Local Government Energy Audit Report

Strathmore Elementary School

November 4, 2020

Prepared for:

Matawan Aberdeen Regional School District
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Prepared by:

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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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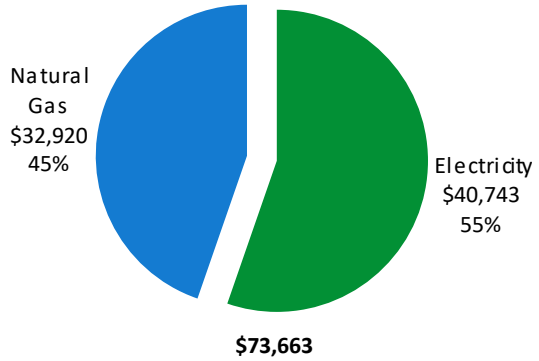
1 EXECUTIVE SUMMARY

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

BUILDING PERFORMANCE REPORT

Annual Utilities	Costs: $73,663 Electricity: 336,358 kWh Natural Gas: 30,285 Therms	
ENERGY STAR® Benchmarking Score	70 *(1-100 scale)*	Congratulations, your building performs better than the national average. This report has suggestions about how to keep your building running efficiently, further improve performance and lower your energy bills even more.

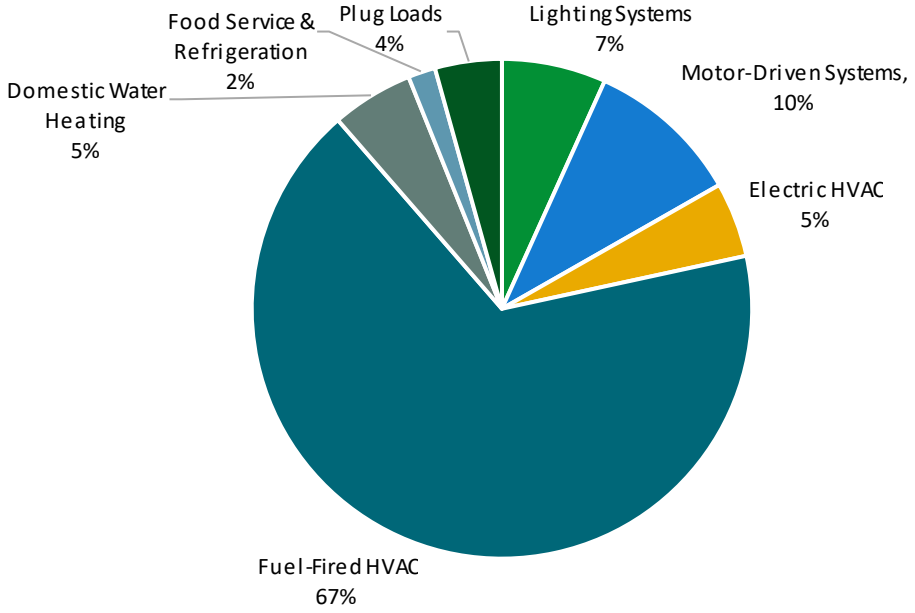


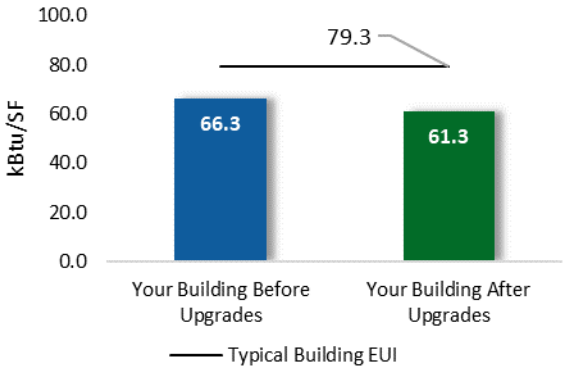
Figure 1 - Energy Use by System

POTENTIAL IMPROVEMENTS

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

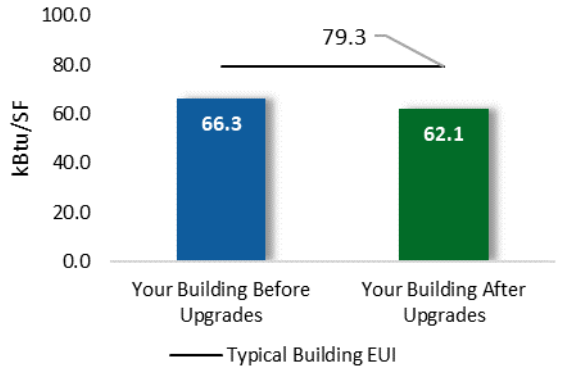
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$62,728
Potential Rebates & Incentives[1]	$21,582
Annual Cost Savings	$10,160
Annual Energy Savings	Electricity: 80,155 kWh Natural Gas: 414 Therms
Greenhouse Gas Emission Savings	43 Tons
Simple Payback	4.0 Years
Site Energy Savings (all utilities)	8%



Scenario 2: Cost Effective Package[2]

Installation Cost	$50,007
Potential Rebates & Incentives	$21,056
Annual Cost Savings	$9,266
Annual Energy Savings	Electricity: 75,987 kWh
Greenhouse Gas Emission Savings	39 Tons
Simple Payback	3.1 Years
Site Energy Savings (all utilities)	6%



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_2e Emissions Reduction (lbs)
Lighting Upgrades			**42,362**	**15.4**	**-9**	**$5,035**	**$22,871**	**$12,146**	**$10,725**	**2.1**	**41,621**
ECM 1	Retrofit Fixtures with LED Lamps	Yes	42,362	15.4	-9	$5,035	$22,871	$12,146	$10,725	2.1	41,621
Lighting Control Measures			**4,572**	**1.2**	**-1**	**$543**	**$5,703**	**$1,260**	**$4,443**	**8.2**	**4,492**
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	4,527	1.2	-1	$538	$5,478	$1,260	$4,218	7.8	4,448
ECM 3	Install High/Low Lighting Controls	No	45	0.0	0	$5	$225	$0	$225	42.4	44
Variable Frequency Drive (VFD) Measures			**19,857**	**6.5**	**0**	**$2,405**	**$16,967**	**$7,400**	**$9,567**	**4.0**	**19,996**
ECM 4	Install VFDs on Constant Volume (CV) Fans	Yes	19,857	6.5	0	$2,405	$16,967	$7,400	$9,567	4.0	19,996
HVAC System Improvements			**4,124**	**0.0**	**35**	**$883**	**$8,353**	**$136**	**$8,217**	**9.3**	**8,284**
ECM 5	Implement Demand Control Ventilation (DCV)	No	4,124	0.0	20	$721	$8,157	$0	$8,157	11.3	6,536
ECM 6	Install Pipe Insulation	Yes	0	0.0	15	$162	$196	$136	$60	0.4	1,747
Domestic Water Heating Upgrade			**0**	**0.0**	**16**	**$174**	**$4,354**	**$540**	**$3,814**	**22.0**	**1,870**
ECM 7	Install High Efficiency Gas-Fired Water Heater	No	0	0.0	15	$168	$4,340	$526	$3,814	22.8	1,804
ECM 8	Install Low-Flow DHW Devices	Yes	0	0.0	1	$6	$14	$14	$0	0.0	65
Food Service & Refrigeration Measures			**9,240**	**1.1**	**0**	**$1,119**	**$4,480**	**$100**	**$4,380**	**3.9**	**9,305**
ECM 9	Replace Refrigeration Equipment	Yes	7,629	0.9	0	$924	$4,250	$0	$4,250	4.6	7,682
ECM 10	Vending Machine Control	Yes	1,612	0.2	0	$195	$230	$100	$130	0.7	1,623
TOTALS (COST EFFECTIVE MEASURES)			**75,987**	**24.1**	**6**	**$9,266**	**$50,007**	**$21,056**	**$28,950**	**3.1**	**77,183**
TOTALS (ALL MEASURES)			**80,155**	**24.2**	**41**	**$10,160**	**$62,728**	**$21,582**	**$41,146**	**4.0**	**85,567**

* - 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	Retrofit Fixtures with LED Lamps	X	X	
ECM 2	Install Occupancy Sensor Lighting Controls	X	X	
ECM 3	Install High/Low Lighting Controls		X	
ECM 4	Install VFDs on Constant Volume (CV) Fans	X	X	
ECM 5	Implement Demand Control Ventilation (DCV)		X	
ECM 6	Install Pipe Insulation	X	X	
ECM 7	Install High Efficiency Gas-Fired Water Heater	X	X	
ECM 8	Install Low-Flow DHW Devices	X	X	
ECM 9	Replace Refrigeration Equipment		X	
ECM 10	Vending Machine Control	X	X	

Figure 3 – Funding Options

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

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

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

Individual Measures with SmartStart

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

Turnkey Installation with Direct Install

The Direct Install program provides turnkey installation of multiple measures through an authorized network of participating contractors. This program can provide substantially higher incentives than SmartStart, up to 70% 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 Strathmore Elementary 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 22, 2020, TRC performed an energy audit at Strathmore Elementary 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.

Strathmore Elementary School is a one-story, 63,000 square foot building built in 1963. Spaces include classrooms, gymnasium, offices, cafeteria, corridors, kitchen, and mechanical and electrical equipment spaces.

As part of a future capital improvement project, the school plans to install cooling for the gymnasium.

2.2 Building Occupancy

The facility is occupied regular hours from September through June (school season - 10 months). On weekdays, the school occasionally remains open after regular hours for some activities. The school is closed on weekends Typical weekday occupancy is approximately 70 staff and 397 students.

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

Building Name	Weekday/Weekend	Operating Schedule
Strathmore Elementary School (Regular Hours)	Weekday	7:00 AM - 5:00 PM
	Weekend	Closed
	Summer	Varies
Strathmore Elementary School (Custodial Hours)	Weekday	6:00 AM - 11:00 PM
	Weekend	Closed
	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 and were replaced approximately 15 years ago. 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 windows

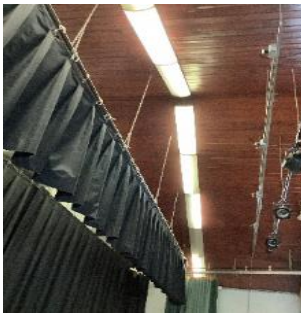
2.4 Lighting Systems

The primary interior lighting system uses 32-Watt linear fluorescent T8 lamps. There are also several 40-Watt and 50-Watt LED fixtures in corridors and 4-foot LED linear tube lamps in the cafeteria. In addition, there are some LED lamps in some spaces and 54-Watt linear T5 fluorescent lamps in the gymnasium.

Fixture types include 1-lamp, 2-lamp, and 3-lamp, 4-foot long troffer, recessed and surface mounted fixtures. Most fixtures are in good condition.

All exit signs are LED type.

2' x 4' T8 2-lamp fixture



4' T8 2-lamp fixture

2' x 4' T5 3-lamp fixture

1' x 2' T8 1-lamp fixture

Lighting fixtures in all classrooms, main office, computer lab, corridors, and staff lounge are controlled by occupancy sensors. All the remaining interior lighting is manually controlled by wall switches.

Ceiling-mounted occupancy sensor

Skylights in restroom

Exterior fixtures include LED wall-mounted fixtures, under canopy LED fixtures, and LED flood type fixtures. All exterior fixtures are controlled by timeclocks.

Under canopy LED fixture

Wall-mounted LED fixture

Wall-mounted LED fixture

LED flood lamp

2.5 Air Handling Systems

Unit Ventilators

There are 30 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 Units

There are nine packaged rooftop units (RTUs) which include three dedicated outside air units (DOAS). All RTUs have direct expansion (DX) coils for cooling. Except for the Trane RTU for the media center, which has electric heating, all RTUs are equipped with gas-fired furnaces for heating. The Trane unit for the media center is in fair condition and is beyond its useful life. The table below lists the RTU tag names, area served by them and other relevant details:

	Tag Name	Area Served	Cooling Capacity (Tons)	Cooling EER	Gas Heating Output Capacity (MBh)	Gas Heating Efficiency	Manufacturer
1	No tag name	Child study team	3	15.0	89.6	80.0%	York
2	No tag name	Main office	3	15.0	89.6	80.0%	York
3	DOAS-4	Hallways	5	14.3	81.0	81.0%	Aaon
4	DOAS-5	Hallways	5	11.2	81.0	81.0%	Aaon
5	DOAS-6	Hallways	5	11.2	81.0	81.0%	Aaon
6	No tag name	Cafeteria RTU	15	12.2	240.0	80.0%	York
7	No tag name	Media Center RTU 1	4	12.0	89.6	80.0%	York
8	No tag name	Media Center RTU 2	4	9.4	N/A [1]	N/A	Trane
9	RTU 26	Art Room	4	14.6	81	81.0%	Aaon

The Trane RTU for media center is equipped with electric resistance heating of 6kW capacity.

Refer to Appendix A for detailed information about each unit.

Air Conditioners

There is one ductless mini split air-source heat pump with 1-ton capacity and one 3-ton split system AC. The SEER value for the ductless mini split air-source heat pump is 19 and its COP is 3.8. The SEER value for the split AC is 13.0.

Both units are within their useful life and in good condition.

Air Handling Units

The gymnasium and the cafeteria are served by air handling units (AHU). The gymnasium AHU has a 7.5 hp supply fan and a 5 hp return fan. The cafeteria AHU has a 5 hp supply fan. Hot water to the AHU hot water coils is supplied from the boilers. There is no space cooling for the gymnasium.

Exhaust Fans

There are approximately 17 exhaust fans installed on the roof. The exhaust fans serve hallways, the kitchen cooking area, restrooms, gymnasium, and boiler rooms. Exhaust fan motors range from 0.16 hp to 1 hp. The exhaust fans are in fair condition.

Packaged rooftop unit


Ductless mini-split heat pump


Air handling unit for cafeteria


Single packaged vertical unit for classrooms

2.6 Heating Hot Water Systems

Two Smith cast iron 2,513 output MBh, hot water boilers serve building space heating load. The boilers are non-condensing type with a maximum efficiency of 82.86%. The boilers are configured in an automated lead-lag control scheme and are shut down in summer. The boilers were installed in 2014 and are in good condition.

Heating hot water is supplied throughout the building by two 2 hp constant speed pumps. The pumps operate in an automated lead-lag control scheme. The boilers and pumps provide hot water to hot water coils in the single packaged vertical units and to the AHUs.

The hot water supply temperature remains between 170°F and 180°F during peak winter and is lowered as outside air temperatures increase using an outdoor air temperature reset algorithm. The boilers are locked out at an outside air temperature of 85°F and above.


Hot water boiler


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 some pneumatic controls. Both EMS's provide equipment scheduling, monitoring and controlling of 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 100% of the HVAC equipment.

EMS home screen

Screen with 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 one 98-gallon, 75 MBh gas-fired A.O. Smith storage water heater and one 100-gallon, 80 MBh gas-fired Bradford White water heater. Both the water heaters are non-condensing types with maximum efficiency ratings of 80%. While the 100-gallon water heater is within its useful life and in good condition, the 98-gallon A.O. Smith water heater was installed in 2004, is approaching the end of its useful life, and is in fair condition.

The domestic hot water pipes for both water heaters are not insulated.

Domestic hot water heaters

Domestic hot water piping without insulation

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 and heating is done using a convection gas-fired oven. Also, there is one electric insulated food holding cabinet.

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 oven

Electric food storage heated cabinet

2.10 Refrigeration

The kitchen has a stand-up, solid door commercial refrigerator, a stand-up solid door freezer and two freezer chests. All equipment except one freezer chest is in good condition. The stand-up, solid door refrigerator is ENERGY STAR® rated.

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

Solid door stand-up refrigerator

Freezer chest

Solid door stand-up freezer

Freezer chest

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 260 desktop and laptop computers throughout the facility. Other plug loads throughout the building include general café and office equipment. Café equipment includes heated/chilled serving tables in the kitchen, microwave ovens and toaster ovens, residential-style refrigerators, coffee makers and hot/cold water dispensers in the break room, and nurse's office. 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.

There is one refrigerated beverage vending machine in the staff lounge.

Residential style refrigerator

Electric cooktop and oven

Hot/cold water dispenser

Refrigerated vending machine

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 1.5 gpm.

2.13 Process Equipment

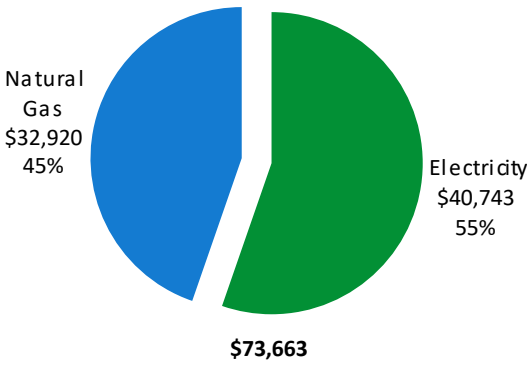
Some HVAC equipment in the school is controlled by a pneumatic control system and the air compressor provides compressed air for it. It has two 2.0 hp motors to run the air compressor. It runs intermittently and as much as needed to maintain the required air pressure in the pneumatic system.

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	336,358 kWh	$40,743
Natural Gas	30,285 Therms	$32,920
Total		**$73,663**



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.

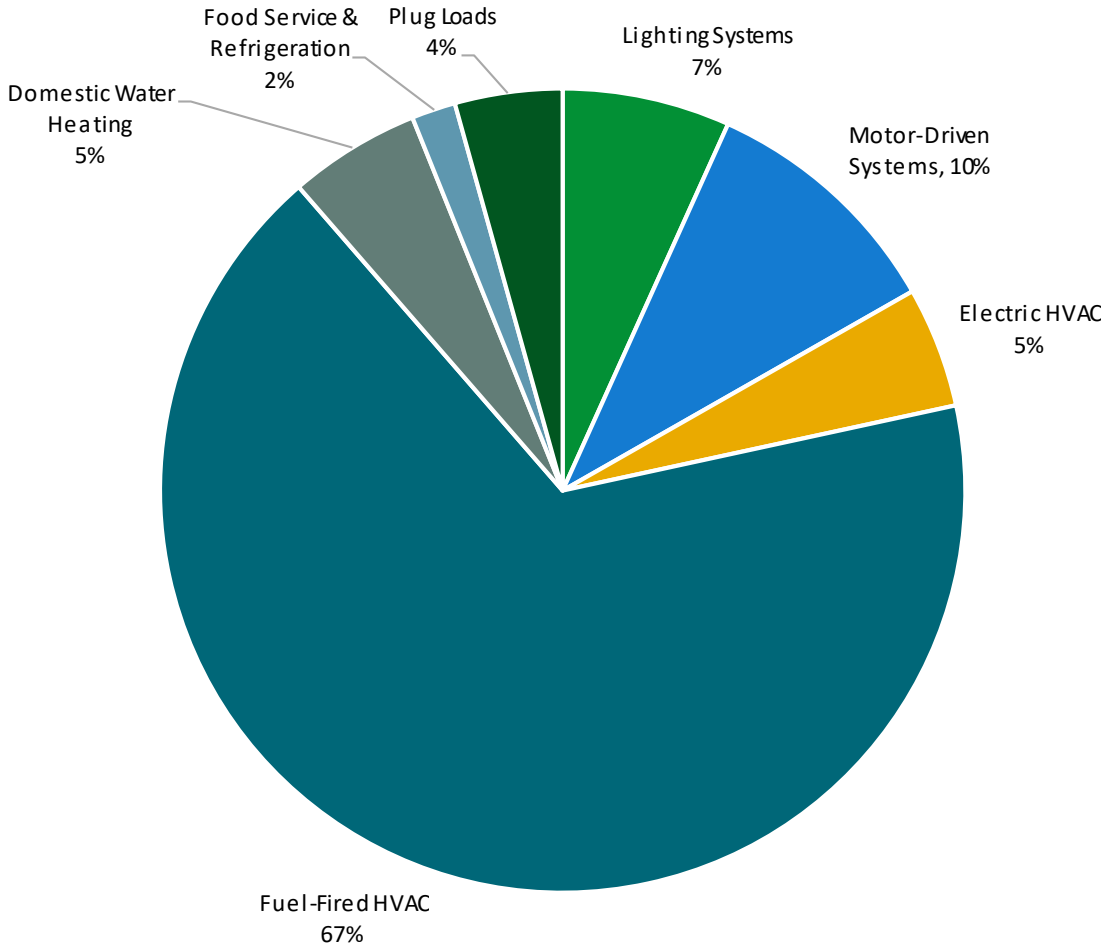
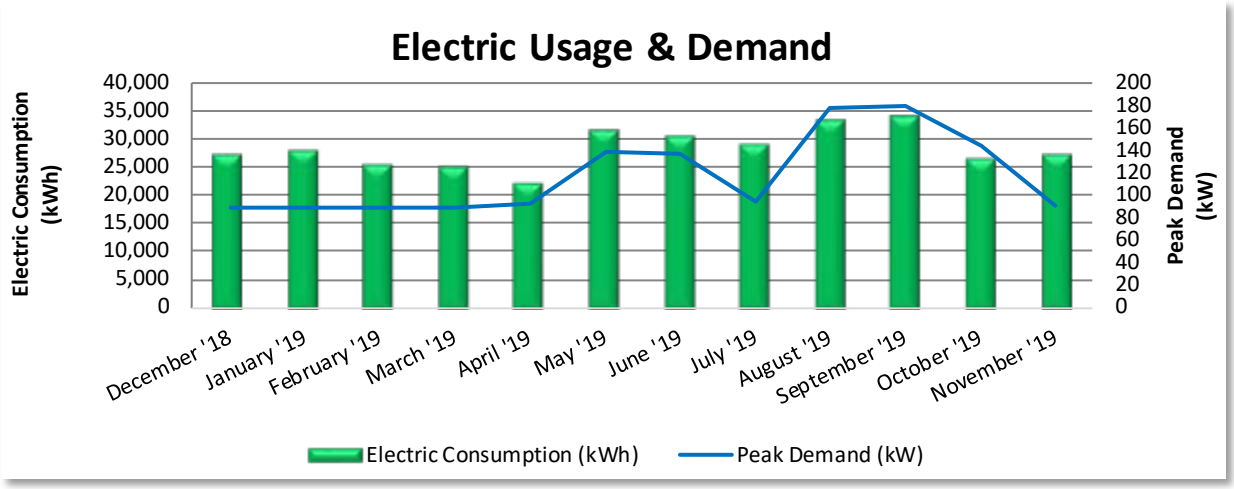


Figure 5 - Energy Balance

3.1 Electricity

JCP&L delivers electricity under rate class General Service Secondary 3 Phase, with electric production provided by East Coast Power & Gas of New Jersey, a third-party supplier.



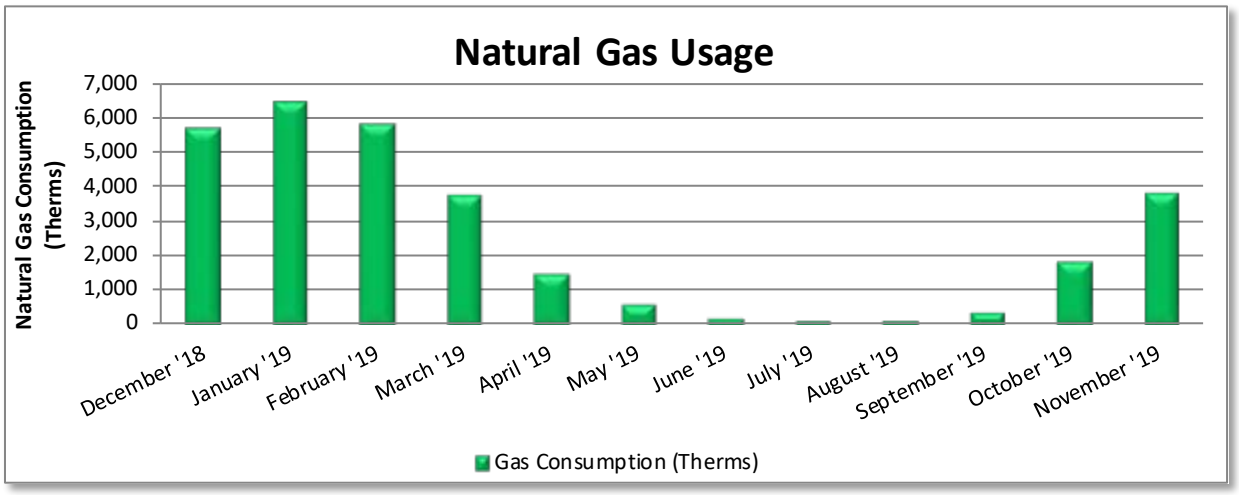
Electric Billing Data					
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**
1/14/19	34	27,200	90	$501	$3,077
2/12/19	29	27,680	89	$498	$3,167
3/13/19	29	25,120	90	$499	$2,872
4/11/19	29	24,800	90	$500	$2,844
5/10/19	29	22,080	92	$515	$2,684
6/12/19	33	31,360	140	$860	$3,801
7/12/19	30	30,080	137	$845	$3,786
8/12/19	31	28,960	94	$558	$3,401
9/11/19	30	32,960	178	$1,115	$4,341
10/11/19	30	33,760	179	$1,042	$4,341
11/9/19	29	26,400	144	$828	$3,423
12/12/19	33	26,880	90	$508	$3,120
Totals	**366**	**337,280**	**179**	**$8,270**	**$40,855**
Annual	**365**	**336,358**	**179**	**$8,247**	**$40,743**

Notes:

- Peak demand of 179 kW occurred in September 2019.
- Average demand over the past 12 months was 118 kW.
- The average electric cost over the past 12 months was $0.121/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 057CNN2G, 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	5,690	$6,362
2/5/19	28	6,423	$6,491
3/7/19	30	5,826	$5,596
4/8/19	32	3,776	$3,583
5/7/19	29	1,490	$1,680
6/6/19	30	630	$971
7/10/19	34	217	$644
8/7/19	28	150	$584
9/6/19	30	169	$596
10/4/19	28	382	$762
11/5/19	32	1,812	$1,953
12/6/19	31	3,804	$3,790
Totals	**366**	**30,368**	**$33,010**
Annual	**365**	**30,285**	**$32,920**

Notes:

- The average gas cost for the past 12 months is $1.087/therm, which is the blended rate used throughout the analysis.

3.3 Benchmarking

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

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

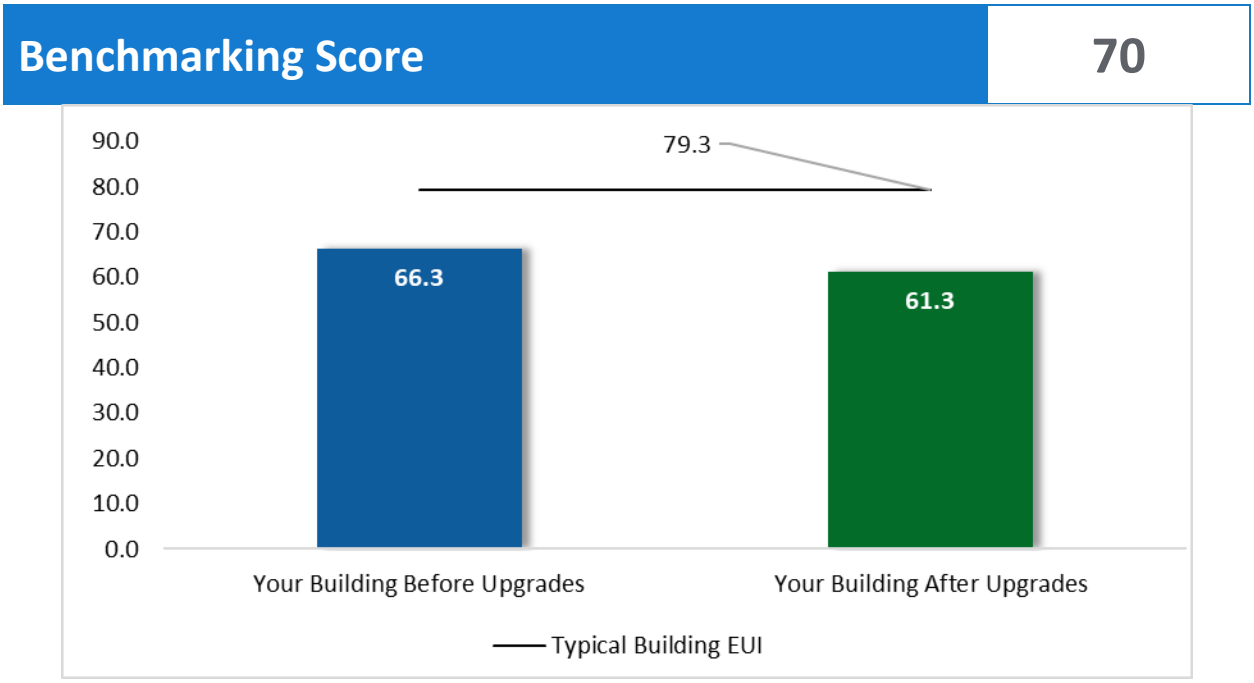


Figure 6 - Energy Use Intensity Comparison[3]

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

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

[3] Based on all evaluated ECMs

Tracking Your Energy Performance

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

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

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

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

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

4 Energy Conservation Measures

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

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

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

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

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**42,362**	**15.4**	**-9**	**$5,035**	**$22,871**	**$12,146**	**$10,725**	**2.1**	**41,621**
ECM 1	Retrofit Fixtures with LED Lamps	Yes	42,362	15.4	-9	$5,035	$22,871	$12,146	$10,725	2.1	41,621
Lighting Control Measures			**4,572**	**1.2**	**-1**	**$543**	**$5,703**	**$1,260**	**$4,443**	**8.2**	**4,492**
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	4,527	1.2	-1	$538	$5,478	$1,260	$4,218	7.8	4,448
ECM 3	Install High/Low Lighting Controls	No	45	0.0	0	$5	$225	$0	$225	42.4	44
Variable Frequency Drive (VFD) Measures			**19,857**	**6.5**	**0**	**$2,405**	**$16,967**	**$7,400**	**$9,567**	**4.0**	**19,996**
ECM 4	Install VFDs on Constant Volume (CV) Fans	Yes	19,857	6.5	0	$2,405	$16,967	$7,400	$9,567	4.0	19,996
HVAC System Improvements			**4,124**	**0.0**	**35**	**$883**	**$8,353**	**$136**	**$8,217**	**9.3**	**8,284**
ECM 5	Implement Demand Control Ventilation (DCV)	No	4,124	0.0	20	$721	$8,157	$0	$8,157	11.3	6,536
ECM 6	Install Pipe Insulation	Yes	0	0.0	15	$162	$196	$136	$60	0.4	1,747
Domestic Water Heating Upgrade			**0**	**0.0**	**16**	**$174**	**$4,354**	**$540**	**$3,814**	**22.0**	**1,870**
ECM 7	Install High Efficiency Gas-Fired Water Heater	No	0	0.0	15	$168	$4,340	$526	$3,814	22.8	1,804
ECM 8	Install Low-Flow DHW Devices	Yes	0	0.0	1	$6	$14	$14	$0	0.0	65
Food Service & Refrigeration Measures			**9,240**	**1.1**	**0**	**$1,119**	**$4,480**	**$100**	**$4,380**	**3.9**	**9,305**
ECM 9	Replace Refrigeration Equipment	Yes	7,629	0.9	0	$924	$4,250	$0	$4,250	4.6	7,682
ECM 10	Vending Machine Control	Yes	1,612	0.2	0	$195	$230	$100	$130	0.7	1,623
TOTALS			**80,155**	**24.2**	**41**	**$10,160**	**$62,728**	**$21,582**	**$41,146**	**4.0**	**85,567**

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

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

Figure 7 – All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**42,362**	**15.4**	**-9**	**$5,035**	**$22,871**	**$12,146**	**$10,725**	**2.1**	**41,621**
ECM 1	Retrofit Fixtures with LED Lamps	42,362	15.4	-9	$5,035	$22,871	$12,146	$10,725	2.1	41,621
Lighting Control Measures		**4,527**	**1.2**	**-1**	**$538**	**$5,478**	**$1,260**	**$4,218**	**7.8**	**4,448**
ECM 2	Install Occupancy Sensor Lighting Controls	4,527	1.2	-1	$538	$5,478	$1,260	$4,218	7.8	4,448
Variable Frequency Drive (VFD) Measures		**19,857**	**6.5**	**0**	**$2,405**	**$16,967**	**$7,400**	**$9,567**	**4.0**	**19,996**
ECM 4	Install VFDs on Constant Volume (CV) Fans	19,857	6.5	0	$2,405	$16,967	$7,400	$9,567	4.0	19,996
HVAC System Improvements		**0**	**0.0**	**15**	**$162**	**$196**	**$136**	**$60**	**0.4**	**1,747**
ECM 6	Install Pipe Insulation	0	0.0	15	$162	$196	$136	$60	0.4	1,747
Domestic Water Heating Upgrade		**0**	**0.0**	**1**	**$6**	**$14**	**$14**	**$0**	**0.0**	**65**
ECM 8	Install Low-Flow DHW Devices	0	0.0	1	$6	$14	$14	$0	0.0	65
Food Service & Refrigeration Measures		**9,240**	**1.1**	**0**	**$1,119**	**$4,480**	**$100**	**$4,380**	**3.9**	**9,305**
ECM 9	Replace Refrigeration Equipment	7,629	0.9	0	$924	$4,250	$0	$4,250	4.6	7,682
ECM 10	Vending Machine Control	1,612	0.2	0	$195	$230	$100	$130	0.7	1,623
TOTALS		**75,987**	**24.1**	**6**	**$9,266**	**$50,007**	**$21,056**	**$28,950**	**3.1**	**77,183**

* - 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_2e Emissions Reduction (lbs)
Lighting Upgrades		**42,362**	**15.4**	**-9**	**$5,035**	**$22,871**	**$12,146**	**$10,725**	**2.1**	**41,621**
ECM 1	Retrofit Fixtures with LED Lamps	42,362	15.4	-9	$5,035	$22,871	$12,146	$10,725	2.1	41,621

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: Retrofit Fixtures with LED Lamps

Replace fluorescent 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 and T5HO lamps in the gymnasium.

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**4,572**	**1.2**	**-1**	**$543**	**$5,703**	**$1,260**	**$4,443**	**8.2**	**4,492**
ECM 2	Install Occupancy Sensor Lighting Controls	4,527	1.2	-1	$538	$5,478	$1,260	$4,218	7.8	4,448
ECM 3	Install High/Low Lighting Controls	45	0.0	0	$5	$225	$0	$225	42.4	44

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 2: 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: cafeteria, offices, gymnasium, kitchen, closets, and restrooms.

ECM 3: Install High/Low Lighting Controls

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

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

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

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

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.

Affected building areas: hallway near custodian closets.

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_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**19,857**	**6.5**	**0**	**$2,405**	**$16,967**	**$7,400**	**$9,567**	**4.0**	**19,996**
ECM 4	Install VFDs on Constant Volume (CV) Fans	19,857	6.5	0	$2,405	$16,967	$7,400	$9,567	4.0	19,996

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 4: Install VFDs on Constant Volume (CV) Fans

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

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

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

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

Affected air handlers: York RTU for cafeteria and the AHUs serving the gymnasium and cafeteria.

4.4 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_2e Emissions Reduction (lbs)
HVAC System Improvements		**4,124**	**0.0**	**35**	**$883**	**$8,353**	**$136**	**$8,217**	**9.3**	**8,284**
ECM 5	Implement Demand Control Ventilation (DCV)	4,124	0.0	20	$721	$8,157	$0	$8,157	11.3	6,536
ECM 6	Install Pipe Insulation	0	0.0	15	$162	$196	$136	$60	0.4	1,747

ECM 5: Implement Demand Control Ventilation (DCV)

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

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

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

Affected building areas: gymnasium, cafeteria, and media center.

ECM 6: Install Pipe Insulation

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

4.5 Domestic Water Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**16**	**$174**	**$4,354**	**$540**	**$3,814**	**22.0**	**1,870**
ECM 6	Install High Efficiency Gas-Fired Water Heater	0	0.0	15	$168	$4,340	$526	$3,814	22.8	1,804
ECM 7	Install Low-Flow DHW Devices	0	0.0	1	$6	$14	$14	$0	0.0	65

ECM 7: Install High Efficiency Gas-Fired Water Heater

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

ECM 8: Install Low-Flow DHW Devices

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

Device	Flow Rate
Faucet aerators (lavatory)	0.5 gpm
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.

4.6 Food Service & Refrigeration Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Food Service & Refrigeration Measures		**9,240**	**1.1**	**0**	**$1,119**	**$4,480**	**$100**	**$4,380**	**3.9**	**9,305**
ECM 8	Replace Refrigeration Equipment	7,629	0.9	0	$924	$4,250	$0	$4,250	4.6	7,682
ECM 9	Vending Machine Control	1,612	0.2	0	$195	$230	$100	$130	0.7	1,623

ECM 9: Replace Refrigeration Equipment

Replace the existing, older freezer chest with new ENERGY STAR® rated equipment. The energy savings associated with this measure come from reduced energy usage, due to more efficient technology, and reduced run times.

ECM 10: 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.

4.7 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 emissions[5]. 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.

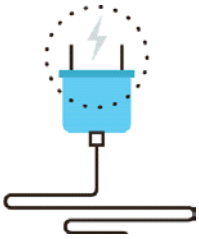
Compressed Air System Maintenance

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.

Plug Load Controls



Reducing plug loads is a common way to decrease your electrical use. Limiting the energy use of plug loads can include increasing occupant awareness, removing under-used equipment, installing hardware controls, and using software controls. Consider enabling the most aggressive power settings on existing devices or install load sensing or occupancy sensing (advanced) power strips[6]. Your local utility may offer incentives or rebates for this equipment.

Computer Power Management Software

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

[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.

Water Conservation

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

For more information regarding water conservation go to the EPA's WaterSense® website[7] or download a copy of EPA's "WaterSense® at Work: Best Management Practices for Commercial and Institutional Facilities"[8] to get ideas for creating a water management plan and best practices for a wide range of water using systems.

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

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

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.

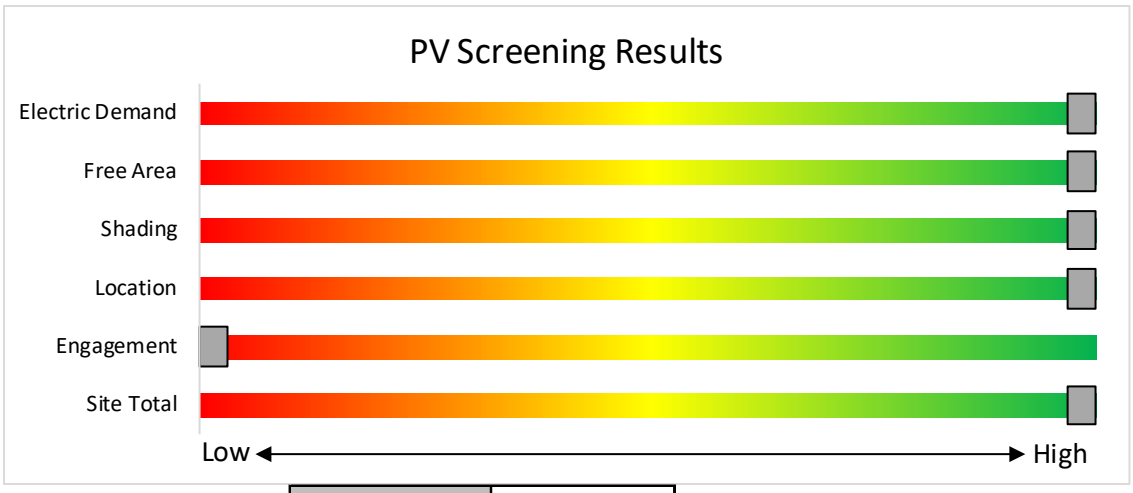
6.1 Solar Photovoltaic

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.



Potential	High	
System Potential	90	kW DC STC
Electric Generation	107,224	kWh/yr
Displaced Cost	$12,990	/yr
Installed Cost	$234,000	

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. Low and infrequent thermal load, and lack of space for siting the equipment are the most significant factors contributing to the lack of CHP potential.

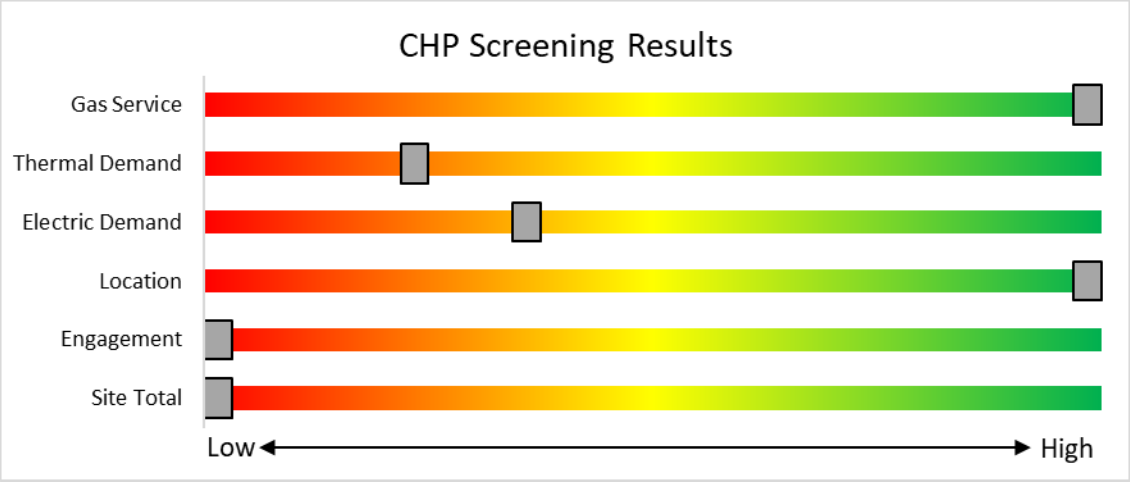


Figure 10 – CHP Screening

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

7.1 SmartStart

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

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

Equipment with Prescriptive Incentives Currently Available:

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

Incentives

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

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

How to Participate

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

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

7.2 Direct Install

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

Based on the site building and utility data provided, the facility meets 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.

Based on the site building and utility data provided, the facility does not meet the requirements of the current P4P program.

Incentives

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

How to Participate

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

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

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

7.4 Combined Heat and Power

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

Incentives

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

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

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

How to Participate

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

7.5 Energy Savings Improvement Program

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

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

How to Participate

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

(1) Use an energy services company or "ESCO."

(2) Use independent engineers and other specialists, or your own qualified staff, to provide and manage the requirements of the program through bonds or lease obligations.

(3) Use a hybrid approach of the two options described above where the ESCO is used for some services and independent engineers, or other specialists or qualified staff, are used to deliver other requirements of the program.

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

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

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

7.6 Transition Incentive (TI) Program

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

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

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

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

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

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

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

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

8 Energy Purchasing and Procurement Strategies

8.1 Retail Electric Supply Options

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

If your facility is not purchasing electricity from a third-party supplier, consider shopping for a reduced rate from third-party electric suppliers. If your facility already buys electricity from a third-party supplier, review and compare prices at the end of each contract year.

A list of licensed third-party electric suppliers is available at the NJBPU website[9].

8.2 Retail Natural Gas Supply Options

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

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

If your facility does not already purchase natural gas from a third-party supplier, consider shopping for a reduced rate from third-party natural gas suppliers. If your facility already purchases natural gas from a third-party supplier, review and compare prices at the end of each contract year.

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

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

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

APPENDIX A: EQUIPMENT INVENTORY & RECOMMENDATIONS

Lighting Inventory & Recommendations

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	4	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	770		None	No	4	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	770	0.0	0	0	$0	$0	$0	0.0
Boiler Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	770	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	770	0.0	56	0	$7	$73	$40	5.0
BSI office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,518	1	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,518	0.1	331	0	$39	$219	$120	2.5
Cafeteria	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
Cafeteria	60	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,200	2	None	Yes	60	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.4	1,305	0	$155	$1,080	$280	5.2
Cafeteria	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	770	1, 2	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	531	0.3	356	0	$42	$635	$270	8.6
Classroom 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 1	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 11	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 11	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 12	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 13	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 13	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 15	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 15	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 17	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 17	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 19 computer lab	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 2	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 20	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 20	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 21	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 21	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 22	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 22	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 23	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 23	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 24	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 24	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 25	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 25	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 26	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 26	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 27	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 27	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 27	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 28	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 28	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 29	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 29	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 29	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.5	1,102	0	$131	$730	$400	2.5
Classroom 3	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 3	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 30	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 30	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 30	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 31	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 31	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	770		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	770	0.0	0	0	$0	$0	$0	0.0
Classroom 31	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 31	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 32	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 32	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	770		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	770	0.0	0	0	$0	$0	$0	0.0
Classroom 32	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 32	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 33	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 33	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	770		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	770	0.0	0	0	$0	$0	$0	0.0
Classroom 33	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 33	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 34	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 34	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	770		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	770	0.0	0	0	$0	$0	$0	0.0
Classroom 34	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 34	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 4	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 4	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 5	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 5	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 7	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 7	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 8	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 8	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Classroom 9	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,518	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	29	0	$3	$18	$10	2.4
Classroom 9	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5
Copy Office	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	2,200	1, 2	Relamp	Yes	1	LED - Linear Tubes: (1) 2' Lamp	Occupancy Sensor	9	1,518	0.0	39	0	$5	$16	$6	2.2
Copy Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	2,200	1, 2	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.1	213	0	$25	$343	$110	9.2

	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
CST office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,200	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.1	203	0	$24	$189	$40	6.2
Custodial Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	3,300	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,300	0.0	64	0	$8	$18	$10	1.1
Exterior Lighting (Building)	6	LED - Fixtures: 15W Canopy LED Fixtures	Timeclock		15	3,650		None	No	6	LED - Fixtures: 15W Canopy LED Fixtures	Timeclock	15	3,650	0.0	0	0	$0	$0	$0	0.0
Exterior Lighting (Building)	6	LED - Fixtures: 40W Wall Pack LED Fixtures	Timeclock		40	3,650		None	No	6	LED - Fixtures: 40W Wall Pack LED Fixtures	Timeclock	40	3,650	0.0	0	0	$0	$0	$0	0.0
Exterior Lighting (Building)	4	LED - Fixtures: 50W Wall Pack LED Fixtures	Timeclock		50	3,650		None	No	4	LED - Fixtures: 50W Wall Pack LED Fixtures	Timeclock	50	3,650	0.0	0	0	$0	$0	$0	0.0
Exterior Lighting (Building)	5	LED - Fixtures: 84W Flood Light LED Fixtures	Timeclock		84	3,650		None	No	5	LED - Fixtures: 84W Flood Light LED Fixtures	Timeclock	84	3,650	0.0	0	0	$0	$0	$0	0.0
Gymnasium	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
Gymnasium	24	Linear Fluorescent - T5HO: 4' T5HO (54W) - 3L	Wall Switch	S	179	3,300	1, 2	Relamp	Yes	24	LED - Linear Tubes: (3) 4' T5HO (25W) Lamps	Occupancy Sensor	77	2,277	2.2	10,996	-2	$1,307	$2,492	$860	1.2
Gymnasium	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,200	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.1	203	0	$24	$73	$40	1.4
Gymnasium	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,200	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.1	406	0	$48	$146	$80	1.4
Janitorial Closet	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	3,300	2	None	Yes	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	2,277	0.0	23	0	$3	$116	$0	43.4
Janitorial Closet 2	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	2,200		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	2,200	0.0	0	0	$0	$0	$0	0.0
Janitorial Closet 3	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	2,200		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	2,200	0.0	0	0	$0	$0	$0	0.0
Kitchen	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
Kitchen	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,200	1, 2	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.2	508	0	$60	$453	$170	4.7
Library	46	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	46	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	1.1	2,535	-1	$301	$1,680	$920	2.5
Lobby - Classroom wing Left	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 - Classroom wing Left	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,277	1	Relamp	No	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,277	0.5	1,653	0	$196	$730	$400	1.7
Lobby - Classroom wing N-S	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 - Classroom wing N-S	14	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	S	40	2,277		None	No	14	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	40	2,277	0.0	0	0	$0	$0	$0	0.0
Lobby - Classroom wing right	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
Lobby - Classroom wing right	9	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	S	40	2,277		None	No	9	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	40	2,277	0.0	0	0	$0	$0	$0	0.0
Lobby - Custodial area	3	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	2,200	1, 3	Relamp	Yes	3	LED - Linear Tubes: (1) 2' Lamp	High/Low Control	9	1,518	0.0	117	0	$14	$274	$18	18.4
Lobby - Custodial area	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	2,200	1, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	1,518	0.0	103	0	$12	$65	$24	3.4
Lobby - Gym to Kitchen	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

	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
Lobby - Gym to Kitchen	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,277	1	Relamp	No	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,277	0.3	1,075	0	$128	$475	$260	1.7
Lobby - Main office area	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 - Main office area	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,277	1	Relamp	No	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,277	0.3	909	0	$108	$402	$220	1.7
Main Office	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,518	1	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,518	0.4	827	0	$98	$548	$300	2.5
Main Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,518	1	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,518	0.1	331	0	$39	$219	$120	2.5
Nurse's Office	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,200	1, 2	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.2	711	0	$85	$526	$210	3.7
Nurse's Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	770	1, 2	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	531	0.0	36	0	$4	$37	$20	3.9
Restroom 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	770	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	770	0.0	28	0	$3	$37	$20	5.0
Restroom 10	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,200	1, 2	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.1	305	0	$36	$380	$130	6.9
Restroom 11	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,200	1, 2	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.1	305	0	$36	$380	$130	6.9
Restroom 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	770	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	770	0.0	28	0	$3	$37	$20	5.0
Restroom 3	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	770	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	770	0.0	28	0	$3	$37	$20	5.0
Restroom 4	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	770	1, 2	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	531	0.1	107	0	$13	$380	$130	19.7
Restroom 5	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,200	1, 2	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.1	305	0	$36	$380	$130	6.9
Restroom 6	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,200	1, 2	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.1	305	0	$36	$380	$130	6.9
Restroom 7	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	2,200	1	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	2,200	0.0	33	0	$4	$16	$6	2.6
Restroom 7	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,200	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.1	406	0	$48	$416	$150	5.5
Restroom 8	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	2,200	1	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	2,200	0.0	33	0	$4	$16	$6	2.6
Restroom 8	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,200	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.1	406	0	$48	$416	$150	5.5
Restroom 9	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	2,200	1	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	2,200	0.0	33	0	$4	$16	$6	2.6
Restroom 9	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	2,200	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,200	0.0	42	0	$5	$18	$10	1.6
Restroom 9	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,200	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.1	203	0	$24	$189	$40	6.2
Roof	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	770	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	531	0.1	142	0	$17	$416	$150	15.7
Speech Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	2,200	1, 2	Relamp	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,518	0.0	160	0	$19	$325	$30	15.5
Staff Lounge	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,518	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,518	0.3	661	0	$79	$438	$240	2.5

Motor Inventory & Recommendations

		Existing Conditions							Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Pneumatic System	2	Air Compressor	2.0	78.5%	No	W	730		No	78.5%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Boilers	2	Combustion Air Fan	1.0	77.0%	No	W	2,745		No	77.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Large EF	1	Exhaust Fan	1.0	85.5%	No	W	2,745		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Medium EF	3	Exhaust Fan	0.5	78.2%	No	W	2,745		No	78.2%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Small EF	13	Exhaust Fan	0.2	60.0%	No	W	2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	HHW System	2	Heating Hot Water Pump	2.0	86.5%	No	W	2,745		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HHW circulation pump - Gym AHU	1	Heating Hot Water Pump	0.3	73.4%	No	W	2,745		No	73.4%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Gym AHU	1	Return Fan	5.0	89.5%	No	W	3,000	4	No	89.5%	Yes	1	1.5	4,689	0	$568	$4,076	$1,800	4.0
Boiler Room	Cafeteria AHU	1	Supply Fan	5.0	89.5%	No	W	2,640	4	No	89.5%	Yes	1	1.4	4,126	0	$500	$4,076	$1,800	4.6
Roof	Gym AHU	1	Supply Fan	7.5	91.0%	No	W	3,000	4	No	91.0%	Yes	1	2.1	6,917	0	$838	$4,738	$2,000	3.3
Boiler Room	HHW circulation pump- Cafeteria AHU	1	Heating Hot Water Pump	0.2	60.0%	No	W	2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Child study team supply fan	1	Supply Fan	1.5	86.5%	No	W	2,640		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Main office	1	Supply Fan	1.5	86.5%	No	W	3,000		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	DOAS -4 Hallway	1	Supply Fan	1.0	85.5%	No	W	2,640		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Doas 5 for hallways	1	Supply Fan	1.0	85.5%	No	W	2,640		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	DOAS 6 - Hallways	1	Supply Fan	1.0	85.5%	No	W	2,640		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Cafeteria RTU	1	Supply Fan	5.0	89.5%	No	W	2,640	4	No	89.5%	Yes	1	1.4	4,126	0	$500	$4,076	$1,800	4.6
Roof	Library RTU 1	1	Supply Fan	1.5	86.5%	No	W	2,640		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Library RTU 2	1	Supply Fan	0.8	78.0%	No	W	2,640		No	78.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU 26- For Art Room	1	Supply Fan	1.0	85.5%	No	W	2,640		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0

		Existing Conditions							Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	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
Classroom 1	Unit Ventilator for Classroom	1	Supply Fan	0.5	78.2%	No	W	2,640		No	78.2%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 11	Unit Ventilator for Classroom	1	Supply Fan	0.5	78.2%	No	W	2,640		No	78.2%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 12	Unit Ventilator for Classroom	1	Supply Fan	0.5	78.2%	No	W	2,640		No	78.2%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 13	Unit Ventilator for Classroom	1	Supply Fan	0.5	78.2%	No	W	2,640		No	78.2%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 15	Unit Ventilator for Classroom	1	Supply Fan	0.5	78.2%	No	W	2,640		No	78.2%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 17	Unit Ventilator for Classroom	1	Supply Fan	0.5	78.2%	No	W	2,640		No	78.2%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 19 computer lab	Unit Ventilator for Classroom	1	Supply Fan	0.5	78.2%	No	W	2,640		No	78.2%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 2	Unit Ventilator for Classroom	1	Supply Fan	0.5	78.2%	No	W	2,640		No	78.2%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 20	Unit Ventilator for Classroom	1	Supply Fan	0.5	78.2%	No	W	2,640		No	78.2%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 21	Unit Ventilator for Classroom	1	Supply Fan	0.5	78.2%	No	W	2,640		No	78.2%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 22	Unit Ventilator for Classroom	1	Supply Fan	0.5	78.2%	No	W	2,640		No	78.2%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 23	Unit Ventilator for Classroom	1	Supply Fan	0.5	78.2%	No	W	2,640		No	78.2%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 24	Unit Ventilator for Classroom	1	Supply Fan	0.5	78.2%	No	W	2,640		No	78.2%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 25	Unit Ventilator for Classroom	1	Supply Fan	0.5	78.2%	No	W	2,640		No	78.2%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 26	Unit Ventilator for Classroom	1	Supply Fan	0.5	78.2%	No	W	2,640		No	78.2%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 27	Unit Ventilator for Classroom	1	Supply Fan	1.0	85.5%	No	W	2,640		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 28	Unit Ventilator for Classroom	1	Supply Fan	1.0	85.5%	No	W	2,640		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 29	Unit Ventilator for Classroom	1	Supply Fan	1.0	85.5%	No	W	2,640		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 3	Unit Ventilator for Classroom	1	Supply Fan	1.0	85.5%	No	W	2,640		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 30	Unit Ventilator for Classroom	1	Supply Fan	1.0	85.5%	No	W	2,640		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0

		Existing Conditions							Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	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
Classroom 31	Unit Ventilator for Classroom	1	Supply Fan	1.0	85.5%	No	W	2,640		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 32	Unit Ventilator for Classroom	1	Supply Fan	1.0	85.5%	No	W	2,640		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 33	Unit Ventilator for Classroom	1	Supply Fan	1.0	85.5%	No	W	2,640		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 34	Unit Ventilator for Classroom	1	Supply Fan	1.0	85.5%	No	W	2,640		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 4	Unit Ventilator for Classroom	1	Supply Fan	1.0	85.5%	No	W	2,640		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 5	Unit Ventilator for Classroom	1	Supply Fan	1.0	85.5%	No	W	2,640		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 7	Unit Ventilator for Classroom	1	Supply Fan	1.0	85.5%	No	W	2,640		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 8	Unit Ventilator for Classroom	1	Supply Fan	1.0	85.5%	No	W	2,640		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 9	Unit Ventilator for Classroom	1	Supply Fan	1.0	85.5%	No	W	2,640		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Staff Lounge	Unit Ventilator for Classroom	1	Supply Fan	1.0	85.5%	No	W	2,640		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 10	Unit Ventilator for Classroom	1	Supply Fan	1.0	85.5%	No	W	2,640		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0

Electric HVAC Inventory & Recommendations

		Existing Conditions					Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	Child study team	1	Packaged AC	3.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Main office	1	Packaged AC	3.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Network closet near main office	1	Split-System AC	3.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Nurse's office	1	Split-System Air-Source HP	1.00	13.50	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	DOAS -4 Hallway	1	Packaged AC	5.00		N		No							0.0	0	0	$0	$0	$0	0.0
Roof	Doas 5 for hallways	1	Packaged AC	5.00		N		No							0.0	0	0	$0	$0	$0	0.0
Roof	DOAS 6 - Hallways	1	Packaged AC	5.00		N		No							0.0	0	0	$0	$0	$0	0.0
Roof	Cafeteria RTU	1	Packaged AC	15.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Library RTU 1	1	Packaged AC	4.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Library RTU 2	1	Packaged AC	4.00		B		No							0.0	0	0	$0	$0	$0	0.0
Roof	RTU 26- For Art Room	1	Packaged AC	4.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 1	Unit Ventilator for Classroom	1	Packaged AC	3.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 11	Unit Ventilator for Classroom	1	Packaged AC	3.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 12	Unit Ventilator for Classroom	1	Packaged AC	3.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 13	Unit Ventilator for Classroom	1	Packaged AC	3.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 15	Unit Ventilator for Classroom	1	Packaged AC	3.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 17	Unit Ventilator for Classroom	1	Packaged AC	3.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 19 computer lab	Unit Ventilator for Classroom	1	Packaged AC	3.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 2	Unit Ventilator for Classroom	1	Packaged AC	3.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 20	Unit Ventilator for Classroom	1	Packaged AC	3.00		W		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	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
Classroom 21	Unit Ventilator for Classroom	1	Packaged AC	3.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 22	Unit Ventilator for Classroom	1	Packaged AC	3.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 23	Unit Ventilator for Classroom	1	Packaged AC	3.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 24	Unit Ventilator for Classroom	1	Packaged AC	3.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 25	Unit Ventilator for Classroom	1	Packaged AC	3.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 26	Unit Ventilator for Classroom	1	Packaged AC	3.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 27	Unit Ventilator for Classroom	1	Packaged AC	4.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 28	Unit Ventilator for Classroom	1	Packaged AC	4.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 29	Unit Ventilator for Classroom	1	Packaged AC	4.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 3	Unit Ventilator for Classroom	1	Packaged AC	4.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 30	Unit Ventilator for Classroom	1	Packaged AC	4.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 31	Unit Ventilator for Classroom	1	Packaged AC	4.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 32	Unit Ventilator for Classroom	1	Packaged AC	4.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 33	Unit Ventilator for Classroom	1	Packaged AC	4.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 34	Unit Ventilator for Classroom	1	Packaged AC	4.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 4	Unit Ventilator for Classroom	1	Packaged AC	4.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 5	Unit Ventilator for Classroom	1	Packaged AC	4.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 7	Unit Ventilator for Classroom	1	Packaged AC	4.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 8	Unit Ventilator for Classroom	1	Packaged AC	4.00		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 9	Unit Ventilator for Classroom	1	Packaged AC	4.00		W		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	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
Staff Lounge	Unit Ventilator for Classroom	1	Packaged AC	4.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Library RTU 2	1	Electric Resistance Heat		20.47	W		No							0.0	0	0	$0	$0	$0	0.0

Fuel Heating Inventory & Recommendations

		Existing Conditions				Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Main Boiler	1	Non-Condensing Hot Water Boiler	2,513	W		No						0.0	0	0	$0	$0	$0	0.0
Boiler Room	Main Boiler	1	Non-Condensing Hot Water Boiler	2,513	W		No						0.0	0	0	$0	$0	$0	0.0
Roof	Child study team	1	Furnace	90	W		No						0.0	0	0	$0	$0	$0	0.0
Roof	Main office	1	Furnace	90	W		No						0.0	0	0	$0	$0	$0	0.0
Roof	DOAS -4 Hallway	1	Furnace	81	N		No						0.0	0	0	$0	$0	$0	0.0
Roof	Doas 5 for hallways	1	Furnace	81	N		No						0.0	0	0	$0	$0	$0	0.0
Roof	DOAS 6 - Hallways	1	Furnace	81	N		No						0.0	0	0	$0	$0	$0	0.0
Roof	Cafeteria RTU	1	Furnace	240	W		No						0.0	0	0	$0	$0	$0	0.0
Roof	Library RTU 1	1	Furnace	90	W		No						0.0	0	0	$0	$0	$0	0.0
Roof	RTU 26- For Classrooms	1	Furnace	81	W		No						0.0	0	0	$0	$0	$0	0.0

Demand Control Ventilation Recommendations

		Recommendation Inputs					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	ECM #	Number of Zones	Cooling Capacity of Controlled System (Tons)	Electric Heating Capacity of Controlled System (kBtu/hr)	Output Heating Capacity of Controlled System (MBh)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Gymnasium	Gymnasium	5	2.00	0.00	0.00	502.60	0.0	0	12	$132	$2,719	$0	20.7
Cafeteria	Cafeteria	5	2.00	15.00	0.00	240.00	0.0	3,791	5	$518	$2,719	$0	5.3
Media Center	Media Center	5	2.00	8.00	20.47	89.60	0.0	333	3	$71	$2,719	$0	38.1

Pipe Insulation Recommendations

		Recommendation Inputs			Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	ECM #	Length of Uninsulated Pipe (ft)	Pipe Diameter (in)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	DHW System Piping (A.O Smith Heater)	6	12	1.00	0.0	0	5	$57	$69	$48	0.4
Boiler Room	DHW System Piping (Bradford White Heater)	6	22	1.00	0.0	0	10	$105	$127	$88	0.4

DHW Inventory & Recommendations

		Existing Conditions			Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Remaining Useful Life	ECM #	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	DHW System	1	Storage Tank Water Heater (> 50 Gal)	B	6	Yes	1	Storage Tank Water Heater (> 50 Gal)	Natural Gas	93.00%	Et	0.0	0	15	$168	$4,340	$526	22.8
Boiler Room	DHW System	1	Storage Tank Water Heater (> 50 Gal)	N		No						0.0	0	0	$0	$0	$0	0.0

Low-Flow Device Recommendations

	Recommedation Inputs					Energy Impact & Financial Analysis						
Location	ECM #	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Restrooms	7	2	Faucet Aerator (Lavatory)	1.50	0.50	0.0	0	1	$6	$14	$14	0.0

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions			Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Freezer Chest	No	8	Yes	0.4	3,551	0	$430	$2,050	$0	4.8
Kitchen	1	Freezer Chest	No	8	Yes	0.5	4,077	0	$494	$2,200	$0	4.5
Kitchen	1	Stand-Up Freezer, Solid Door (16 - 30 cu. ft.)	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Yes		No	0.0	0	0	$0	$0	$0	0.0

Cooking Equipment Inventory & Recommendations

	Existing Conditions			Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	High Efficiency Equipement?	ECM #	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Gas Convection Oven (Half Size)	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

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Classrooms, Offices, Staff Lounge, Library	85	Desktop Computer	24	Yes
Classrooms, Offices, Staff Lounge, Library	182	Laptop Computers	15	Yes
Classrooms	61	Wall-mounted Fan	50	No
Staff Lounge	1	Microwave Oven	1,200	No
Staff Lounge	1	Electric Cooktop & Oven	2,000	No
Main Office	1	Printer (Small/Medium)	50	Yes
Main Office	1	Printer (Large)	550	Yes
Classrooms	29	Projector	200	No
Staff Lounge	2	Refrigerator (Residential)	600	No
Kitchen	1	Chilled Serving Table	750	No
Kitchen	1	Heated Serving Table	2,500	No
Staff Lounge	1	Water Cooler	500	No

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	ECM #	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Staff Lounge	1	Refrigerated	9	Yes	0.2	1,612	0	$195	$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.

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ENERGY STAR® Statement of Energy Performance

70

ENERGY STAR® Score[1]

Strathmore Elementary School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 63,000
Built: 1963

For Year Ending: December 31, 2019
Date Generated: September 21, 2020

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
Strathmore Elementary School 282 Church Street Aberdeen, New Jersey 07747	Matawan-Aberdeen Regional School District One Crest Way Aberdeen, NJ 07747 (732) 705-4016	Adam Nasr One Crest Way Aberdeen, NJ 07747 (732) 705-4013 anasr@marsd.k12.nj.us

Property ID: 3760977

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
64.7 kBtu/ft²

Source EUI
99.8 kBtu/ft²

Annual Energy by Fuel		
Electric - Grid (kBtu)	1,148,588 (28%)	
Natural Gas (kBtu)	2,927,418 (72%)	

National Median Comparison	
National Median Site EUI (kBtu/ft²)	79.3
National Median Source EUI (kBtu/ft²)	122.4
% Diff from National Median Source EUI	-18%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	265

Signature & Stamp of Verifying Professional

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

LP Signature: _____ Date: _____

Licensed Professional

____ _____
,
(____)____-_____
_____

Professional Engineer or Registered Architect Stamp (if applicable)

APPENDIX C: GLOSSARY

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

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

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