



Local Government Energy Audit Report

Cambridge Park Pre-K/Administration Building

November 4, 2020

Prepared for:

Matawan Aberdeen Regional School District
1 Crest Way
Aberdeen, NJ 07747

Prepared by:

TRC
900 Route 9 North
Woodbridge, NJ 07095

Disclaimer

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

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

TRC bases estimated 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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Table of Contents

1	Executive Summary.....	1
1.1	Planning Your Project	4
	Pick Your Installation Approach	4
	More Options from Around the State.....	6
2	Existing Conditions.....	7
2.1	Site Overview.....	7
2.2	Building Occupancy	7
2.3	Building Envelope	8
2.4	Lighting Systems.....	9
2.5	Air Handling Systems	10
	Unit Ventilators	10
	Packaged and Split-system Units	10
2.6	Heating Hot Water Systems	11
2.7	Building Energy Management Systems (EMS)	11
2.8	Domestic Hot Water	12
2.9	Plug Load & Vending Machines.....	12
2.10	Water-Using Systems	12
3	Energy Use and Costs	13
3.1	Electricity	15
3.2	Natural Gas.....	16
3.3	Benchmarking.....	17
	Tracking Your Energy Performance.....	18
4	Energy Conservation Measures	19
4.1	Lighting	21
	ECM 1: Retrofit Fixtures with LED Lamps.....	21
4.2	Lighting Controls.....	21
	ECM 2: Install Occupancy Sensor Lighting Controls	21
	ECM 3: Install High/Low Lighting Controls	22
4.3	Variable Frequency Drives (VFD).....	23
	ECM 4: Install VFDs on Constant Volume (CV) Fans.....	23
4.4	Electric Unitary HVAC	24
	ECM 5: Install High Efficiency Air Conditioning Units.....	24
4.5	Food Service & Refrigeration Measures.....	24
	ECM 6: Vending Machine Control	24
4.6	Measures for Future Consideration	25
	Expansion of an Energy Management System	25

Retro-Commissioning Study	26
5 Energy Efficient Best Practices	27
Energy Tracking with ENERGY STAR® Portfolio Manager®	27
Lighting Maintenance	27
Lighting Controls	27
Motor Maintenance	28
Thermostat Schedules and Temperature Resets	28
Economizer Maintenance	28
AC System Evaporator/Condenser Coil Cleaning	28
HVAC Filter Cleaning and Replacement	28
Boiler Maintenance	29
Furnace Maintenance	29
Water Heater Maintenance	29
Water Conservation	30
Procurement Strategies	30
6 On-site Generation	31
6.1 Solar Photovoltaic	32
6.2 Combined Heat and Power	34
7 Project Funding and Incentives	35
7.1 SmartStart	36
7.2 Direct Install	37
7.3 Pay for Performance - Existing Buildings	38
7.4 Combined Heat and Power	39
7.5 Energy Savings Improvement Program	40
7.6 Transition Incentive (TI) Program	41
8 Energy Purchasing and Procurement Strategies	42
8.1 Retail Electric Supply Options	42
8.2 Retail Natural Gas Supply Options	42
Appendix A: Equipment Inventory & Recommendations	A-1
Appendix B: ENERGY STAR® Statement of Energy Performance	B-1
Appendix C: Glossary	C-1

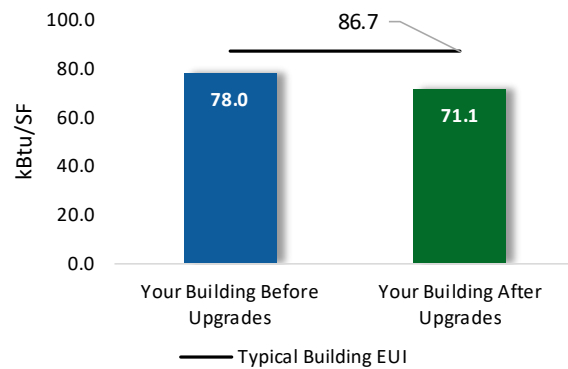
POTENTIAL IMPROVEMENTS



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.

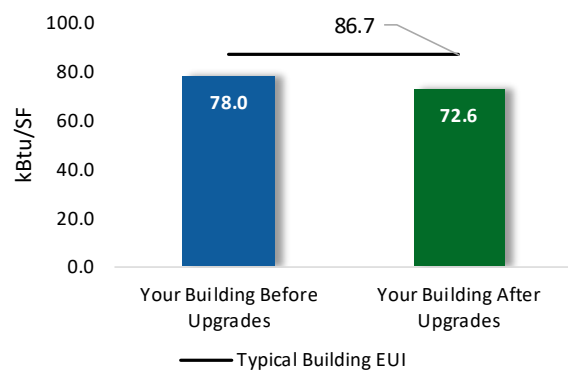
Scenario 1: Full Package (all evaluated measures)

Installation Cost	\$106,718
Potential Rebates & Incentives ¹	\$24,353
Annual Cost Savings	\$11,584
Annual Energy Savings	Electricity: 97,733 kWh
Greenhouse Gas Emission Savings	48 Tons
Simple Payback	7.1 Years
Site Energy Savings (all utilities)	9%



Scenario 2: Cost Effective Package²

Installation Cost	\$33,368
Potential Rebates & Incentives	\$15,773
Annual Cost Savings	\$9,215
Annual Energy Savings	Electricity: 78,039 kWh
Greenhouse Gas Emission Savings	38 Tons
Simple Payback	1.9 Years
Site Energy Savings (all utilities)	7%



On-site Generation Potential

Photovoltaic	Medium
Combined Heat and Power	None

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

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			63,072	13.9	-13	\$7,444	\$20,903	\$11,198	\$9,705	1.3	61,969
ECM 1	Retrofit Fixtures with LED Lamps	Yes	63,072	13.9	-13	\$7,444	\$20,903	\$11,198	\$9,705	1.3	61,969
Lighting Control Measures			13,012	2.4	-3	\$1,536	\$12,005	\$4,475	\$7,530	4.9	12,785
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	11,447	2.2	-2	\$1,351	\$9,530	\$2,370	\$7,160	5.3	11,246
ECM 3	Install High/Low Lighting Controls	Yes	1,566	0.3	0	\$185	\$2,475	\$2,105	\$370	2.0	1,538
Variable Frequency Drive (VFD) Measures			1,636	0.6	0	\$197	\$6,020	\$300	\$5,720	29.1	1,647
ECM 4	Install VFDs on Constant Volume (CV) Fans	No	1,636	0.6	0	\$197	\$6,020	\$300	\$5,720	29.1	1,647
Electric Unitary HVAC Measures			18,058	16.4	0	\$2,172	\$67,330	\$8,280	\$59,050	27.2	18,184
ECM 5	Install High Efficiency Air Conditioning Units	No	18,058	16.4	0	\$2,172	\$67,330	\$8,280	\$59,050	27.2	18,184
Food Service & Refrigeration Measures			1,954	0.2	0	\$235	\$460	\$100	\$360	1.5	1,968
ECM 6	Vending Machine Control	Yes	1,954	0.2	0	\$235	\$460	\$100	\$360	1.5	1,968
TOTALS (COST EFFECTIVE MEASURES)			78,039	16.6	-16	\$9,215	\$33,368	\$15,773	\$17,595	1.9	76,722
TOTALS (ALL MEASURES)			97,733	33.6	-16	\$11,584	\$106,718	\$24,353	\$82,365	7.1	96,554

* - 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	X	
ECM 4	Install VFDs on Constant Volume (CV) Fans	X	X	
ECM 5	Install High Efficiency Air Conditioning Units	X	X	
ECM 6	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 (NJBP) has sponsored this Local Government Energy Audit (LGEA) Report for Cambridge Park Pre-K. 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 23, 2020 TRC performed an energy audit at Cambridge Park Pre-K located in Aberdeen, New Jersey. TRC met with Adam Nasr and Joe Czimcharo to review the facility operations and help focus our investigation on specific energy-using systems.

Cambridge Park Pre-K is a one-story, 46,524 square foot building built in 1970. Spaces include: classrooms, offices, conference rooms, multipurpose rooms, lobbies, corridors, stairwells, storage and mechanical space.

Recent improvements include: Over the last three years, all rooftop packaged units have been replaced. About six months ago the facility replaced fluorescent fixtures with LED fixtures in the board room, multipurpose room, Admin POD lobby, Admin offices 10 and 14, Lobby- building central section, main office and other administration offices.

2.2 Building Occupancy

The facility is occupied year-round. Typical weekday occupancy is 75 staff and 120 students.

Summer occupancy includes summer classes, administrative activities, and continuing maintenance activities. There are no weekend activities.

Building Name	Weekday/Weekend	Operating Schedule
Office Hours	Weekday	8:00 AM - 4:00 PM
	Weekend	Closed

Figure 4 - Building Occupancy Schedule

2.3 Building Envelope

Building walls are concrete block over structural steel with a brick facade. Most of the roof is flat and covered with white membrane with a pitched roof above hexagonal sections. The roof is in good condition.

The walls are made of concrete masonry units (CMUs) with a painted CMU interior finish.

Most of the windows are double pane and have aluminum frames. The glass-to-frame seals are in good condition. The operable window weather seals are in good condition, showing little evidence of excessive wear. Exterior doors have aluminum frames and are in good condition with undamaged door seals. Degraded window and door seals increase drafts and outside air infiltration.



Exterior walls



Exterior doors



Windows

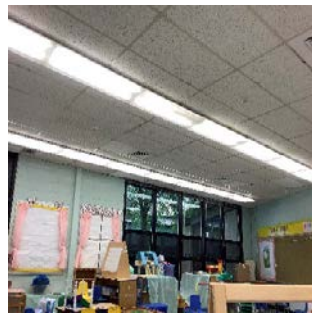


Roof

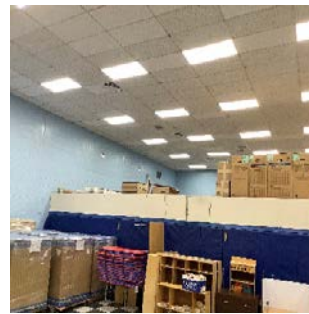
2.4 Lighting Systems

The primary interior lighting system uses 32-Watt linear fluorescent T8 lamps. There are also several 40-Watt and 50-Watt LED fixtures in hallways, offices and, the multipurpose room. Additionally, there are some compact fluorescent lamps (CFL), incandescent, and LED general purpose lamps. Typically, T8 fluorescent lamps use electronic ballasts.

Fixture types include 1-lamp, 2-lamp, or 3-lamp, 2-foot or 4-foot long recessed or surface mounted fixtures and 2-foot fixtures with linear tube lamps. All exit signs are LED units. Most fixtures are in good condition. Interior lighting levels were generally sufficient.



Classroom lighting



Multipurpose room lighting

Most lighting fixtures are controlled manually, and the remainder are controlled by occupancy sensors.



Remote occupancy sensor

Exterior fixtures include wall packs and canopy lights with LED lamps. Exterior fixtures are timer controlled.



Wall packs



Canopy lights

2.5 Air Handling Systems

Unit Ventilators

Unit ventilators provide heating and ventilation to some offices and classrooms. They are equipped with supply fan motors, outside air dampers, and hot water coils with zone valves that operate with a pneumatic control system. This system is original to the building and appears to be in fair operating condition.

Packaged and Split-system Units

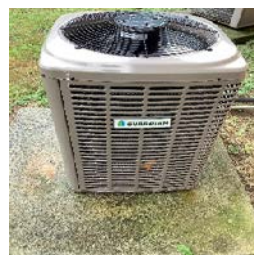
Some building areas are conditioned by multiple split-system and packaged roof top units, including:

Unit	Area Served	Size	Efficiency
Split-System AC (x11 units)	For Admin POD offices	4 tons	7.57 EER
Split-System AC	Office area condensing unit	3 tons	9.23 SEER
Split-System AC	Old unit for electrical closet	1 ton	7.31 EER
Packaged AC w/ gas-fired furnace	Board room RTU 3	11 tons 156 MBh	13.9 EER 80% AFUE
Packaged AC w/ gas-fired furnace	CST RTU 4	3 tons 49 MBh	14.8 EER 81.7% AFUE
Packaged AC w/ gas-fired furnace	Gym RTU 7	6 tons 120 MBh	14.0 EER 80% AFUE
Packaged AC w/ gas-fired furnace	Gym RTU 8	9 tons 156 MBh	13.9 EER 80% AFUE
Packaged AC w/ gas-fired furnace	Main office 5	8 tons 72.9 MBh	14.0 EER 81% AFUE
Packaged AC w/ gas-fired furnace	Maintenance Shop + office RTU 6	6 tons 120 MBh	14.0 EER 80% AFUE
Packaged AC w/ gas-fired furnace	Preschool POD classes RTU 1	18 tons 218.7 MBh	12.7 EER 81% AFUE
Packaged AC w/ gas-fired furnace	Preschool POD classes RTU 2	18 tons 218.7 MBh	12.7 EER 81% AFUE
Ductless Mini-Split HP	Nurse's office	0.75 tons 11 Mbh	20.2 SEER 3.88 COP

Refer to Appendix A for detailed information about each unit.



Ductless mini-split HP



Split-system AC



Packaged AC



Unit Ventilator

2.6 Heating Hot Water Systems

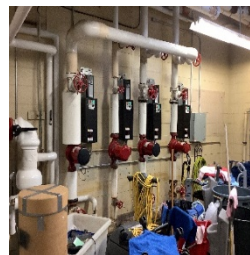
Three Lochinvar 1,380 MBh hot water boilers serve the reheat coils in unit ventilators in the administration offices and Pre-K classrooms pod section. They also provide hot water to small unit heaters throughout the building. The burners are fully modulating with a nominal efficiency of 92%. The boilers are configured in a lead-lag control scheme. Multiple boilers may be required under high load conditions. The boilers were installed in 2014, and they are in good condition.

The boilers are configured in a variable flow primary distribution with two 1.5 hp variable frequency drive (VFD) controlled hot water pumps operating under a lead-lag control scheme in one loop, and two 2 hp VFD controlled hot water pumps operating under a lead-lag control scheme in the other loop.

Hot water is supplied at between 170°F and 180°F during winter and between 100°F and 120°F in the summer.



Hot water boilers



Hot water pumps

2.7 Building Energy Management Systems (EMS)

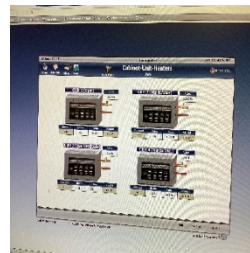
A Honeywell EMS controls the HVAC equipment, boilers, air handlers, and the package units. The EMS provides equipment scheduling control and monitors and controls space temperatures, supply air temperatures, and heating water loop temperatures.



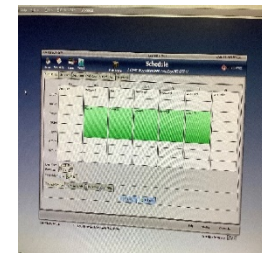
RTU dashboard



Exhaust fan schedule



Cabinet unit heater dashboard



HVAC operation schedule

2.8 Domestic Hot Water

Hot water is produced by a 117-gallon, 500 MBh gas-fired storage water heater with a 96% rated efficiency.

The domestic hot water pipes are insulated, and the insulation is in good condition.



Hot water heater

2.9 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 46 computer workstations throughout the facility. Plug loads throughout the building include general café and office equipment. There are classroom typical loads such as projectors and printers.

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

There is one refrigerated beverage vending machine and one non-refrigerated vending machine. Vending machines are not equipped with occupancy-based controls.



Vending machines

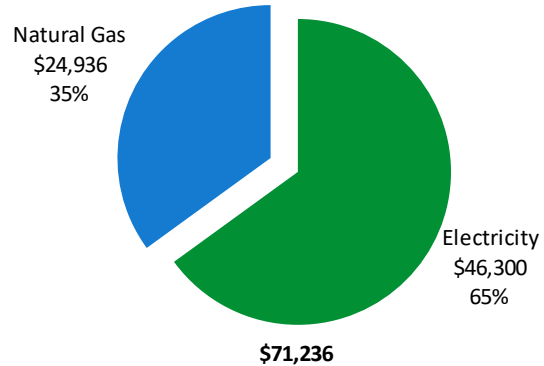
2.10 Water-Using Systems

There are restrooms with toilets, urinals, and sinks. 25 lavatory faucets with flow rates at 0.5 gallons per minute (gpm), considered low flow.

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	384,929 kWh	\$46,300
Natural Gas	23,136 Therms	\$24,936
Total		\$71,236



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.

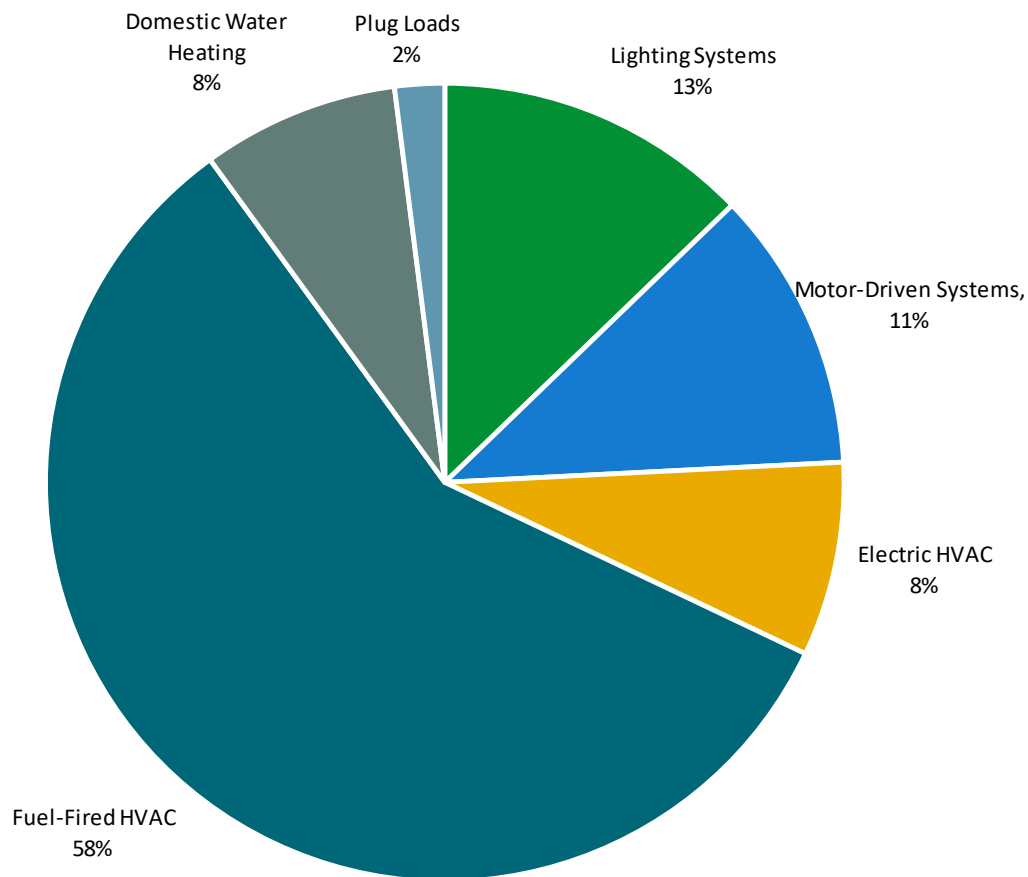
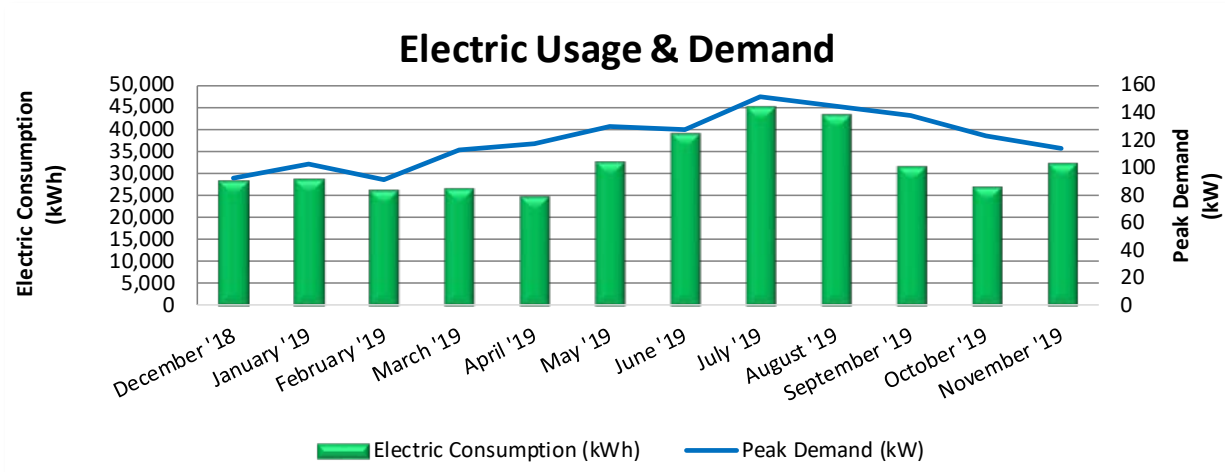


Figure 5 - Energy Balance

3.1 Electricity

JCP&L delivers electricity under rate class General Service Secondary and Outdoor Lighting Service, with electric production provided by East Coast Power, a third-party supplier.



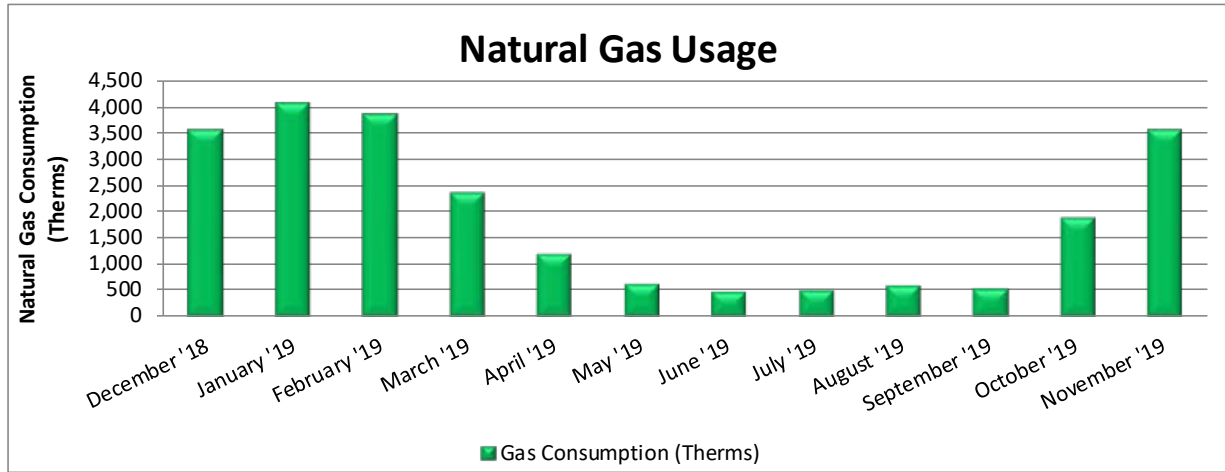
Electric Billing Data					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
1/14/19	34	28,506	92	\$468	\$3,256
2/12/19	29	28,644	103	\$522	\$3,361
3/13/19	29	26,238	92	\$499	\$3,103
4/11/19	29	26,602	112	\$606	\$3,194
5/10/19	29	24,780	117	\$673	\$3,171
6/12/19	33	32,701	130	\$700	\$3,925
7/12/19	30	38,939	128	\$781	\$4,639
8/12/19	31	45,059	152	\$941	\$5,399
9/12/19	31	43,380	144	\$890	\$5,187
10/10/19	28	31,740	138	\$792	\$3,968
11/8/19	29	27,060	123	\$697	\$3,425
12/12/19	34	32,335	115	\$592	\$3,799
Totals	366	385,984	152	\$8,161	\$46,427
Annual	365	384,929	152	\$8,138	\$46,300

Notes:

- Peak demand of 152 kW occurred in July 2019.
- Average demand over the past 12 months was 121 kW.
- The average electric cost over the past 12 months was \$0.120/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.
- There is a noticeable increase in electricity consumption in summer due to the increase in cooling load met by electric HVAC equipment.

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
1/15/19	33	3,549	\$3,981
2/12/19	28	4,076	\$4,157
3/15/19	31	3,858	\$3,778
4/15/19	31	2,348	\$2,294
5/14/19	29	1,184	\$1,335
6/17/19	34	607	\$880
7/17/19	30	470	\$752
8/15/19	29	484	\$755
9/13/19	29	588	\$840
10/11/19	28	517	\$773
11/12/19	32	1,885	\$1,942
12/13/19	31	3,570	\$3,449
Totals	365	23,136	\$24,936
Annual	365	23,136	\$24,936

Notes:

- The average gas cost for the past 12 months is \$1.078/therm, which is the blended rate used throughout the analysis.
- A majority of gas consumption occurs in winter due to the increased heating load met by the gas boilers and furnaces. Summer gas consumption is due to hot water reheat provided by the gas boilers as well as domestic hot water needs met by the gas water heater.

3.3 Benchmarking

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

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

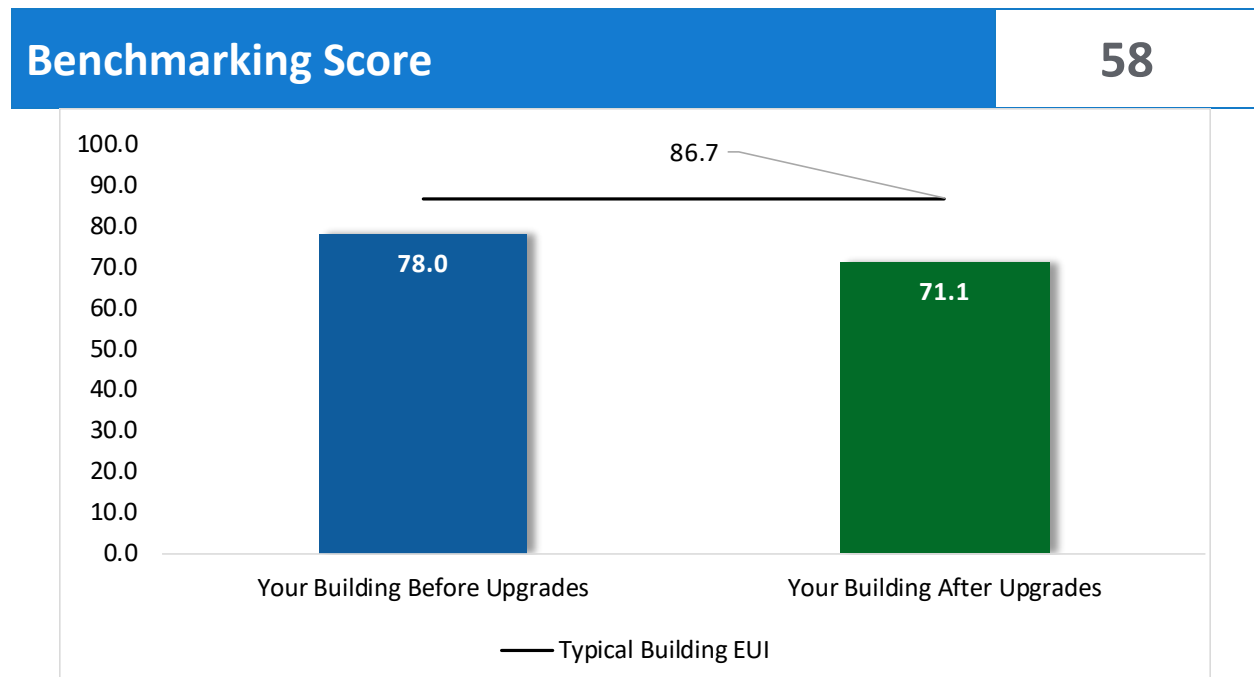


Figure 6 - Energy Use Intensity Comparison³

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 website⁴.

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

4 ENERGY CONSERVATION MEASURES

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

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

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

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

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			63,072	13.9	-13	\$7,444	\$20,903	\$11,198	\$9,705	1.3	61,969
ECM 1	Retrofit Fixtures with LED Lamps	Yes	63,072	13.9	-13	\$7,444	\$20,903	\$11,198	\$9,705	1.3	61,969
Lighting Control Measures			13,012	2.4	-3	\$1,536	\$12,005	\$4,475	\$7,530	4.9	12,785
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	11,447	2.2	-2	\$1,351	\$9,530	\$2,370	\$7,160	5.3	11,246
ECM 3	Install High/Low Lighting Controls	Yes	1,566	0.3	0	\$185	\$2,475	\$2,105	\$370	2.0	1,538
Variable Frequency Drive (VFD) Measures			1,636	0.6	0	\$197	\$6,020	\$300	\$5,720	29.1	1,647
ECM 4	Install VFDs on Constant Volume (CV) Fans	No	1,636	0.6	0	\$197	\$6,020	\$300	\$5,720	29.1	1,647
Electric Unitary HVAC Measures			18,058	16.4	0	\$2,172	\$67,330	\$8,280	\$59,050	27.2	18,184
ECM 5	Install High Efficiency Air Conditioning Units	No	18,058	16.4	0	\$2,172	\$67,330	\$8,280	\$59,050	27.2	18,184
Food Service & Refrigeration Measures			1,954	0.2	0	\$235	\$460	\$100	\$360	1.5	1,968
ECM 6	Vending Machine Control	Yes	1,954	0.2	0	\$235	\$460	\$100	\$360	1.5	1,968
TOTALS			97,733	33.6	-16	\$11,584	\$106,718	\$24,353	\$82,365	7.1	96,554

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

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

Figure 7 – All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades		63,072	13.9	-13	\$7,444	\$20,903	\$11,198	\$9,705	1.3	61,969
ECM 1	Retrofit Fixtures with LED Lamps	63,072	13.9	-13	\$7,444	\$20,903	\$11,198	\$9,705	1.3	61,969
Lighting Control Measures		13,012	2.4	-3	\$1,536	\$12,005	\$4,475	\$7,530	4.9	12,785
ECM 2	Install Occupancy Sensor Lighting Controls	11,447	2.2	-2	\$1,351	\$9,530	\$2,370	\$7,160	5.3	11,246
ECM 3	Install High/Low Lighting Controls	1,566	0.3	0	\$185	\$2,475	\$2,105	\$370	2.0	1,538
Food Service & Refrigeration Measures		1,954	0.2	0	\$235	\$460	\$100	\$360	1.5	1,968
ECM 6	Vending Machine Control	1,954	0.2	0	\$235	\$460	\$100	\$360	1.5	1,968
TOTALS		78,039	16.6	-16	\$9,215	\$33,368	\$15,773	\$17,595	1.9	76,722

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

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

Figure 8 – Cost Effective ECMs

4.1 Lighting

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades		63,072	13.9	-13	\$7,444	\$20,903	\$11,198	\$9,705	1.3	61,969
ECM 1	Retrofit Fixtures with LED Lamps	63,072	13.9	-13	\$7,444	\$20,903	\$11,198	\$9,705	1.3	61,969

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 and incandescent lamps with LED lamps. Many LED tubes are direct replacements for existing fluorescent tubes and can be installed while leaving the fluorescent fixture ballast in place. LED lamps can be used in existing fixtures as a direct replacement for most other lighting technologies.

This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space. Maintenance savings may also be available, as longer-lasting LEDs lamps will not need to be replaced as often as the existing lamps.

Affected building areas: all areas with fluorescent fixtures with T8 tubes; classrooms, offices, and storage and janitorial closets with incandescent lamps and CFLs.

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Control Measures		13,012	2.4	-3	\$1,536	\$12,005	\$4,475	\$7,530	4.9	12,785
ECM 2	Install Occupancy Sensor Lighting Controls	11,447	2.2	-2	\$1,351	\$9,530	\$2,370	\$7,160	5.3	11,246
ECM 3	Install High/Low Lighting Controls	1,566	0.3	0	\$185	\$2,475	\$2,105	\$370	2.0	1,538

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: offices, classrooms, multipurpose room, and restrooms.

ECM 3: Install High/Low Lighting Controls

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

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

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

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

Affected building areas: lobbies.

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

4.3 Variable Frequency Drives (VFD)

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		1,636	0.6	0	\$197	\$6,020	\$300	\$5,720	29.1	1,647
ECM 4	Install VFDs on Constant Volume (CV) Fans	1,636	0.6	0	\$197	\$6,020	\$300	\$5,720	29.1	1,647

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

We evaluated installing 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: RTU 3 (board room) and RTU 4 (CST offices).

4.4 Electric Unitary HVAC

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Electric Unitary HVAC Measures		18,058	16.4	0	\$2,172	\$67,330	\$8,280	\$59,050	27.2	18,184
ECM 5	Install High Efficiency Air Conditioning Units	18,058	16.4	0	\$2,172	\$67,330	\$8,280	\$59,050	27.2	18,184

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

ECM 5: Install High Efficiency Air Conditioning Units

We evaluated replacing standard efficiency packaged air conditioning units with high efficiency packaged air conditioning units. The magnitude of energy savings for this measure depends on the relative efficiency of the older unit versus the new high efficiency unit, the average cooling load, and the estimated annual operating hours.

Affected units: all York units serving admin pod, old unit serving electrical closet.

4.5 Food Service & Refrigeration Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Food Service & Refrigeration Measures		1,954	0.2	0	\$235	\$460	\$100	\$360	1.5	1,968
ECM 6	Vending Machine Control	1,954	0.2	0	\$235	\$460	\$100	\$360	1.5	1,968

ECM 6: 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.

4.6 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 alternate 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.

Expansion of an Energy Management System

Most of the facility is connected to an energy management system (EMS) which provides for centralized, remote control and monitoring of some of the building systems. An EMS utilizes a system of temperature and pressure sensors that obtain feedback about field conditions and provide signals to control systems that adjust HVAC system operation for optimal functioning. Thirty years ago, most control systems were pneumatic systems driven by compressed air, with pneumatic thermostats and air driven actuators for valves and dampers. Most of the pneumatics controls at this facility have largely been replaced by direct digital control (DDC) systems, but a small pneumatic system remains. Contemporary DDC systems afford tighter controls and enhanced monitoring and trending capabilities as compared to the older systems.

Based on our survey, it appears that the expansion of the EMS at your site could increase the efficiency of your building HVAC system operation by including the unit ventilators in the EMS.

A controls upgrade would expand automated equipment “start” and “stop” times, temperature setpoints, lockouts and deadbands to be programmed remotely using the existing graphic interface. Controls can be configured to optimize ventilation and outside air intake by adjusting economizer position, damper function and fan speed. Coordinated control of HVAC systems is dependent on a network of sensors and status points. A comprehensive building control system provides monitoring and control for all HVAC systems so operators can adjust system programming for optimal comfort and energy savings.

It is recommended that an HVAC engineer or contractor who specializes in energy management systems be contacted for a detailed evaluation and implementation costs. For the purposes of this report, the potential energy savings and measure costs were estimated based on industry standards and previous project experience. Further analysis should be conducted for the feasibility of this measure. This is not an investment grade analysis nor should be used as a basis for design and construction.

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 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.

In your case, a good time for retro-commissioning might be in combination with expansion of the EMS, providing an opportunity for fully integrating and balancing operation of your heating, ventilating, and cooling equipment.

5 ENERGY EFFICIENT BEST PRACTICES

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

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

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

Energy Tracking with ENERGY STAR® Portfolio Manager®



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

Lighting Maintenance



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

Lighting Controls

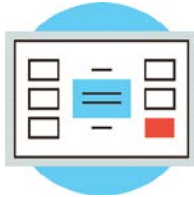
As part of a lighting maintenance schedule, test lighting controls to ensure proper functioning. For occupancy sensors, this requires triggering the sensor and verifying that the sensor's timer settings are correct. For daylight and photocell sensors, maintenance involves cleaning sensor lenses and confirming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

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

Motor Maintenance

Motors have many moving parts. As these parts degrade over time, the efficiency of the motor is reduced. Routine maintenance prevents damage to motor components. Routine maintenance should include cleaning surfaces and ventilation openings on motors to prevent overheating, lubricating moving parts to reduce friction, inspecting belts and pulleys for wear and to ensure they are at proper alignment and tension, and cleaning and lubricating bearings. Consult a licensed technician to assess these and other motor maintenance strategies.

Thermostat Schedules and Temperature Resets



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

Economizer Maintenance

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

Periodic inspection and maintenance will keep economizers working in sync with the heating and cooling system. This maintenance should be part of annual system maintenance, and it should include proper setting of the outdoor thermostat/enthalpy control, inspection of control and damper operation, lubrication of damper connections, and adjustment of minimum damper position.

AC System Evaporator/Condenser Coil Cleaning

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

HVAC Filter Cleaning and Replacement

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

Boiler Maintenance

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

Furnace Maintenance

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

Water Heater Maintenance

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

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

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

Water Conservation



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

For more information regarding water conservation go to the EPA's WaterSense® website⁶ or download a copy of EPA's "WaterSense® at Work: Best Management Practices for Commercial and Institutional Facilities"⁷ to get ideas for creating a water management plan and best practices for a wide range of water using systems.

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

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

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

Procurement Strategies

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

⁶ <https://www.epa.gov/watersense>.

⁷ <https://www.epa.gov/watersense/watersense-work-0>.

6 ON-SITE GENERATION

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

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

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

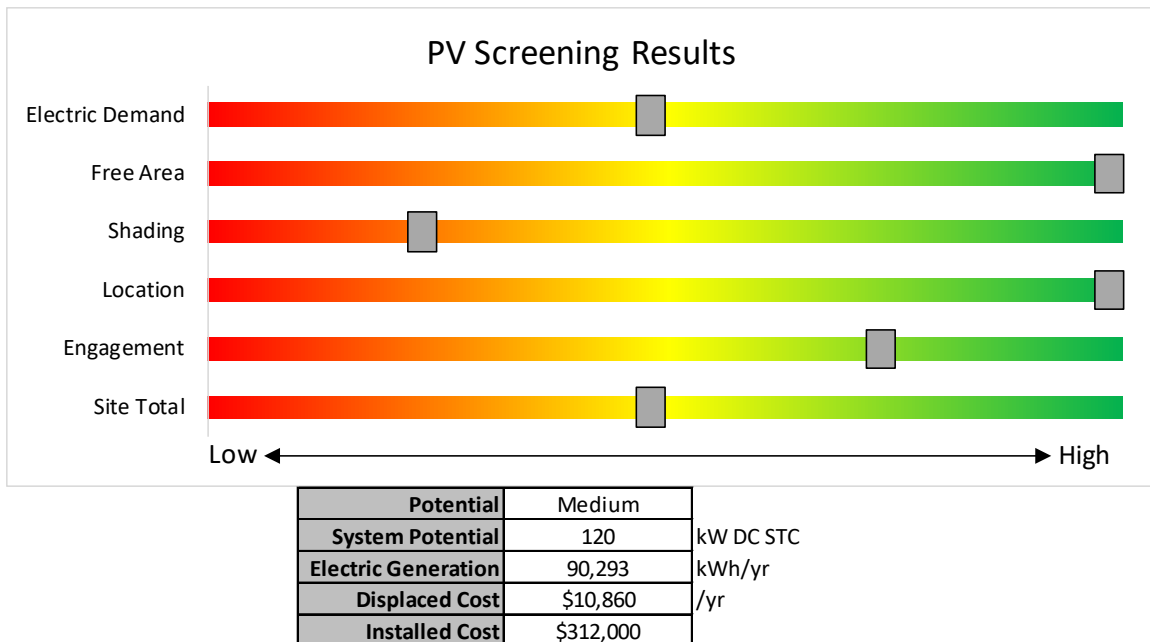


Figure 9 - Photovoltaic Screening

Transition Incentive (TI) Program

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

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

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

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

6.2 Combined Heat and Power

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

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

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

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

Based on a preliminary analysis, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation. 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.

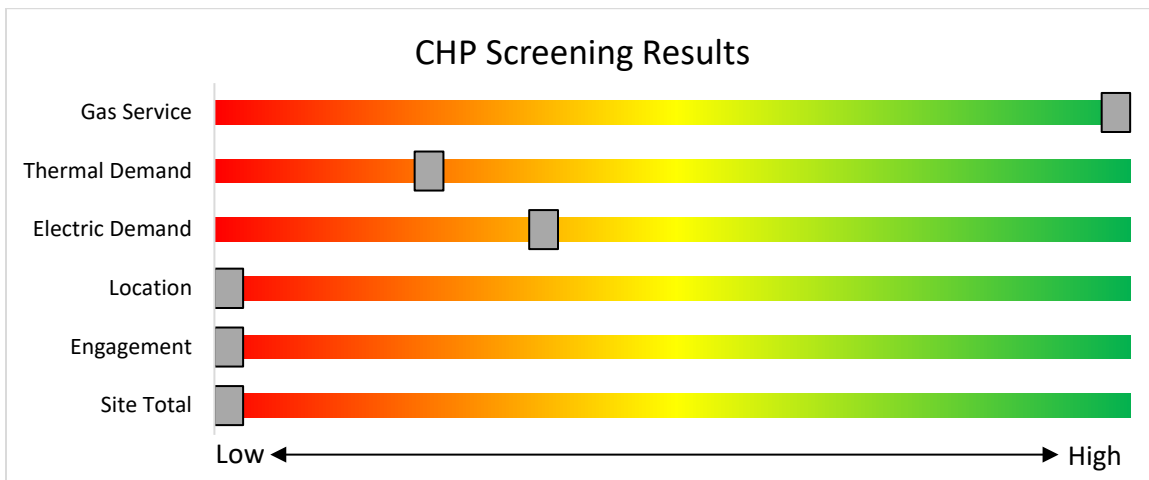


Figure 10 - CHP Screening

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

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.

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		
Gas Combustion Turbine	> 1 MW - 3 MW	\$550	30%	\$3 million
Microturbine	>3 MW	\$350		
Fuel Cells with Heat Recovery				
Waste Heat to Power*	<1 MW	\$1,000	30%	\$2 million
	> 1MW	\$500		\$3 million

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

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

How to Participate

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

7.5 Energy Savings Improvement Program

The Energy Savings Improvement Program (ESIP) serves New Jersey's government agencies by financing energy projects. An ESIP is a type of performance contract, whereby school districts, counties, municipalities, housing authorities and other public and state entities enter 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. $\$152 \times 0.85 = \$129.20/\text{MWh}$). The TREC factors are defined based on the chart below:

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

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

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

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

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

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

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

8 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

8.1 Retail Electric Supply Options

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

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

A list of licensed third-party electric suppliers is available at the NJBPU website⁸.

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 website⁹.

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

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

APPENDIX A: EQUIPMENT INVENTORY & RECOMMENDATIONS

Lighting Inventory & Recommendations

Location	Existing Conditions							Proposed Conditions							Energy Impact & Financial Analysis						
	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Admin Lounge	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.1	647	0	\$76	\$416	\$150	3.5
Admin POD Office 10	1	LED Lamps: (2) 40W A19 Screw-In Lamps	Wall Switch	S	80	3,500		None	No	1	LED Lamps: (2) 40W A19 Screw-In Lamps	Wall Switch	80	3,500	0.0	0	0	\$0	\$0	\$0	0.0
Admin POD Office 10	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1, 2	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.1	485	0	\$57	\$380	\$130	4.4
Admin POD Office 10	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,500	1, 2	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,415	0.5	2,425	-1	\$286	\$818	\$370	1.6
Admin POD Office 10	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,500	1, 2	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,415	0.2	1,212	0	\$143	\$544	\$220	2.3
Admin POD Office 10	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,500	1, 2	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,415	0.5	2,910	-1	\$343	\$927	\$430	1.4
Admin POD Office 11	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,500	0.0	127	0	\$15	\$37	\$20	1.1
Admin POD Office 11	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1, 2	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.4	1,940	0	\$229	\$708	\$310	1.7
Admin POD Office 11	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	3,500	1, 2	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,415	0.1	339	0	\$40	\$343	\$110	5.8
Admin POD Office 11	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,500	1, 2	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,415	0.1	485	0	\$57	\$226	\$100	2.2
Admin POD Office 12	1	Incandescent: (1) 65W A19 Screw-In Lamp	Wall Switch	S	65	3,500	1	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	10	3,500	0.0	213	0	\$25	\$17	\$2	0.6
Admin POD Office 12	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1, 2	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.4	2,263	0	\$267	\$781	\$350	1.6
Admin POD Office 13	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1, 2	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.4	1,940	0	\$229	\$708	\$310	1.7
Admin POD Office 13	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,500	0.0	127	0	\$15	\$37	\$20	1.1
Admin POD Office 13	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,500	1, 2	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,415	0.1	485	0	\$57	\$226	\$100	2.2
Admin POD Office 13	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,500	1, 2	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,415	0.2	970	0	\$114	\$489	\$190	2.6
Admin POD Office 14	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
Admin POD Office 14	1	LED Lamps: (1) 12W Plug-In Lamp	Wall Switch	S	12	3,500		None	No	1	LED Lamps: (1) 12W Plug-In Lamp	Wall Switch	12	3,500	0.0	0	0	\$0	\$0	\$0	0.0
Admin POD Office 14	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1, 2	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.5	2,910	-1	\$343	\$1,197	\$500	2.0
Admin POD Office 14	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.1	647	0	\$76	\$416	\$150	3.5
Admin POD Office 15	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
Admin POD Office 15	1	Incandescent: (1) 65W A19 Screw-In Lamp	Wall Switch	S	65	3,500	1	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	10	3,500	0.0	213	0	\$25	\$17	\$2	0.6
Admin POD Office 15	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1, 2	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.4	2,263	0	\$267	\$781	\$350	1.6
Admin POD Office 15	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1, 2	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.2	970	0	\$114	\$489	\$190	2.6
Admin POD Office 15	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,500	1	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,500	0.0	191	0	\$22	\$55	\$30	1.1

Location	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis								
	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Admin POD Office 16	1	Compact Fluorescent: (1) 18W Plug-In Lamp	Wall Switch	S	18	3,500	1	Relamp	No	1	LED Lamps: (1) 12W Plug-In Lamp	Wall Switch	12	3,500	0.0	23	0	\$3	\$13	\$2	3.9
Admin POD Office 16	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
Admin POD Office 16	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1, 2	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.4	2,263	0	\$267	\$781	\$350	1.6
Admin POD Office 16	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,500	1	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,500	0.0	191	0	\$22	\$55	\$30	1.1
Admin POD Office 17	1	Compact Fluorescent: (1) 18W Plug-In Lamp	Wall Switch	S	18	3,500	1	Relamp	No	1	LED Lamps: (1) 12W Plug-In Lamp	Wall Switch	12	3,500	0.0	23	0	\$3	\$13	\$2	3.9
Admin POD Office 17	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
Admin POD Office 17	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1, 2	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.1	485	0	\$57	\$380	\$130	4.4
Admin POD Office 17	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1, 2	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.5	2,425	-1	\$286	\$818	\$370	1.6
Admin POD Office 17	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,500	1, 2	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,415	0.1	485	0	\$57	\$226	\$100	2.2
Admin POD Office 17	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,500	1	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,500	0.0	191	0	\$22	\$55	\$30	1.1
Admin POD Office 18	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
Admin POD Office 18	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1, 2	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.5	2,587	-1	\$305	\$854	\$390	1.5
Admin POD Office 19	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,500	1, 2	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,415	0.2	970	0	\$114	\$489	\$190	2.6
Admin POD Office 19	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,500	1, 2	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,415	0.5	2,667	-1	\$315	\$872	\$400	1.5
Admin POD Office 20	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,500	1, 2	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,415	0.3	1,455	0	\$172	\$599	\$250	2.0
Admin POD Office 20	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,500	1, 2	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,415	0.2	970	0	\$114	\$489	\$190	2.6
Board Room	16	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	S	40	2,415		None	No	16	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	40	2,415	0.0	0	0	\$0	\$0	\$0	0.0
Board Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,415	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.0	175	0	\$21	\$73	\$40	1.6
Board Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,415	1	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.1	351	0	\$41	\$146	\$80	1.6
Boiler Room	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Boiler Room	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1	Relamp	No	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,500	0.2	1,271	0	\$150	\$365	\$200	1.1
Classroom POD Room 1	1	Compact Fluorescent: (1) 18W Plug-In Lamp	Wall Switch	S	18	3,500	1	Relamp	No	1	LED Lamps: (1) 12W Plug-In Lamp	Wall Switch	12	3,500	0.0	23	0	\$3	\$13	\$2	3.9
Classroom POD Room 1	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Classroom POD Room 1	1	Incandescent: (1) 40W A19 Screw-In Lamp	Wall Switch	S	40	3,500	1	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	6	3,500	0.0	131	0	\$15	\$17	\$2	1.0
Classroom POD Room 1	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,415	1	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.4	1,578	0	\$186	\$657	\$360	1.6

Location	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis								
	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Classroom POD Room 10	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 POD Room 10	1	Incandescent: (1) 40W A19 Screw-In Lamp	Wall Switch	S	40	3,500	1	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	6	3,500	0.0	131	0	\$15	\$17	\$2	1.0
Classroom POD Room 10	28	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,415	1	Relamp	No	28	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.7	2,455	-1	\$290	\$1,022	\$560	1.6
Classroom POD Room 11	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 POD Room 11	1	Incandescent: (1) 40W A19 Screw-In Lamp	Wall Switch	S	40	3,500	1	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	6	3,500	0.0	131	0	\$15	\$17	\$2	1.0
Classroom POD Room 11	26	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,415	1	Relamp	No	26	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.6	2,279	0	\$269	\$949	\$520	1.6
Classroom POD Room 2	1	Compact Fluorescent: (1) 18W Plug-In Lamp	Wall Switch	S	18	3,500	1	Relamp	No	1	LED Lamps: (1) 12W Plug-In Lamp	Wall Switch	12	3,500	0.0	23	0	\$3	\$13	\$2	3.9
Classroom POD Room 2	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 POD Room 2	1	Incandescent: (1) 40W A19 Screw-In Lamp	Wall Switch	S	40	3,500	1	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	6	3,500	0.0	131	0	\$15	\$17	\$2	1.0
Classroom POD Room 2	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,415	1	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.4	1,578	0	\$186	\$657	\$360	1.6
Classroom POD Room 3	1	Compact Fluorescent: (1) 18W Plug-In Lamp	Wall Switch	S	18	3,500	1	Relamp	No	1	LED Lamps: (1) 12W Plug-In Lamp	Wall Switch	12	3,500	0.0	23	0	\$3	\$13	\$2	3.9
Classroom POD Room 3	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 POD Room 3	1	Incandescent: (1) 40W A19 Screw-In Lamp	Wall Switch	S	40	3,500	1	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	6	3,500	0.0	131	0	\$15	\$17	\$2	1.0
Classroom POD Room 3	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,415	1	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.4	1,578	0	\$186	\$657	\$360	1.6
Classroom POD Room 4	1	Compact Fluorescent: (1) 18W Plug-In Lamp	Wall Switch	S	18	3,500	1	Relamp	No	1	LED Lamps: (1) 12W Plug-In Lamp	Wall Switch	12	3,500	0.0	23	0	\$3	\$13	\$2	3.9
Classroom POD Room 4	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Classroom POD Room 4	1	Incandescent: (1) 40W A19 Screw-In Lamp	Wall Switch	S	40	3,500	1	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	6	3,500	0.0	131	0	\$15	\$17	\$2	1.0
Classroom POD Room 4	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,415	1	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.4	1,578	0	\$186	\$657	\$360	1.6
Classroom POD Room 5	1	Compact Fluorescent: (1) 18W Plug-In Lamp	Wall Switch	S	18	3,500	1	Relamp	No	1	LED Lamps: (1) 12W Plug-In Lamp	Wall Switch	12	3,500	0.0	23	0	\$3	\$13	\$2	3.9
Classroom POD Room 5	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 POD Room 5	1	Incandescent: (1) 40W A19 Screw-In Lamp	Wall Switch	S	40	3,500	1	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	6	3,500	0.0	131	0	\$15	\$17	\$2	1.0
Classroom POD Room 5	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,415	1	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.4	1,578	0	\$186	\$657	\$360	1.6
Classroom POD Room 6	1	Compact Fluorescent: (1) 18W Plug-In Lamp	Wall Switch	S	18	3,500	1	Relamp	No	1	LED Lamps: (1) 12W Plug-In Lamp	Wall Switch	12	3,500	0.0	23	0	\$3	\$13	\$2	3.9
Classroom POD Room 6	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 POD Room 6	1	Incandescent: (1) 40W A19 Screw-In Lamp	Wall Switch	S	40	3,500	1	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	6	3,500	0.0	131	0	\$15	\$17	\$2	1.0

Location	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis								
	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Classroom POD Room 6	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,415	1	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.4	1,578	0	\$186	\$657	\$360	1.6
Classroom POD Room 7	1	Compact Fluorescent: (1) 18W Plug-In Lamp	Wall Switch	S	18	3,500	1	Relamp	No	1	LED Lamps: (1) 12W Plug-In Lamp	Wall Switch	12	3,500	0.0	23	0	\$3	\$13	\$2	3.9
Classroom POD Room 7	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 POD Room 7	1	Incandescent: (1) 40W A19 Screw-In Lamp	Wall Switch	S	40	3,500	1	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	6	3,500	0.0	131	0	\$15	\$17	\$2	1.0
Classroom POD Room 7	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,415	1	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.4	1,578	0	\$186	\$657	\$360	1.6
Classroom POD Room 8	1	Compact Fluorescent: (1) 18W Plug-In Lamp	Wall Switch	S	18	3,500	1	Relamp	No	1	LED Lamps: (1) 12W Plug-In Lamp	Wall Switch	12	3,500	0.0	23	0	\$3	\$13	\$2	3.9
Classroom POD Room 8	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 POD Room 8	1	Incandescent: (1) 40W A19 Screw-In Lamp	Wall Switch	S	40	3,500	1	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	6	3,500	0.0	131	0	\$15	\$17	\$2	1.0
Classroom POD Room 8	19	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,415	1	Relamp	No	19	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.5	1,666	0	\$197	\$694	\$380	1.6
Classroom POD Room 9	1	Compact Fluorescent: (1) 18W Plug-In Lamp	Wall Switch	S	18	3,500	1	Relamp	No	1	LED Lamps: (1) 12W Plug-In Lamp	Wall Switch	12	3,500	0.0	23	0	\$3	\$13	\$2	3.9
Classroom POD Room 9	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 POD Room 9	1	Incandescent: (1) 40W A19 Screw-In Lamp	Wall Switch	S	40	3,500	1	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	6	3,500	0.0	131	0	\$15	\$17	\$2	1.0
Classroom POD Room 9	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,415	1	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.4	1,578	0	\$186	\$657	\$360	1.6
Electrical Room 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	500	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	345	0.1	46	0	\$5	\$189	\$40	27.3
Exterior Lighting (building)	3	LED - Fixtures: 30W Wall Pack LED Fixtures	Timeclock		30	4,380		None	No	3	LED - Fixtures: 30W Wall Pack LED Fixtures	Timeclock	30	4,380	0.0	0	0	\$0	\$0	\$0	0.0
Exterior Lighting (Building)	16	LED - Fixtures: 50W Wall Pack LED Fixtures	Timeclock		50	4,380		None	No	16	LED - Fixtures: 50W Wall Pack LED Fixtures	Timeclock	50	4,380	0.0	0	0	\$0	\$0	\$0	0.0
Multipurpose Room	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
Multipurpose Room	35	LED - Fixtures: 50W Hard Ceiling LED Fixtures	Wall Switch	S	50	3,500	2	None	Yes	35	LED - Fixtures: 50W Hard Ceiling LED Fixtures	Occupancy Sensor	50	2,415	0.4	2,089	0	\$247	\$810	\$210	2.4
Multipurpose Room	3	LED - Fixtures: 50W Hard Ceiling LED Fixtures	Wall Switch	S	50	3,500	2	None	Yes	3	LED - Fixtures: 50W Hard Ceiling LED Fixtures	Occupancy Sensor	50	2,415	0.0	179	0	\$21	\$270	\$70	9.5
Janitorial Closet 1	1	Incandescent: (1) 65W A19 Screw-In Lamp	Wall Switch	S	65	500	1	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	10	500	0.0	30	0	\$4	\$17	\$2	4.2
Janitorial Closet 2	1	Incandescent: (1) 65W A19 Screw-In Lamp	Wall Switch	S	65	500	1	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	10	500	0.0	30	0	\$4	\$17	\$2	4.2
Janitorial Closet 3	1	Incandescent: (1) 65W A19 Screw-In Lamp	Wall Switch	S	65	500	1	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	10	500	0.0	30	0	\$4	\$17	\$2	4.2
Janitorial Closet 3	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	500	1	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	500	0.0	9	0	\$1	\$33	\$12	19.8
Lobby - Admin POD	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
Lobby - Admin POD	17	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	S	40	2,415		None	No	17	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	40	2,415	0.0	0	0	\$0	\$0	\$0	0.0

Location	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis								
	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Lobby - Boiler room area	2	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Wall Switch	S	40	3,500	3	None	Yes	2	LED - Fixtures: 40W Hard Ceiling LED Fixtures	High/Low Control	40	2,415	0.0	95	0	\$11	\$225	\$140	7.5
Lobby - Boiler room area	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1, 3	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,415	0.2	970	0	\$114	\$444	\$345	0.9
Lobby - Central Area	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 - Central Area	7	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Wall Switch	S	40	3,500	3	None	Yes	7	LED - Fixtures: 40W Hard Ceiling LED Fixtures	High/Low Control	40	2,415	0.1	334	0	\$39	\$450	\$450	0.0
Lobby - Central Area	8	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Wall Switch	S	40	3,500	3	None	Yes	8	LED - Fixtures: 40W Hard Ceiling LED Fixtures	High/Low Control	40	2,415	0.1	382	0	\$45	\$450	\$450	0.0
Lobby - Central Area	2	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Wall Switch	S	40	3,500	3	None	Yes	2	LED - Fixtures: 40W Hard Ceiling LED Fixtures	High/Low Control	40	2,415	0.0	95	0	\$11	\$225	\$140	7.5
Lobby - Central Area	3	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Wall Switch	S	40	3,500	3	None	Yes	3	LED - Fixtures: 40W Hard Ceiling LED Fixtures	High/Low Control	40	2,415	0.0	143	0	\$17	\$225	\$210	0.9
Lobby - Central Area	3	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Wall Switch	S	40	3,500	3	None	Yes	3	LED - Fixtures: 40W Hard Ceiling LED Fixtures	High/Low Control	40	2,415	0.0	143	0	\$17	\$225	\$210	0.9
Lobby - Central Area	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,415	0.1	323	0	\$38	\$298	\$180	3.1
Lobby - Classroom POD	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
Lobby - Classroom POD	17	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	S	40	2,415		None	No	17	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	40	2,415	0.0	0	0	\$0	\$0	\$0	0.0
Lobby - Receiving area	2	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Wall Switch	S	40	3,500	3	None	Yes	2	LED - Fixtures: 40W Hard Ceiling LED Fixtures	High/Low Control	40	2,415	0.0	95	0	\$11	\$225	\$140	7.5
Main Office	1	Incandescent: (2) 40W A19 Screw-In Lamps	Wall Switch	S	80	3,500	1	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	12	3,500	0.0	262	0	\$31	\$34	\$4	1.0
Main Office	1	Incandescent: (2) 40W A19 Screw-In Lamps	Wall Switch	S	80	3,500	1	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	12	3,500	0.0	262	0	\$31	\$34	\$4	1.0
Main Office	6	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	S	40	2,415		None	No	6	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	40	2,415	0.0	0	0	\$0	\$0	\$0	0.0
Main Office	4	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	S	40	2,415		None	No	4	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	40	2,415	0.0	0	0	\$0	\$0	\$0	0.0
Main Office	10	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	S	40	2,415		None	No	10	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	40	2,415	0.0	0	0	\$0	\$0	\$0	0.0
Main Office	6	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	S	40	2,415		None	No	6	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	40	2,415	0.0	0	0	\$0	\$0	\$0	0.0
Main Office	1	LED - Fixtures: 17W Hard Ceiling LED Fixture	Wall Switch	S	17	3,500		None	No	1	LED - Fixtures: 17W Hard Ceiling LED Fixture	Wall Switch	17	3,500	0.0	0	0	\$0	\$0	\$0	0.0
Main Office	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	3,500	1	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,500	0.0	62	0	\$7	\$33	\$12	2.8
Main Office	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	3,500	1	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,500	0.0	62	0	\$7	\$33	\$12	2.8
Main Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	3,500	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,500	0.0	67	0	\$8	\$18	\$10	1.0
Main Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,415	1	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.1	351	0	\$41	\$146	\$80	1.6
Main Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.1	323	0	\$38	\$189	\$80	2.9
Main Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,500	0.0	127	0	\$15	\$37	\$20	1.1

Location	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis								
	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Main Office (1)	2	Incandescent: (1) 40W A19 Screw-In Lamp	Wall Switch	S	40	3,500	1, 2	Relamp	Yes	2	LED Lamps: A19 Lamps	Occupancy Sensor	6	2,415	0.1	276	0	\$33	\$150	\$44	3.3
Main Office (1)	10	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	S	40	2,415		None	No	10	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	40	2,415	0.0	0	0	\$0	\$0	\$0	0.0
Main Office (1)	6	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	S	40	2,415		None	No	6	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	40	2,415	0.0	0	0	\$0	\$0	\$0	0.0
Main Office (1)	1	LED - Fixtures: 17W Hard Ceiling LED Fixture	Wall Switch	S	17	3,500		None	No	1	LED - Fixtures: 17W Hard Ceiling LED Fixture	Wall Switch	17	3,500	0.0	0	0	\$0	\$0	\$0	0.0
Main Office (1)	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	3,500	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,500	0.0	67	0	\$8	\$18	\$10	1.0
Maint. Workshop	2	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	S	40	2,415		None	No	2	LED - Fixtures: 40W Hard Ceiling LED Fixtures	Occupancy Sensor	40	2,415	0.0	0	0	\$0	\$0	\$0	0.0
Maint. Workshop	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,415	1	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.4	1,578	0	\$186	\$657	\$360	1.6
Maint. Workshop	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,415	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.0	175	0	\$21	\$73	\$40	1.6
Maint Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	500	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	500	0.0	18	0	\$2	\$37	\$20	7.7
Nurse's Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,500	0.0	127	0	\$15	\$37	\$20	1.1
Nurse's Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,500	1, 2	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,415	0.2	970	0	\$114	\$489	\$190	2.6
Nurse's Office	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,500	1, 2	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,415	0.3	1,697	0	\$200	\$653	\$280	1.9
Restroom 1	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	3,500	1	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	3,500	0.0	52	0	\$6	\$16	\$6	1.7
Restroom 10	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.1	323	0	\$38	\$189	\$40	3.9
Restroom 2	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	3,500	1	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	3,500	0.0	52	0	\$6	\$16	\$6	1.7
Restroom 3	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.1	647	0	\$76	\$416	\$150	3.5
Restroom 4	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.1	647	0	\$76	\$416	\$150	3.5
Restroom 5	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.1	323	0	\$38	\$189	\$40	3.9
Restroom 6	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.1	323	0	\$38	\$189	\$40	3.9
Restroom 7	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	3,500	1	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	3,500	0.0	52	0	\$6	\$16	\$6	1.7
Restroom 8	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	3,500	1	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	3,500	0.0	52	0	\$6	\$16	\$6	1.7
Restroom 9	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.1	323	0	\$38	\$189	\$40	3.9
Staff Lounge	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,415	1	Relamp	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,415	0.2	877	0	\$103	\$365	\$200	1.6
Storage 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	500	1	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	500	0.0	27	0	\$3	\$55	\$30	7.7
Storage Room 1	1	Compact Fluorescent: (1) 18W Plug-In Lamp	Wall Switch	S	18	500	1	Relamp	No	1	LED Lamps: (1) 12W Plug-In Lamp	Wall Switch	12	500	0.0	3	0	\$0	\$13	\$2	27.0



Motor Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions							Proposed Conditions					Energy Impact & Financial Analysis						
		Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	HVAC pneumatic control	2	Air Compressor	3.0	86.5%	No	W	1,460		No	86.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Large	4	Exhaust Fan	1.0	82.5%	No	W	2,500		No	82.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Medium	6	Exhaust Fan	0.5	70.0%	No	W	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Small	7	Exhaust Fan	0.3	70.0%	No	W	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Electrical Room 1	Classroom POD	1	Supply Fan	0.5	70.0%	No	W	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Boiler Room	HHW pump loop 2	2	Heating Hot Water Pump	2.0	86.5%	Yes	W	2,745		No	86.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Boiler Room	HHW pumps loop 1	2	Heating Hot Water Pump	1.5	84.0%	Yes	W	2,745		No	84.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Admin POD Office 10	Admin POD Office 10	1	Supply Fan	0.5	70.0%	No	B	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Admin POD Office 10	Admin POD Office 10	1	Supply Fan	0.3	70.0%	No	B	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Admin POD Office 11	Admin POD Office 11	1	Supply Fan	0.3	70.0%	No	B	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Admin POD Office 11	Admin POD Office 11	1	Supply Fan	0.5	70.0%	No	B	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Admin POD Office 12	Admin POD Office 12	1	Supply Fan	0.3	70.0%	No	B	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Admin POD Office 12	Admin POD Office 12	1	Supply Fan	0.5	70.0%	No	B	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Admin POD Office 13	Admin POD Office 13	1	Supply Fan	0.3	70.0%	No	B	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Admin POD Office 13	Admin POD Office 13	1	Supply Fan	0.5	70.0%	No	B	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Admin POD Office 14	Admin POD Office 14	1	Supply Fan	0.3	70.0%	No	B	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Admin POD Office 14	Admin POD Office 14	1	Supply Fan	0.5	70.0%	No	B	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Admin POD Office 15	Admin POD Office 15	1	Supply Fan	0.5	70.0%	No	B	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Admin POD Office 15	Admin POD Office 15	1	Supply Fan	0.3	70.0%	No	B	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Admin POD Office 16	Admin POD Office 16	1	Supply Fan	0.3	70.0%	No	B	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0

		Existing Conditions							Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	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
Admin POD Office 16	Admin POD Office 16	1	Supply Fan	0.5	70.0%	No	B	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Admin POD Office 17	Admin POD Office 17	1	Supply Fan	0.3	70.0%	No	B	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Admin POD Office 17	Admin POD Office 17	1	Supply Fan	0.5	70.0%	No	B	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Admin POD Office 18	Admin POD Office 18	1	Supply Fan	0.5	70.0%	No	B	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Admin POD Office 18	Admin POD Office 18	1	Supply Fan	0.3	70.0%	No	B	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Admin POD Office 19	Admin POD Office 19	1	Supply Fan	0.5	70.0%	No	B	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Admin POD Office 19	Admin POD Office 19	1	Supply Fan	0.3	70.0%	No	B	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Admin POD Office 20	Admin POD Office 20	1	Supply Fan	0.3	70.0%	No	B	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Admin POD Office 20	Admin POD Office 20	1	Supply Fan	0.5	70.0%	No	B	2,500		No	70.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Board room RTU 3	1	Supply Fan	5.0	89.5%	Yes	W	2,500		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	CST RTU 4	1	Supply Fan	1.0	85.5%	No	W	2,500	4	No	85.5%	Yes	1	0.3	818	0	\$98	\$3,010	\$150	29.1
Roof	Gym RTU 7	1	Supply Fan	1.0	85.5%	Yes	W	2,250		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Gym RTU 8	1	Supply Fan	3.0	89.5%	Yes	W	2,250		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Main office 5	1	Supply Fan	2.0	86.5%	Yes	W	2,500		No	86.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Maint. Shop + office RTU 6	1	Supply Fan	2.0	86.5%	Yes	W	2,500		No	86.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Pre school POD classes RTU 1	1	Supply Fan	7.5	91.0%	Yes	W	2,750		No	91.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Pre school POD classes RTU 2	1	Supply Fan	7.5	91.0%	Yes	W	2,750		No	91.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Board room RTU 3	1	Exhaust Fan	3.0	89.5%	Yes	W	2,500		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	CST RTU 4	1	Exhaust Fan	1.0	85.5%	No	W	2,500	4	No	85.5%	Yes	1	0.3	818	0	\$98	\$3,010	\$150	29.1
Roof	Gym RTU 7	1	Exhaust Fan	1.0	85.5%	Yes	W	2,500		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0

Location	Area(s)/System(s) Served	Existing Conditions							Proposed Conditions					Energy Impact & Financial Analysis						
		Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	Gym RTU 8	1	Exhaust Fan	2.0	86.5%	Yes	W	2,500		No	86.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Main office 5	1	Exhaust Fan	3.0	89.5%	Yes	W	2,500		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Maint. Shop + office RTU 6	1	Exhaust Fan	1.0	85.5%	Yes	W	2,500		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Pre school POD classes RTU 1	1	Exhaust Fan	5.0	89.5%	Yes	W	2,500		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Pre school POD classes RTU 2	1	Exhaust Fan	7.5	91.0%	Yes	W	2,500		No	91.0%	No		0.0	0	0	\$0	\$0	\$0	0.0



Electric HVAC Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions						Proposed Conditions							Energy Impact & Financial Analysis						
		System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Admin POD Office 10	For Admin POD offices	11	Split-System AC	4.00		B	5	Yes	11	Split-System AC	4.00		14.00		16.0	17,627	0	\$2,120	\$65,834	\$8,096	27.2
Roof	Office area condensing unit	1	Split-System AC	3.00		W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Super old unit for electrical closet	1	Split-System AC	1.00		B	5	Yes	1	Split-System AC	1.00		14.00	0.4	431	0	\$52	\$1,496	\$184	25.3	
Roof	Board room RTU 3	1	Packaged AC	11.00		W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	CST RTU 4	1	Packaged AC	3.00		W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Gym RTU 7	1	Packaged AC	6.00		W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Gym RTU 8	1	Packaged AC	9.00		W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Main office 5	1	Packaged AC	8.00		W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Maint. Shop + office RTU 6	1	Packaged AC	6.00		W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Pre school POD classes RTU 1	1	Packaged AC	18.00		W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Pre school POD classes RTU 2	1	Packaged AC	18.00		W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Nurse's office	1	Ductless Mini-Split HP	0.75	11.00	N		No						0.0	0	0	\$0	\$0	\$0	0.0	

Fuel Heating Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
		System Quantity	System Type	Output Capacity per Unit (MBh)	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years	
Boiler Room	Heating hot water system	3	Condensing Hot Water Boiler	1,380	W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Board room RTU 3	1	Furnace	156	W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	CST RTU 4	1	Furnace	49	W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Gym RTU 7	1	Furnace	120	W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Gym RTU 8	1	Furnace	156	W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Main office 5	1	Furnace	73	W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Maint. Shop + office RTU 6	1	Furnace	120	W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Pre school POD classes RTU 1	1	Furnace	219	W		No						0.0	0	0	\$0	\$0	\$0	0.0	
Roof	Pre school POD classes RTU 2	1	Furnace	219	W		No						0.0	0	0	\$0	\$0	\$0	0.0	

DHW Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions			Proposed Conditions							Energy Impact & Financial Analysis						
		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	Entire facility DHW	1	Storage Tank Water Heater (> 50 Gal)	N		No						0.0	0	0	\$0	\$0	\$0	0.0

Plug Load Inventory

Location	Existing Conditions			
	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Multiple Locations	8	Coffee Machine	400	No
Multiple Locations	46	Desktop	75	No
Multiple Locations	8	Microwave	1,000	No
Multiple Locations	5	Printer (Medium/Small)	20	No
Multiple Locations	14	Printer/Copier (Large)	515	No
Multiple Locations	21	Projector	200	No
Admin POD Office 14	1	Refrigerator (Mini)	30	No
Multiple Locations	3	Refrigerator (Residential)	600	No
Multiple Locations	2	Toaster Oven	1,200	No
Bus Yard	1	Engine Block Warmers	12,000	No

Vending Machine Inventory & Recommendations

Location	Existing Conditions		Proposed Conditions		Energy Impact & Financial Analysis						
	Quantity	Vending Machine Type	ECM #	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Lobby - Receiving area	1	Refrigerated	6	Yes	0.2	1,612	0	\$194	\$230	\$100	0.7
Lobby - Receiving area	1	Non-Refrigerated	6	Yes	0.0	343	0	\$41	\$230	\$0	5.6

APPENDIX B: ENERGY STAR® STATEMENT OF ENERGY PERFORMANCE

EUI is presented in terms of *site energy* and *source energy*. Site energy is the amount of fuel and electricity consumed by a building as reflected in utility bills. Source energy includes fuel consumed to generate electricity consumed at the site, factoring in electric production and distribution losses for the region.

ENERGY STAR® Statement of Energy Performance

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58

ENERGY STAR®
Score¹

Cambridge Park Administration Building & Pre-K

Primary Property Type: Office
Gross Floor Area (ft²): 46,524
Built: 1970

For Year Ending: January 31, 2020
Date Generated: May 08, 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 Cambridge Park Administration Building & Pre-K 1 Crest Way Aberdeen, New Jersey 07747	Property Owner Matawan-Aberdeen Regional School District One Crest Way Aberdeen, NJ 07747 (732) 705-4016	Primary Contact Adam Nasr One Crest Way Aberdeen, NJ 07747 (732) 705-4013 anasr@marsd.k12.nj.us
Property ID: 4353743		

Energy Consumption and Energy Use Intensity (EUI)			
Site EUI 77.7 kBtu/ft²	Annual Energy by Fuel		National Median Comparison
	Electric - Grid (kBtu)	1,309,444 (36%)	National Median Site EUI (kBtu/ft²) 88.7
	Natural Gas (kBtu)	2,306,395 (64%)	National Median Source EUI (kBtu/ft²) 145.9
		% Diff from National Median Source EUI -10%	
Source EUI 130.9 kBtu/ft²	Annual Emissions		Greenhouse Gas Emissions (Metric Tons CO2e/year) 255

Signature & Stamp of Verifying Professional

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

LP Signature: _____ Date: _____

Licensed Professional

 () _____



Professional Engineer or Registered Architect Stamp (if applicable)

APPENDIX C: GLOSSARY

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

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

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