1	6	LED - Fixtures: 25W Low Bay LED Fixtures	Occupancy Sensor	S	25	1,932		None	No	6	LED - Fixtures: 25W Low Bay LED Fixtures	Occupancy Sensor	25	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Locker Room - Girls - Small locker area 2	6	LED - Fixtures: 25W Low Bay LED Fixtures	Occupancy Sensor	S	25	1,932		None	No	6	LED - Fixtures: 25W Low Bay LED Fixtures	Occupancy Sensor	25	1,932	0.0	0	0	\$0	\$0	\$0	0.0
Main Gymnasium (New)	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Main Gymnasium (New) - Gym mezzanine space	3	LED Lamps: (1) 13W A19 Screw-In Lamp	Wall Switch	S	13	968	4	None	Yes	3	LED Lamps: (1) 13W A19 Screw-In Lamp	Occupancy Sensor	13	668	0.0	13	0	\$1	\$270	\$0	185.1
Main Gymnasium (New)	24	Linear Fluorescent - TSHO: 4' TSHO (54W) - 4L	Wall Switch	S	234	3,444	3, 4	Relamp	Yes	24	LED - Linear Tubes: (4) 4' TSHO (25W) Lamps	Occupancy Sensor	102	2,376	2.8	14,877	-3	\$1,685	\$3,074	\$1,100	1.2
Main Gymnasium (New) - Main gym storage area	8	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	968	3, 4	Relamp	Yes	8	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	668	0.1	187	0	\$21	\$416	\$80	15.8
Maintenance office/storage Area	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0

Location	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis								
	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
Maintenance office/storage Area - Custodian restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	5	22	3,444	3, 4	Relamp	Yes	1	LED - Linear Tubes: (1) 2' Lamp	Occupancy Sensor	9	2,376	0.0	61	0	\$7	\$132	\$6	18.2
Maintenance office/storage Area - Custodian restroom 2	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	5	22	3,444	3, 4	Relamp	Yes	1	LED - Linear Tubes: (1) 2' Lamp	Occupancy Sensor	9	2,376	0.0	61	0	\$7	\$132	\$6	18.2
Maintenance office/storage Area - Custodian office area	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	5	32	3,444	3, 4	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,376	0.1	417	0	\$47	\$361	\$50	6.6
Maintenance office/storage Area - Women's locker room	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	5	32	3,444	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,444	0.0	66	0	\$8	\$18	\$10	1.1
Maintenance office/storage Area - Hallway/Storage/Ladder area	21	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	5	62	3,444	3, 5	Relamp	Yes	21	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,376	0.6	3,341	-1	\$378	\$1,667	\$420	3.3
Maintenance office/storage Area - Tool storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	5	114	968	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	968	0.0	60	0	\$7	\$73	\$40	4.9
Mechanical room	3	Exit Signs: LED - 2 W Lamp	None	6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0	
Mechanical room	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	5	62	3,444	3	Relamp	No	11	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,444	0.3	1,375	0	\$156	\$402	\$220	1.2
Mechanical room - Air compressor room	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	5	62	968	3	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	968	0.2	281	0	\$32	\$292	\$160	4.1
Nurse office - Supply closet	1	Linear Fluorescent - T12: 2' T12 (20W) - 2L	Wall Switch	5	50	968	2	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	968	0.0	35	0	\$4	\$65	\$12	13.3
Nurse office - Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	5	33	2,760	3	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,760	0.0	49	0	\$6	\$33	\$12	3.7
Nurse office - Main area	15	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	5	32	1,932	3	Relamp	No	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.2	558	0	\$63	\$274	\$150	2.0
Office - 116	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	5	62	2,760	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,904	0.1	510	0	\$58	\$416	\$150	4.6
Office - 412	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	5	114	968	3, 4	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	668	0.2	315	0	\$36	\$562	\$230	9.3
Office - Main office and its rooms - Break room	1	LED - Fixtures: 40W Hard Ceiling LED Fixture	Wall Switch	5	40	2,760		None	No	1	LED - Fixtures: 40W Hard Ceiling LED Fixture	Wall Switch	40	2,760	0.0	0	0	\$0	\$0	\$0	0.0
Office - Main office and its rooms - Copy room 101	2	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Wall Switch	5	40	2,760	4	None	Yes	2	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	40	1,904	0.0	75	0	\$9	\$116	\$40	8.9
Office - Main office and its rooms - Main open area	12	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Wall Switch	5	40	2,760	4	None	Yes	12	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	40	1,904	0.1	452	0	\$51	\$270	\$70	3.9
Office - Main office and its rooms - Office 1	1	LED - Fixtures: 40W Hard Ceiling LED Fixture	Wall Switch	5	40	2,760		None	No	1	LED - Fixtures: 40W Hard Ceiling LED Fixture	Wall Switch	40	2,760	0.0	0	0	\$0	\$0	\$0	0.0
Office - Main office and its rooms - Office 102	3	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Wall Switch	5	40	2,760	4	None	Yes	3	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	40	1,904	0.0	113	0	\$13	\$270	\$70	15.6
Office - Main office and its rooms - Office 103	3	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Wall Switch	5	40	2,760	4	None	Yes	3	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	40	1,904	0.0	113	0	\$13	\$270	\$70	15.6
Office - Main office and its rooms - Office 107	2	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Wall Switch	5	40	2,760	4	None	Yes	2	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	40	1,904	0.0	75	0	\$9	\$116	\$40	8.9
Office - Main office and its rooms - Office 108	2	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Wall Switch	5	40	2,760	4	None	Yes	2	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	40	1,904	0.0	75	0	\$9	\$116	\$40	8.9
Office - Main office and its rooms - Office 109	1	LED - Fixtures: 40W Hard Ceiling LED Fixture	Wall Switch	5	40	2,760		None	No	1	LED - Fixtures: 40W Hard Ceiling LED Fixture	Wall Switch	40	2,760	0.0	0	0	\$0	\$0	\$0	0.0
Office - Main office and its rooms - Office 110	2	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Wall Switch	5	40	2,760	4	None	Yes	2	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	40	1,904	0.0	75	0	\$9	\$116	\$40	8.9
Office - Main office and its rooms - Office 111	1	LED - Fixtures: 40W Hard Ceiling LED Fixture	Wall Switch	5	40	2,760		None	No	1	LED - Fixtures: 40W Hard Ceiling LED Fixture	Wall Switch	40	2,760	0.0	0	0	\$0	\$0	\$0	0.0

Location	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis								
	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
Office - Main office and its rooms - Office 113	2	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Wall Switch	S	40	2,760	4	None	Yes	2	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	40	1,904	0.0	75	0	\$9	\$116	\$40	8.9
Office - Main office and its rooms - Office 114	1	LED - Fixtures: 40W Hard Ceiling LED Fixture	Wall Switch	S	40	2,760		None	No	1	LED - Fixtures: 40W Hard Ceiling LED Fixture	Wall Switch	40	2,760	0.0	0	0	\$0	\$0	\$0	0.0
Office - Main office and its rooms - Open area 2	10	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Wall Switch	S	40	2,760	4	None	Yes	10	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	40	1,904	0.1	376	0	\$43	\$270	\$70	4.7
Office - Main office and its rooms - Principal office	3	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Wall Switch	S	40	2,760	4	None	Yes	3	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	40	1,904	0.0	113	0	\$13	\$270	\$70	15.6
Office - Main office and its rooms - Small copy room	1	LED - Fixtures: 40W Hard Ceiling LED Fixture	Wall Switch	S	40	2,760		None	No	1	LED - Fixtures: 40W Hard Ceiling LED Fixture	Wall Switch	40	2,760	0.0	0	0	\$0	\$0	\$0	0.0
Office 509	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.1	281	0	\$32	\$146	\$80	2.1
Office 510	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,760	3, 4	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,904	0.2	892	0	\$101	\$526	\$210	3.1
Office 520	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,932	3	Relamp	No	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.2	526	0	\$60	\$274	\$150	2.1
Office Area 512 - Small hallway	1	LED - Fixtures: 40W Hard Ceiling LED Fixture	Wall Switch	S	40	2,760		None	No	1	LED - Fixtures: 40W Hard Ceiling LED Fixture	Wall Switch	40	2,760	0.0	0	0	\$0	\$0	\$0	0.0
Office Area 512 - 512 office area	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,760	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,904	0.1	574	0	\$65	\$434	\$160	4.2
Office Area 512 - Office 516	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,760	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,904	0.1	382	0	\$43	\$226	\$100	2.9
Office Area 512 - Office 513	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,760	3, 4	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,904	0.1	449	0	\$51	\$262	\$120	2.8
Office Area 512 - Office 517	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,760	3, 4	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,904	0.2	898	0	\$102	\$562	\$230	3.3
Office Area 514	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,760	3, 4	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,904	0.2	674	0	\$76	\$489	\$190	3.9
Office Area 514	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,760	3, 4	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,904	0.2	674	0	\$76	\$489	\$190	3.9
Prep room 2 Wing 600	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.1	281	0	\$32	\$146	\$80	2.1
Prep room 3 Wing 600	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.1	421	0	\$48	\$219	\$120	2.1
Prep room 4 Wing 600	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.1	421	0	\$48	\$219	\$120	2.1
Prep room 5 Wing 600	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.1	421	0	\$48	\$219	\$120	2.1
Prep room Wing 600	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	S	88	968	2, 4	Relamp & Reballast	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	668	0.2	332	0	\$38	\$472	\$40	11.5
Prep room Wing 600	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.1	421	0	\$48	\$219	\$120	2.1
Principal Office - Wing 600 - Conf room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	968	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	668	0.1	179	0	\$20	\$416	\$150	13.1
Principal Office - Wing 600 - Office 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	968	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	668	0.1	89	0	\$10	\$189	\$40	14.7
Principal Office - Wing 600 - Office 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	968	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	668	0.1	89	0	\$10	\$189	\$40	14.7
Principal Office - Wing 600 - Office 3	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	968	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	668	0.1	89	0	\$10	\$189	\$40	14.7

Location	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis								
	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
Principal Office - Wing 600 - Open area	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	968	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	668	0.1	179	0	\$20	\$416	\$150	13.1
Restroom 1 wing 100	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,760	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,760	0.0	100	0	\$11	\$37	\$20	1.5
Restroom 1 wing 200	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	2,760	3, 4	Relamp	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,904	0.0	200	0	\$23	\$171	\$30	6.2
Restroom 1 wing 300	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,760	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,904	0.1	255	0	\$29	\$189	\$40	5.2
Restroom 1 wing 400	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	2,760	3, 4	Relamp	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,904	0.0	134	0	\$15	\$153	\$20	8.8
Restroom 1 Wing 500	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,760	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,904	0.1	255	0	\$29	\$189	\$40	5.2
Restroom 1 Wing 600	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	968	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	668	0.1	89	0	\$10	\$189	\$40	14.7
Restroom 2 Wing 100	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,760	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,760	0.0	100	0	\$11	\$37	\$20	1.5
Restroom 2 wing 200	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	2,760	3, 4	Relamp	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,904	0.0	200	0	\$23	\$171	\$30	6.2
Restroom 2 wing 400	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,760	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,904	0.1	255	0	\$29	\$189	\$40	5.2
Restroom 2 Wing 500	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,760	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,904	0.1	255	0	\$29	\$189	\$40	5.2
Restroom 2 Wing 600	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	968	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	668	0.1	89	0	\$10	\$189	\$40	14.7
Restroom 3 Wing 500	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.0	70	0	\$8	\$37	\$20	2.1
Restroom 4 Wing 500	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	968	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	968	0.0	35	0	\$4	\$37	\$20	4.1
Room 213	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,932	3	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.0	74	0	\$8	\$37	\$20	2.0
Room 213 - Room 214	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	2,760	3, 4	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,904	0.1	267	0	\$30	\$343	\$40	10.0
Room 213	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,760	3, 4	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,904	0.2	765	0	\$87	\$489	\$190	3.5
Room 213 - Room 216	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,760	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,904	0.1	382	0	\$43	\$226	\$100	2.9
Room 213 - Room 215	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	968	3, 4	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	668	0.1	158	0	\$18	\$262	\$120	8.0
Storage - 125	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,760	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,904	0.2	765	0	\$87	\$489	\$120	4.3
Storage / Elevator Wing 500	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,444	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,444	0.0	125	0	\$14	\$37	\$20	1.2
Storage - Stage craft	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,760	3	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,760	0.1	501	0	\$57	\$183	\$100	1.5
Storage - Wing 100 (Band)	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Storage - Wing 100 (Band)	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,760	3, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,904	0.4	1,530	0	\$173	\$708	\$240	2.7
Storage wing 200	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,932	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.0	105	0	\$12	\$55	\$30	2.1

Location	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis								
	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
Studio near 309	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Studio near 309	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	968	3, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	668	0.4	537	0	\$61	\$708	\$310	6.6
Weight room	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Weight room - Main area	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.0	140	0	\$16	\$73	\$40	2.1
Weight room - Weight room bathroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,932	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.0	70	0	\$8	\$37	\$20	2.1
Weight room - Main area	18	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,932	3	Relamp	No	18	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.6	1,894	0	\$215	\$986	\$540	2.1

Motor Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions							Proposed Conditions				Energy Impact & Financial Analysis							
		Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	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
Mechanical room	Air Compressor	2	Air Compressor	7.5	91.0%	No	W	913		No	91.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Kitchen hood EFs	1	Kitchen Hood Exhaust Fan	1.0	85.5%	No	W	1,188	7	No	85.5%	Yes	1	0.0	1,053	21	\$338	\$3,010	\$150	8.5
Roof	Kitchen Area EF	1	Exhaust Fan	0.5	78.2%	No	W	2,745		No	78.2%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Large EF	11	Exhaust Fan	0.5	78.2%	No	W	2,745		No	78.2%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Main (New Gym) exhaust fans	2	Exhaust Fan	2.0	86.5%	Yes	W	2,886		No	86.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Medium EF	11	Exhaust Fan	0.3	73.4%	No	W	2,745		No	73.4%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Small EF	11	Exhaust Fan	0.2	60.0%	No	W	2,745		No	60.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Mechanical room	HHW Pumps 1 & 2	2	Heating Hot Water Pump	10.0	91.7%	Yes	W	3,569		No	91.7%	No		0.0	0	0	\$0	\$0	\$0	0.0
Mechanical room	HHW pumps 3 & 4	2	Heating Hot Water Pump	5.0	89.5%	Yes	W	3,569		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Mechanical room	Hot water supply (small pumps)	4	Heating Hot Water Pump	0.8	81.1%	No	W	3,569		No	81.1%	No		0.0	0	0	\$0	\$0	\$0	0.0
Mechanical room	DHW circulation pump	1	DHW Circulation Pump	0.2	60.0%	No	W	8,760		No	60.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Main Gymnasium (New)	Main gym AHU 53B	2	Supply Fan	7.2	91.0%	Yes	W	2,653		No	91.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Main Gymnasium (New)	New gym AHU 53A	2	Supply Fan	7.2	91.0%	Yes	W	2,653		No	91.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Auxiliary (Old) Gym AHU	1	Supply Fan	5.0	89.5%	No	W	2,653	6	No	89.5%	Yes	1	1.4	4,146	0	\$479	\$4,076	\$1,800	4.8
Roof	DOAS 15 - Corridor	1	Supply Fan	1.0	85.5%	No	W	2,411		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	DOAS 16 - Corridor 500	1	Supply Fan	1.0	85.5%	No	W	2,411		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Energy Recovery Ventilator 1	1	Supply Fan	2.0	86.5%	No	W	2,745		No	86.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Energy Recovery Ventilator 1	1	Exhaust Fan	2.0	86.5%	No	W	2,745		No	86.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Energy Recovery Ventilator 1	1	Other	0.3	73.4%	No	W	2,745		No	73.4%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Energy Recovery Ventilator 2	1	Supply Fan	2.0	86.5%	No	W	2,745		No	86.5%	No		0.0	0	0	\$0	\$0	\$0	0.0

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Roof	Energy Recovery Ventilator 2	1	Exhaust Fan	2.0	86.5%	No	W	2,745		No	86.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Energy Recovery Ventilator 2	1	Other	0.3	73.4%	No	W	2,745		No	73.4%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU #1 Cafeteria	1	Supply Fan	5.0	89.5%	Yes	W	3,000		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU #1 Cafeteria	2	Combustion Air Fan	0.3	66.6%	No	W	2,745		No	66.6%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU #1 Cafeteria	2	Combustion Air Fan	0.3	66.6%	No	W	2,745		No	66.6%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 45-classrooms	1	Supply Fan	3.0	89.5%	Yes	W	3,000		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 45-classrooms	1	Other	0.1	62.2%	No	W	2,745		No	62.2%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 45-classrooms	1	Combustion Air Fan	0.1	66.6%	No	W	2,745		No	66.6%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU #1	1	Supply Fan	3.0	89.5%	Yes	W	3,000		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU #1	1	Exhaust Fan	1.0	85.5%	Yes	W	3,000		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU #1	1	Combustion Air Fan	0.3	66.6%	No	W	2,745		No	66.6%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	General Office	1	Supply Fan	5.0	89.5%	Yes	W	3,060		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	General Office	1	Exhaust Fan	2.0	86.5%	Yes	W	3,060		No	86.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	General Office	1	Combustion Air Fan	0.1	66.6%	No	W	2,745		No	66.6%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 43B Student Services	1	Supply Fan	5.0	89.5%	Yes	W	3,000		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 43B Student Services	1	Exhaust Fan	2.0	86.5%	Yes	W	3,000		No	86.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 43B Student Services	1	Combustion Air Fan	0.1	66.6%	No	W	2,745		No	66.6%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 40 Dance room	1	Supply Fan	2.0	86.5%	Yes	W	3,000		No	86.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 40 Dance room	1	Exhaust Fan	1.0	85.5%	Yes	W	3,000		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 40 Dance room	1	Combustion Air Fan	0.1	66.6%	No	W	2,745		No	66.6%	No		0.0	0	0	\$0	\$0	\$0	0.0

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Roof	RTU 39 wood working	1	Supply Fan	2.0	86.5%	Yes	W	3,000		No	86.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 39 wood working	1	Exhaust Fan	1.0	85.5%	Yes	W	3,000		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 39 wood working	1	Combustion Air Fan	0.1	66.6%	No	W	2,745		No	66.6%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Marine biology room	1	Supply Fan	5.0	89.5%	Yes	W	3,000		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Marine biology room	1	Exhaust Fan	2.0	86.5%	Yes	W	3,000		No	86.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Marine biology room	1	Combustion Air Fan	0.3	66.6%	No	W	2,745		No	66.6%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU-1	1	Supply Fan	3.0	89.5%	Yes	W	3,000		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU-1	1	Exhaust Fan	1.0	85.5%	Yes	W	3,000		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU-1	1	Combustion Air Fan	0.3	66.6%	No	W	2,745		No	66.6%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 46- Science rooms	1	Supply Fan	10.0	91.7%	Yes	W	3,000		No	91.7%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 46- Science rooms	1	Exhaust Fan	7.5	91.0%	Yes	W	3,000		No	91.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 46- Science rooms	1	Combustion Air Fan	0.1	62.2%	No	W	2,745		No	62.2%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Principal office 600s	1	Supply Fan	3.0	89.5%	Yes	W	3,060		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 48- Classes near principal office	1	Supply Fan	5.0	89.5%	Yes	W	3,060		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 48- Classes near principal office	1	Exhaust Fan	3.0	89.5%	Yes	W	3,060		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 48- Classes near principal office	1	Combustion Air Fan	0.1	66.6%	No	W	2,745		No	66.6%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 48- Classes near principal office	1	Other	0.1	62.2%	No	W	2,745		No	62.2%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 50 Class 507	1	Supply Fan	1.0	85.5%	Yes	W	3,000		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 50 Class 508	1	Exhaust Fan	1.0	85.5%	Yes	W	3,000		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 50 Class 509	1	Combustion Air Fan	0.1	66.6%	No	W	2,745		No	66.6%	No		0.0	0	0	\$0	\$0	\$0	0.0

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Roof	RTU 49 offices 510-517	1	Supply Fan	2.0	86.5%	Yes	W	3,060		No	86.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 49 offices 510-517	1	Exhaust Fan	1.0	85.5%	Yes	W	3,060		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 49 offices 510-517	1	Combustion Air Fan	0.1	66.6%	No	W	2,745		No	66.6%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 51 Clrm 505	1	Supply Fan	2.0	86.5%	Yes	W	3,000		No	86.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 51 Clrm 505	1	Exhaust Fan	1.0	85.5%	Yes	W	3,000		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 51 Clrm 505	1	Combustion Air Fan	0.1	66.6%	No	W	2,745		No	66.6%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 51 Clrm 505	1	Other	0.1	62.2%	No	W	2,745		No	62.2%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 52 Cl rm. 503	1	Supply Fan	2.0	86.5%	Yes	W	3,000		No	86.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 52 Cl rm. 503	1	Exhaust Fan	1.0	85.5%	Yes	W	3,000		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 52 Cl rm. 503	1	Combustion Air Fan	0.1	66.6%	No	W	2,745		No	66.6%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 52 Cl rm. 503	1	Other	0.1	62.2%	No	W	2,745		No	62.2%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Auditorium RTU -41	2	Supply Fan	10.0	91.7%	Yes	W	3,000		No	91.7%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Auditorium RTU -41	2	Exhaust Fan	7.5	91.0%	Yes	W	3,000		No	91.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Auditorium RTU -41	1	Combustion Air Fan	0.2	66.6%	No	W	2,745		No	66.6%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Auditorium RTU -41	2	Other	0.3	62.2%	No	W	2,745		No	62.2%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Auditorium RTU -41	2	Other	0.3	66.6%	No	W	2,745		No	66.6%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 4	1	Supply Fan	5.0	89.5%	Yes	W	3,000		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 4	1	Exhaust Fan	5.0	89.5%	Yes	W	3,000		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 4	1	Combustion Air Fan	0.3	66.6%	No	W	2,745		No	66.6%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Unknown RTU	1	Supply Fan	5.0	89.5%	Yes	W	3,000		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0

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Roof	Unknown RTU	1	Exhaust Fan	2.0	86.5%	Yes	W	3,000		No	86.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Unknown RTU	1	Combustion Air Fan	0.3	66.6%	No	W	2,745		No	66.6%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 6 Media Center	1	Supply Fan	7.5	91.0%	Yes	W	3,000		No	91.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 6 Media Center	1	Exhaust Fan	10.0	91.7%	Yes	W	3,000		No	91.7%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 6 Media Center	1	Combustion Air Fan	0.3	66.6%	No	W	2,745		No	66.6%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 7 - Control Room	1	Supply Fan	2.0	86.5%	Yes	W	3,000		No	86.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Lennox Corridor Unit	1	Supply Fan	0.5	78.2%	No	W	3,000		No	78.2%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Lennox Corridor Unit	1	Exhaust Fan	0.8	81.1%	No	W	3,000		No	81.1%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Trane Unit for IT Eqp. Room	1	Supply Fan	3.0	89.5%	No	W	3,000		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Trane Unit for IT Eqp. Room	1	Exhaust Fan	1.0	85.5%	No	W	3,000		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Ground Level Near Weight Room	Weight Room Packaged Unit	1	Supply Fan	3.0	89.5%	No	W	3,000	6	No	89.5%	Yes	1	0.9	2,813	0	\$325	\$3,884	\$400	10.7
Roof	DOAS 15 - Corridor	1	Combustion Air Fan	0.1	66.6%	No	W	2,745		No	66.6%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 201	Unit Ventilator	1	Supply Fan	1.0	85.5%	No	W	2,411		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 204	Unit Ventilator	1	Supply Fan	1.0	85.5%	No	W	2,411		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 203	Unit Ventilator	1	Supply Fan	1.0	85.5%	No	W	2,411		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 205	Unit Ventilator	1	Supply Fan	1.0	85.5%	No	W	2,411		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 207	Unit Ventilator	1	Supply Fan	1.0	85.5%	No	W	2,411		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 209	Unit Ventilator	1	Supply Fan	1.0	85.5%	No	W	2,411		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 211	Unit Ventilator	1	Supply Fan	1.0	85.5%	No	W	2,411		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Room 213	Unit Ventilator	1	Supply Fan	1.0	85.5%	No	W	2,411		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0

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Classroom 400	Unit Ventilator	1	Supply Fan	1.0	85.5%	No	W	2,411		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 401	Unit Ventilator	1	Supply Fan	1.0	85.5%	No	W	2,411		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 402	Unit Ventilator	1	Supply Fan	1.0	85.5%	No	W	2,411		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 404	Unit Ventilator	1	Supply Fan	1.0	85.5%	No	W	2,411		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 403	Unit Ventilator	1	Supply Fan	1.0	85.5%	No	W	2,411		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 406	Unit Ventilator	1	Supply Fan	1.0	85.5%	No	W	2,411		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 405	Unit Ventilator	1	Supply Fan	1.0	85.5%	No	W	2,411		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 408	Unit Ventilator	1	Supply Fan	1.0	85.5%	No	W	2,411		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 407	Unit Ventilator	1	Supply Fan	1.0	85.5%	No	W	2,411		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 409	Unit Ventilator	1	Supply Fan	1.0	85.5%	No	W	2,411		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 414	Unit Ventilator	1	Supply Fan	1.0	85.5%	No	W	2,411		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 411	Unit Ventilator	1	Supply Fan	1.0	85.5%	No	W	2,411		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 416	Unit Ventilator	1	Supply Fan	0.5	78.2%	No	W	2,411		No	78.2%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 413	Unit Ventilator	1	Supply Fan	0.5	78.2%	No	W	2,411		No	78.2%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 418	Unit Ventilator	1	Supply Fan	0.5	78.2%	No	W	2,411		No	78.2%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 415	Unit Ventilator	1	Supply Fan	0.5	78.2%	No	W	2,411		No	78.2%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 420	Unit Ventilator	1	Supply Fan	0.5	78.2%	No	W	2,411		No	78.2%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 417	Unit Ventilator	1	Supply Fan	0.5	78.2%	No	W	2,411		No	78.2%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 422	Unit Ventilator	1	Supply Fan	0.5	78.2%	No	W	2,411		No	78.2%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classroom 502	Unit Ventilator	1	Supply Fan	0.5	78.2%	No	W	2,411		No	78.2%	No		0.0	0	0	\$0	\$0	\$0	0.0

Electric HVAC Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions					Proposed Conditions								Energy Impact & Financial Analysis						
		System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (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	Child study team rooms 200	1	Split-System AC	3.00		N		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	For office area with AHU in ceiling	1	Split-System AC	3.00		B	8	Yes	1	Split-System AC	3.00		14.00	0.5	446	0	\$51	\$4,489	\$552	76.5	
Roof	CU - 53 Gymnasium	1	Split-System AC	20.00		N		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	CU 53A Gymnasium	1	Split-System AC	20.00		N		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Closet for pottery room	1	Split-System AC	2.00		B	8	Yes	1	Split-System AC	2.00		14.00	0.3	297	0	\$34	\$2,992	\$368	76.5	
Roof	Condensing unit near library	1	Split-System AC	0.00		B		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Possibly decommissioned	1	Split-System AC	3.00		B		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Office - 412	1	Ductless Mini-Split AC	1.00		B	8	Yes	1	Split-System AC	1.00		14.00	0.2	149	0	\$17	\$1,496	\$184	76.5	
Roof	Book Storage 410	1	Ductless Mini-Split AC	1.00		B	8	Yes	1	Split-System AC	1.00		14.00	0.2	149	0	\$17	\$1,496	\$184	76.5	
Roof	Book Storage 419	1	Ductless Mini-Split AC	1.00		B	8	Yes	1	Split-System AC	1.00		14.00	0.2	149	0	\$17	\$1,496	\$184	76.5	
Office Area 512	Office 512	1	Electric Resistance Heat		3.41	W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Office Area 514	Office 514	2	Electric Resistance Heat		3.41	W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Classrooms	1	Ductless Mini-Split AC	0.81		W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	DOAS 15 - Corridor	1	Packaged AC	8.00		N		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	DOAS 16 - Corridor 500	1	Packaged AC	4.00		N		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	RTU #1 Cafeteria	1	Packaged AC	40.00		N		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	RTU 45- classrooms	1	Packaged AC	10.00		N		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	RTU #1	1	Packaged AC	11.00		N		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	General office	1	Packaged AC	11.00		N		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	RTU 43B Student services	1	Packaged AC	11.00		N		No						0.0	0	0	\$0	\$0	\$0	0.0	

Location	Area(s)/System(s) Served	Existing Conditions					Proposed Conditions								Energy Impact & Financial Analysis						
		System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	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	RTU 40 Dance room	1	Packaged AC	11.00		N		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	RTU 39 wood working	1	Packaged AC	13.00		N		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Marine biology room	1	Packaged AC	13.00		B	8	Yes	1	Packaged AC	13.00		11.50	1.9	1,771	0	\$204	\$18,120	\$2,054	78.6	
Roof	RTU 1	1	Packaged AC	20.00		B		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	RTU 46- Science rooms	1	Packaged AC	18.00		N		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Principal office 600s	1	Packaged AC	5.00		B	8	Yes	1	Packaged AC	5.00		14.00	0.9	864	0	\$100	\$11,345	\$920	104.5	
Roof	RTU 48- Classes near principal office	1	Packaged AC	13.00		N		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	RTU 50 Class 507	1	Packaged AC	4.00		N		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	RTU 49 offices 510-517	1	Packaged AC	5.00		N		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	RTU 51 Clrm 505	1	Packaged AC	5.00		N		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	RTU 52 Cl rm. 503	1	Packaged AC	5.00		N		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Auditorium RTU -41	1	Packaged AC	50.00		N		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	RTU 4- Rm B0-B2	1	Packaged AC	20.00		B		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	31 ton unit	1	Packaged AC	31.00		B		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	RTU 6	1	Packaged AC	25.00		B	8	Yes	1	Packaged AC	25.00		11.00	3.0	2,822	0	\$326	\$42,185	\$3,950	117.4	
Roof	RTU 7	1	Packaged AC	5.00		B	8	Yes	1	Packaged AC	5.00		14.00	1.5	1,374	0	\$159	\$11,345	\$920	65.7	
Roof	Corridor	1	Packaged AC	3.00		B		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	For big network eqp room near library	1	Packaged AC	5.00		B		No						0.0	0	0	\$0	\$0	\$0	0.0	
Weight room	HVAC -1 (For weight room)	1	Split-System Air-Source HP	7.50	90.00	W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Nurse office ASHP 1	1	Split-System Air-Source HP	0.93	14.00	N		No						0.0	0	0	\$0	\$0	\$0	0.0	

Location	Area(s)/System(s) Served	Existing Conditions					Proposed Conditions								Energy Impact & Financial Analysis						
		System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	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	Nurse Office ASHP 2	1	Split-System Air-Source HP	0.93	14.00	N		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Copy room ASHP	1	Split-System Air-Source HP	0.93	14.00			No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Dance studio office	1	Split-System Air-Source HP	0.75	10.90	N		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Wood workshop office	1	Split-System Air-Source HP	0.75	10.90	N		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Auditorium sound booth	1	Split-System Air-Source HP	0.75	10.90	N		No						0.0	0	0	\$0	\$0	\$0	0.0	
Office - Main office and its rooms	Copy room 101	1	Window AC	1.29		W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Classroom 119 - Band Room	Classroom 119 - Band Room	1	Window AC	2.33		W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Classroom 120	Classroom 120	1	Window AC	1.29		W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Classroom 121- instrumental Room	Classroom 121- instrumental Room	1	Window AC	2.33		W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Classroom 123	Classroom 123	1	Window AC	1.29		W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Classrooms	Unit Ventilators	20	Packaged AC	3.00		N		No						0.0	0	0	\$0	\$0	\$0	0.0	
Classrooms	Unit Ventilators	21	Packaged AC	4.00		N		No						0.0	0	0	\$0	\$0	\$0	0.0	
Weight room	HVAC -1 (For weight room)	1	Electric Resistance Heat		84.78	W		No						0.0	0	0	\$0	\$0	\$0	0.0	

Fuel Heating Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions				Proposed Conditions							Energy Impact & Financial Analysis						
		System Quantity	System Type	Output Capacity per Unit (MBh)	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
Mechanical Room	HHW system	1	Condensing Hot Water Boiler	2,335	W		No						0.0	0	0	\$0	\$0	\$0	0.0
Mechanical Room	HHW system	1	Condensing Hot Water Boiler	2,335	W		No						0.0	0	0	\$0	\$0	\$0	0.0
Mechanical Room	HHW system	1	Condensing Hot Water Boiler	2,335	W		No						0.0	0	0	\$0	\$0	\$0	0.0
Mechanical Room	HHW system	1	Condensing Hot Water Boiler	2,335	W		No						0.0	0	0	\$0	\$0	\$0	0.0
Roof	DOAS 15 - Corridor	1	Furnace	120	N		No						0.0	0	0	\$0	\$0	\$0	0.0
Roof	DOAS 16 - Corridor 500	1	Furnace	81	N		No						0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU #1 Cafeteria	1	Furnace	864	N		No						0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 45- classrooms	1	Furnace	73	N		No						0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU #1	1	Furnace	219	N		No						0.0	0	0	\$0	\$0	\$0	0.0
Roof	General office	1	Furnace	156	N		No						0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 43B Student services	1	Furnace	156	N		No						0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 40 Dance room	1	Furnace	156	N		No						0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 39 wood working	1	Furnace	234	N		No						0.0	0	0	\$0	\$0	\$0	0.0
Roof	Marine biology room	1	Furnace	219	B	9	Yes	1	Furnace	219	82.00%	AFUE	0.0	0	6	\$60	\$4,962	\$800	69.1
Roof	RTU 1	1	Furnace	219	B	9	Yes	1	Furnace	219	82.00%	AFUE	0.0	0	6	\$60	\$4,962	\$800	69.1
Roof	RTU 46- Science rooms	1	Furnace	219	N		No						0.0	0	0	\$0	\$0	\$0	0.0
Roof	Classes near principal office	1	Furnace	156	N		No						0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 50 Class 507	1	Furnace	81	N		No						0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 49 offices 510-517	1	Furnace	81	N		No						0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 51 Clrm 505	1	Furnace	81	N		No						0.0	0	0	\$0	\$0	\$0	0.0

		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
Roof	RTU 52 Cl rm. 503	1	Furnace	81	N		No						0.0	0	0	\$0	\$0	\$0	0.0
Roof	Auditorium RTU -41	1	Furnace	648	N		No						0.0	0	0	\$0	\$0	\$0	0.0
Roof	RTU 4- Rm B0-B2	1	Furnace	219	B	9	Yes	1	Furnace	219	82.00%	AFUE	0.0	0	6	\$60	\$4,962	\$800	69.1
Roof	31 ton Unit	1	Furnace	432	B	9	Yes	1	Furnace	432	82.00%	AFUE	0.0	0	15	\$154	\$9,788	\$800	58.4
Roof	RTU 6	1	Furnace	389	B	9	Yes	1	Furnace	389	82.00%	AFUE	0.0	0	11	\$109	\$8,814	\$800	73.5

Demand Control Ventilation Recommendations

		Recommendation Inputs					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	ECM #	Number of Zones	Cooling Capacity of Controlled System (Tons)	Electric Heating Capacity of Controlled System (kBtu/hr)	Output Heating Capacity of Controlled System (MBh)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Gymnasium	Gymnasium	10	2.00	40.00	0.00	934.00	0.0	1,143	28	\$417	\$2,719	\$0	6.5
Cafeteria	Cafeteria	10	2.00	40.00	0.00	864.00	0.0	1,098	24	\$372	\$2,719	\$0	7.3
Auditorium	Auditorium	10	2.00	50.00	0.00	648.00	0.0	1,297	18	\$334	\$2,719	\$0	8.1

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
Mechanical Room	DHW System	2	Storage Tank Water Heater (> 50 Gal)	N		No						0.0	0	0	\$0	\$0	\$0	0.0

Low-Flow Device Recommendations

Location	Recommendation Inputs					Energy Impact & Financial Analysis						
	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
Main Office	11	1	Faucet Aerator (Kitchen)	2.00	1.50	0.0	0	0	\$1	\$7	\$4	2.2
Classrooms, Kitchen	11	17	Faucet Aerator (Kitchen)	2.50	1.50	0.0	0	5	\$49	\$122	\$68	1.1

Reach-In Cooler/Freezer Inventory & Recommendations

Location	Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
	Cooler/Freezer Quantity	Case Type/Temperature	ECM #	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Energy Efficient Doors?	Install Door Heater Control?	Install Aluminum Night Covers?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	2	Cooler (35F to 55F)	12	Yes	No	No	No	No	0.0	222	0	\$26	\$303	\$80	8.7

Walk-In Cooler/Freezer Inventory & Recommendations

Location	Existing Conditions		Proposed Conditions				Energy Impact & Financial Analysis						
	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
Maintenance office/storage Area	1	Cooler (35F to 55F)	12, 13	Yes	No	Yes	0.1	1,762	0	\$203	\$2,281	\$310	9.7
Maintenance office/storage Area	1	Low Temp Freezer (-35F to -5F)	12, 13	Yes	No	Yes	0.1	2,007	0	\$232	\$2,281	\$310	8.5
Maintenance office/storage Area	1	Low Temp Freezer (-35F to -5F)	12, 13	Yes	No	Yes	0.1	2,007	0	\$232	\$2,281	\$310	8.5
Maintenance office/storage Area	1	Medium Temp Freezer (0F to 30F)	12, 13	Yes	No	Yes	0.1	1,161	0	\$134	\$1,977	\$230	13.0

Commercial Refrigerator/Freezer Inventory & Recommendations

Location	Existing Conditions			Proposed Conditions		Energy Impact & Financial Analysis						
	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	Freezer Chest	No	14	Yes	0.4	3,201	0	\$370	\$1,950	\$0	5.3
Kitchen	5	Refrigerator Chest	No	14	Yes	0.6	5,119	0	\$591	\$7,010	\$0	11.9
Kitchen	1	Stand-Up Refrigerator, Glass Door (31 - 50 cu. ft.)	Yes		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Yes		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	No		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Yes		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	No		No	0.0	0	0	\$0	\$0	\$0	0.0

Commercial Ice Maker Inventory & Recommendations

Location	Existing Conditions			Proposed Conditions		Energy Impact & Financial Analysis						
	Quantity	Ice Maker 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
Office 509	1	Self-Contained Unit (<175 lbs/day), Batch	No		No	0.0	0	0	\$0	\$0	\$0	0.0
Office 510	1	Self-Contained Unit (<175 lbs/day), Batch	No		No	0.0	0	0	\$0	\$0	\$0	0.0
Office 520	1	Self-Contained Unit (<175 lbs/day), Batch	No		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	1	Self-Contained Unit (≥175 lbs/day), Batch	No		No	0.0	0	0	\$0	\$0	\$0	0.0

Cooking Equipment Inventory & Recommendations

Existing Conditions				Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	High Efficiency Equipment?	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	Gas Combination Oven/Steam Cooker (<15 Pans)	No		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	1	Gas Convection Oven (Full Size)	No		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	4	Electric Convection Oven (Half Size)	No		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	1	Gas Convection Oven (Half Size)	No		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	1	Gas Conveyor Oven (<25")	No		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	1	Electric Griddle (≤2 Feet Width)	No		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	1	Insulated Food Holding Cabinet (Full Size)	No		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	2	Electric Steamer	No		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	2	Electric Steamer	No		No	0.0	0	0	\$0	\$0	\$0	0.0

Plug Load Inventory

Existing Conditions				
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified ?
Home Economics	1	Clothes Dryer	1,600	No
Home Economics	1	Clothes Washer	900	No
Library / Main Office	2	Coffee Machine	400	No
Classroom / Kitchen / Library / Offices	267	Desktop Computer	22	Yes
Classrooms / Offices	444	Laptop Computer	10	Yes
Home Economics	2	Dishwasher (Undercounter)	1,500	No
Classroom / Kitchen/ Storage area	12	Fan (Portable)	50	No
Classroom 503 / 507	4	Kiln	11,000	No
Classrooms / Libray / Locker Room - Boys/Girls	9	Microwave	1,200	No
Wood Workshop	6	Power Tools	500	No
Nurse office / Main Office / Principal Office	3	Paper Shredder	900	No
Classrooms / Nurse office	13	Printer (Medium/Small)	50	No
Calssrooms / Offices	7	Printer/Copier (Large)	550	Yes
Classrooms	61	Projector	200	No
Classroom / Offices	7	Refrigerator (Mini)	100	Yes
Home Economics / Library/ Offices	8	Refrigerator (Residential)	600	No
Kitchen	4	Serving Table (Chilled)	750	No
Kitchen	3	Serving Table (Heated)	2,500	No
Classrooms	8	Television	120	No
Principal Office	1	Toaster	800	No
Library	1	Toaster Oven	1,200	No

Vending Machine Inventory & Recommendations

Location	Existing Conditions		Proposed Conditions		Energy Impact & Financial Analysis						
	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
Cafeteria	1	Non-Refrigerated	15	Yes	0.0	343	0	\$40	\$230	\$0	5.8
Cafeteria	1	Refrigerated	15	Yes	0.2	1,612	0	\$186	\$230	\$100	0.7

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

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ENERGY STAR® Score¹

Matawan Regional High School

Primary Property Type: K-12 School
 Gross Floor Area (ft²): 153,914
 Built: 1982

For Year Ending: June 30, 2020
 Date Generated: September 01, 2020

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

Property & Contact Information		
Property Address Matawan Regional High School 450 Atlantic Avenue Aberdeen, New Jersey 07747	Property Owner Matawan-Aberdeen Regional School District One Crest Way Aberdeen, NJ 07747 (732) 705-4016	Primary Contact Adam Nasr One Crest Way Aberdeen, NJ 07747 (732) 705-4013 anasr@marsd.k12.nj.us
Property ID: 3760961		

Energy Consumption and Energy Use Intensity (EUI)				
Site EUI 86.7 kBtu/ft ²	Annual Energy by Fuel		National Median Comparison	
	Natural Gas (kBtu)	8,595,838 (64%)		National Median Site EUI (kBtu/ft ²)
	Electric - Grid (kBtu)	4,743,480 (36%)	National Median Source EUI (kBtu/ft ²)	143.3
Source EUI 144.9 kBtu/ft ²			% Diff from National Median Source EUI	1%
			Annual Emissions	
			Greenhouse Gas Emissions (Metric Tons CO2e/year)	911

Signature & Stamp of Verifying Professional

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

LP Signature: _____ Date: _____

Licensed Professional

 () _____



Professional Engineer or Registered Architect Stamp (If applicable)

APPENDIX C: GLOSSARY

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

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

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