Local Government Energy Audit Report

Clayton J. Davenport Elementary School

July 11, 2019

Prepared for:
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Disclaimer

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

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

TRC bases estimated installation costs on our experience at similar facilities, pricing from local contractors and vendors, and/or cost estimates from RS Means. We encourage the owner of the facility 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.

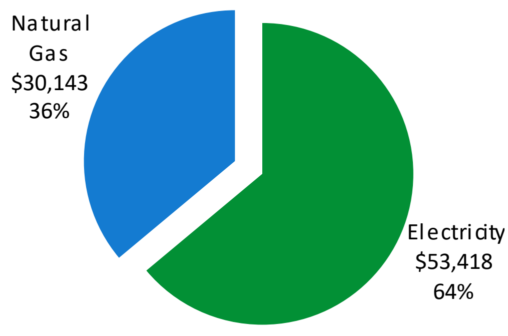
Table of Contents

1 Executive Summary

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

BUILDING PERFORMANCE REPORT

Annual Utilities	Costs: $83,561 Electricity: 535,363 kWh Natural Gas: 24,496 Therms	
ENERGY STAR® Benchmarking Score	86 *(1-100 scale)*	Congratulations, your building performs better than the national average. This report has suggestions about how to keep your building running efficiently, further improve performance and lower your energy bills even more.



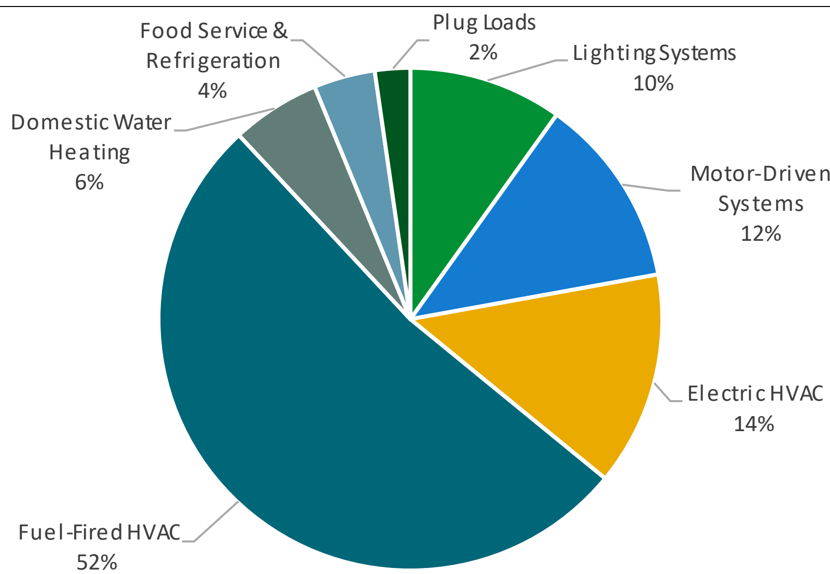


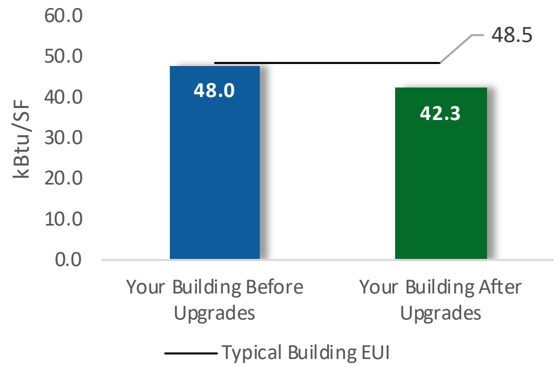
Figure 1 - Energy Use by System

POTENTIAL IMPROVEMENTS

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

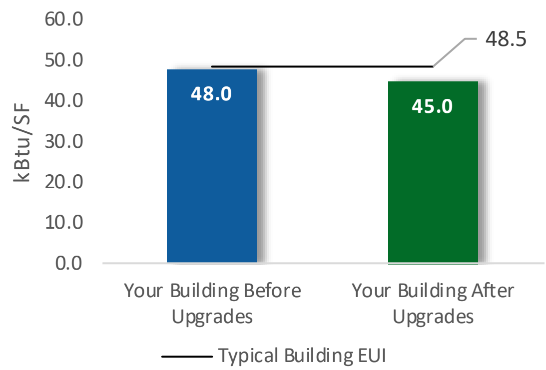
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$177,520
Potential Rebates & Incentives[1]	$19,971
Annual Cost Savings	$15,161
Annual Energy Savings	Electricity: 153,860 kWh
Greenhouse Gas Emission Savings	77 Tons
Simple Payback	10.4 Years
Site Energy Savings (all utilities)	12%



Scenario 2: Cost Effective Package[2]

Installation Cost	$54,584
Potential Rebates & Incentives	$10,783
Annual Cost Savings	$8,063
Annual Energy Savings	Electricity: 82,345 kWh
Greenhouse Gas Emission Savings	41 Tons
Simple Payback	5.4 Years
Site Energy Savings (all utilities)	6%



On-site Generation Potential

Photovoltaic	High
Combined Heat and Power	None

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

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

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Lifetime Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**76,677**	**26.3**	**-12**	**$7,498**	**$112,467**	**$54,131**	**$10,733**	**$43,398**	**5.8**	**75,758**
ECM 1	Install LED Fixtures	16,010	3.3	-1	$1,584	$23,765	$18,215	$1,400	$16,815	10.6	15,997
ECM 2	Retrofit Fixtures with LED Lamps	60,666	23.0	-11	$5,913	$88,702	$35,916	$9,333	$26,583	4.5	59,760
Lighting Control Measures		**14,711**	**6.0**	**-3**	**$1,430**	**$11,440**	**$23,296**	**$2,460**	**$20,836**	**14.6**	**14,454**
	Install Occupancy Sensor Lighting Controls	13,271	5.4	-3	$1,290	$10,320	$20,296	$2,460	$17,836	13.8	13,039
	Install High/Low Lighting Controls	1,440	0.6	0	$140	$1,120	$3,000	$0	$3,000	21.4	1,415
Motor Upgrades		**1,859**	**0.9**	**0**	**$185**	**$2,782**	**$14,625**	**$0**	**$14,625**	**78.9**	**1,872**
	Premium Efficiency Motors	1,859	0.9	0	$185	$2,782	$14,625	$0	$14,625	78.9	1,872
Variable Frequency Drive (VFD) Measures		**48,032**	**19.9**	**0**	**$4,793**	**$71,890**	**$38,883**	**$5,500**	**$33,383**	**7.0**	**48,368**
	Install VFD on Variable Air Volume (VAV) Fans	16,759	11.4	0	$1,672	$25,083	$18,105	$5,500	$12,605	7.5	16,876
	Install VFDs on Chilled Water Pumps	15,637	5.6	0	$1,560	$23,403	$10,389	$0	$10,389	6.7	15,746
	Install VFDs on Heating Water Pumps	15,637	2.9	0	$1,560	$23,403	$10,389	$0	$10,389	6.7	15,746
Electric Unitary HVAC Measures		**3,900**	**4.9**	**0**	**$389**	**$5,836**	**$41,098**	**$1,228**	**$39,870**	**102.5**	**3,927**
	Install High Efficiency Air Conditioning Units	3,900	4.9	0	$389	$5,836	$41,098	$1,228	$39,870	102.5	3,927
Domestic Water Heating Upgrade		**4,056**	**0.0**	**0**	**$405**	**$4,047**	**$222**	**$0**	**$222**	**0.5**	**4,084**
ECM 3	Install Low-Flow DHW Devices	4,056	0.0	0	$405	$4,047	$222	$0	$222	0.5	4,084
Food Service & Refrigeration Measures		**4,625**	**0.5**	**0**	**$462**	**$4,707**	**$5,265**	**$50**	**$5,215**	**11.3**	**4,658**
	Refrigerator/Freezer Case Electrically Commutated Motors	983	0.1	0	$98	$1,471	$1,517	$0	$1,517	15.5	990
	Replace Refrigeration Equipment	2,030	0.2	0	$203	$2,431	$3,518	$0	$3,518	17.4	2,045
ECM 4	Vending Machine Control	1,612	0.2	0	$161	$804	$230	$50	$180	1.1	1,623
TOTALS		**153,860**	**58.5**	**-16**	**$15,161**	**$213,169**	**$177,520**	**$19,971**	**$157,549**	**10.4**	**153,120**

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

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

Figure 2 – Evaluated Energy Improvements

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

1.1 Planning Your Project

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

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

Pick Your Installation Approach

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

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

Energy Conservation Measure		SmartStart	Direct Install	Pay For Performance
ECM 1	Install LED Fixtures	X		X
ECM 2	Retrofit Fixtures with LED Lamps	X		X
ECM 3	Install Low-Flow Domestic Hot Water Devices			X
ECM 4	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 loan also use this program. Pay for Performance works for larger customers with a peak demand over 200 kW. The minimum installed scope of work must include at least two unique measures resulting in at least 15% energy savings, where lighting cannot make up the majority of the savings.

More Options from Around the State

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

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

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

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

Ongoing Electric Savings with Demand Response

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

2 Existing Conditions

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

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

2.1 Site Overview

On December 18, 2018, TRC performed an energy audit at Clayton J. Davenport Elementary School located in Egg Harbor Township, New Jersey. TRC met with Shawn Braue to review the facility operations and help focus our investigation on specific energy-using systems.

Clayton J. Davenport Elementary School is a one-story, 89,100 square foot building built in 1975. Spaces include: classrooms, a gymnasium, an auditorium, offices, a cafeteria, corridors, stairwells, offices, a commercial kitchen, and mechanical space.

Recent improvements include replacing the existing T12 fluorescent fixtures with T8 fluorescent fixtures over the last several years. Fixtures in the majority of the classrooms are now linear fluorescent T8 lamps. Three condensing hot water boilers serve the school's heating needs. Most of the equipment is in good operating condition.

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

2.2 Building Occupancy

The facility is occupied year-round, from September through June, etc. Typical weekday occupancy is 90 staff and 374 students.

Summer occupancy includes continuing maintenance activities only. There are no weekend activities.

Building Name	Weekday/Weekend	Operating Schedule
Clayton J. Davenport Elementary School	Weekday	8:00 AM - 4:00 PM
	Weekend	Unoccupied

Figure 4 - Building Occupancy Schedule

2.3 Building Envelope

The exterior walls are made of poured concrete with a brick veneer and gypsum drywall interior finish.

The flat roof is supported with steel trusses and a reinforced concrete deck and finished with an insulated layer and a covering of PVC white membrane. It is in good condition.

The roof encloses conditioned space. The thermal barrier is between this space and the conditioned space below at the roof.

Windows are double-glazed and have aluminum frames with a thermal break wood frame. The glass-to-frame seals are in good condition. The operable window weather seals are in good condition, showing no evidence of excessive wear. Exterior doors have aluminum frames with glass pane and are in good condition, with undamaged door seals. Degraded window and door seals increase drafts and outside air infiltration.

Building Windows

Building Walls

Building Roof

Building Exterior

2.4 Lighting Systems

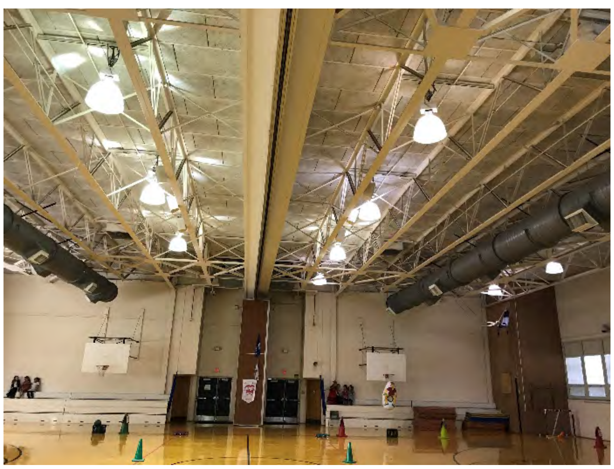
The primary interior lighting system uses 32-Watt linear fluorescent T8 lamps with electronic ballasts. Additionally, there are some compact fluorescent lamps (CFL), incandescent, and LED general purpose lamps. Fixture types include 2-, 3- and 4-lamp, 2- and 4-foot long troffers or recessed mounted fixtures, and 2-foot fixtures with U-bend and linear tube lamps.

The gymnasium fixtures have 150-Watt metal halide fixtures; the gym offices fixtures are 32-Watt linear fluorescent T8 fixtures and are manually controlled.

All exit signs are LED units. Interior lighting levels were generally sufficient.

Cafeteria Lighting

Server room lighting



Gym Lighting

Kitchen Lighting

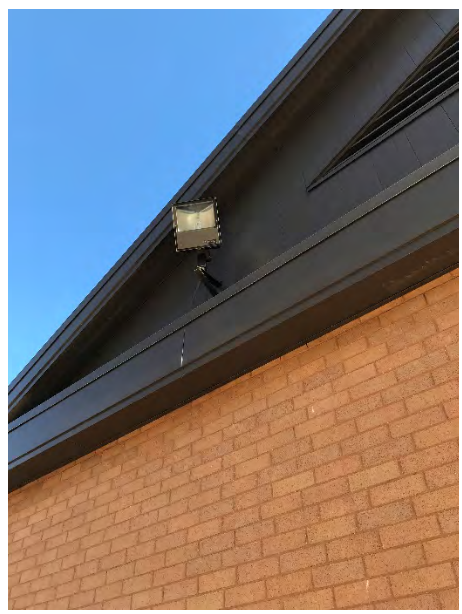
Most lighting fixtures are controlled manually by wall switches.

Exterior fixtures include 37-Watt wall-mounted area LED fixtures, 150-Watt and 250-Watt metal halide fixtures, and 45-Watt LED flood lamps. Exterior fixtures are photocell controlled.

Wall Mounted Exterior Fixture

Wall Mounted Box Fixture

LED Flood Fixture



LED Spot Fixture

2.5 Air Handling Systems

Unit Ventilators

Four different types of unit ventilators, with 0.1 hp supply fan motors, serve the classrooms' heating and cooling needs. A total of 43-unit ventilators serve different classrooms where heating is provided by hot water from boilers and cooling by chilled water loop from chillers. This system is original to the building and appears to be in fair operating condition. Unit ventilators are controlled by the BMS.

There are a total of 19 fan coil units with supply fan motors ranging from 0.1 hp to 0.3 hp that mainly serve the D-wing area of school.

Packaged Units

Four air handling units (AHU-1A,1B,2A & 2B) serves gym and auditorium respectively with supply fan ranging in size from 7.5 hp to 10 hp. These units are equipped with an air-side economizer bringing in more fresh air during shoulder season months.

Library and locker rooms are served with HRU (heat recovery) and BCU (blower coil) units with supply fan ranging in size from 1 hp to 5 hp and return fan for Locker room unit is a 3 hp controlled by the EMS.

Health Office, Main office and Counselor office are served by packaged roof top units (RTU-1,2 & 3). There are three units ranging in size from 2 to 8-ton cooling capacity. These units are not equipped with economizers that are in fair condition. The supply fan motors ranging in size from 0.5 hp to 2 hp and return air fan ranging in size from 0.5 hp to 1 hp. These units are controlled by the BMS.

Air Conditioners

Three EMI ductless mini-split air conditioning (AC) units serves IDF and MDF areas. These vary in capacity between 1 and 2-tons. These units are 17 years old and in fair condition. They range in efficiency between 8 EER to 8.50 EER. They are not ENERGY STAR® labeled.

AHU in Gym

RTU on Roof

Split System Unit in IDF room

Unit Ventilator

2.6 Heating Hot Water Systems

Three Aerco 2790 MBh condensing hot water boilers serve the building heating load. The burners are fully-modulating with a nominal efficiency of 93%. The boilers are configured in a lead-lag control scheme. Multiple boilers are required under high load conditions. Installed in 2009, they are in good condition. There is a service contract in place.

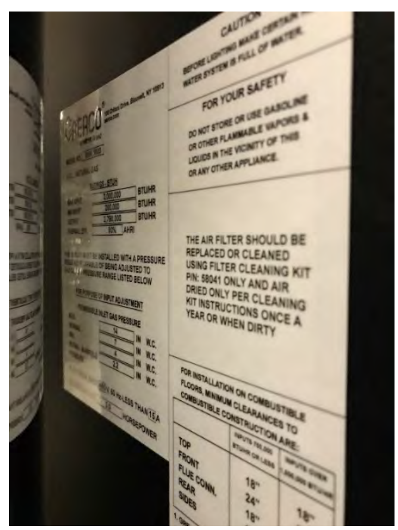
The boilers are configured in a constant flow primary distribution (HHWP 1 and 2) with two 15 hp constant speed hot water pumps operating with a lead lag control scheme. The boilers provide hot water to fan coil units, unit ventilators, AHUs, HRU and BCU unit throughout the building.

Hot water is supplied at 155°F when the outside air temperature is low, and the outside air enable setpoint is 60°F. Occupancy temperature setpoint is adjusted between 68°F to 72°F during cold weather period.

Boiler 1

Heating HW Pumps

Boiler Front Panel



Boiler Nameplate

2.7 Chilled Water Systems

The chiller plant consists of a two 160-ton, Carrier, R-22, air cooled screw chillers (CH1 and CH2). The chillers are configured in a primary- secondary distribution loop with two 15 hp constant flow primary pumps (CWP5 and 6) and two 25 hp variable flow secondary pumps (SCWP3 and 4). Variable frequency drives control the secondary distribution pumps.

water is distributed at 42°F when the outside air temperature is above 60°F and the setpoint is reset to 53°F when the outside air is below 55°F. The chiller plant is locked out when the outside air temperature is below 45°F, and it is turned off from mid-October to March.

The chiller plant supplies chilled water to AHUs, fan coil units and unit ventilators. The chiller plant has a peak load of 300 tons. Installed in 2002, both chillers are in good condition and well maintained. The facility engineers manually stage on chillers to meet the load, operating the least number of chillers required.

Outdoor Chillers

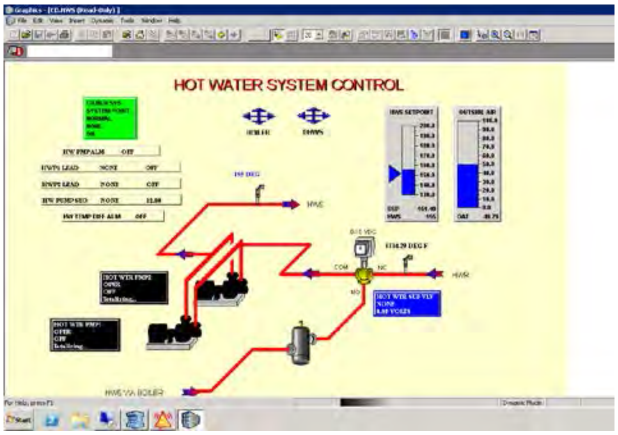
Chiller

Chilled Water Pumps

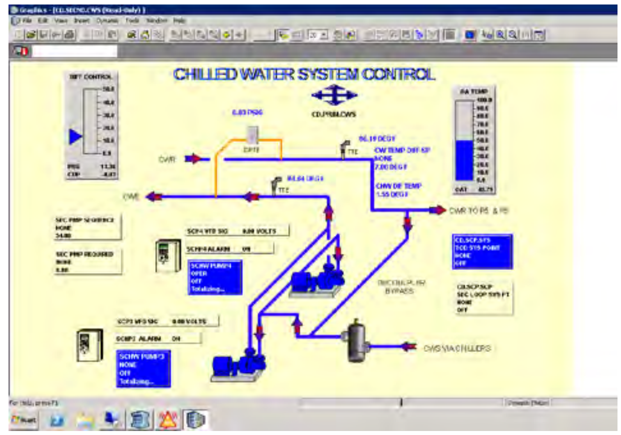
Chiller Nameplate

2.8 Building Energy Management Systems (EMS)

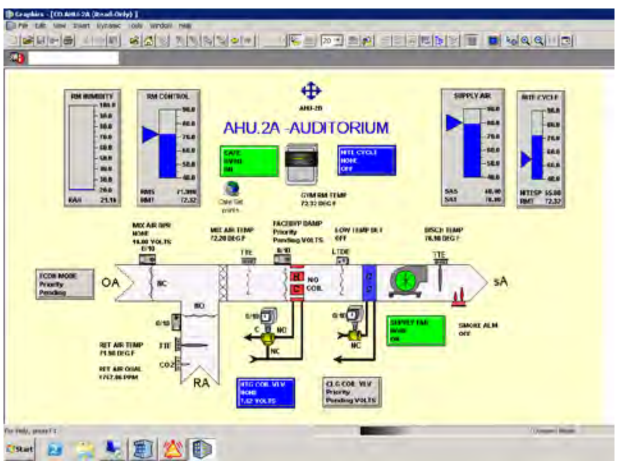
A Siemens EMS controls the HVAC equipment, the boilers, the chillers, the air handlers, fan coil units, unit ventilators and the package units. The EMS provides equipment scheduling control and monitors and controls space temperatures, supply air temperatures, humidity, heating water loop temperatures and chilled water loop temperatures.



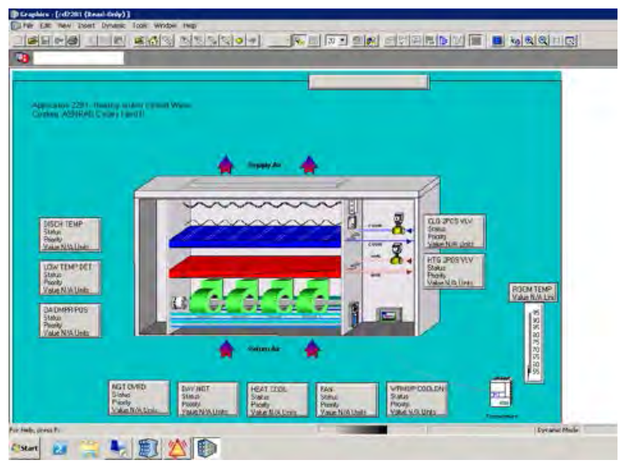
Hot Water System on BMS



Chilled Water System on BMS



AHU Control on BMS



Unit Ventilator Control on BMS

2.9 Domestic Hot Water

Hot water is produced with a 1000 MBh gas-fired tankless water heater with a 93% efficiency and three Bradford white 4.5 kW electric storage water heaters. Two water heater has storage tank capacity of 50 gallon and other one has 40-gallon storage tank. All four water heaters are in good condition. Domestic hot water supplied by 0.5 hp water supply pump to kitchen and rest room areas.

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

Electric DHW Heater

Electric DHW heater nameplate

Gas fired DHW Heater

Electric Water Heater

2.10 Food Service Equipment

The kitchen has mixed gas and electric equipment that is used to prepare lunches for students. Most cooking is done using two convection electric oven. Bulk prepared foods are held in two electric holding cabinets. There is one gas steamer and one electric steamer to cook soups. Equipment is high-efficiency and is in good condition.

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

Serving Table

Insulated Heated Cabinet

Convection Oven

Gas Steamer

2.11 Refrigeration

The kitchen has one stand-up refrigerators with either solid doors. There are two chest type milk coolers to store milk and other dairy products. All equipment is high-efficiency and in good condition.

The Bally walk-in refrigerator has an estimated 0.72-ton compressor located on roof and two fan evaporators equipped with an evaporator fan control and no defrost control.

The Bally walk-in low temperature freezer has an estimated 0.72-ton compressor located on roof and three fan evaporators equipped with an evaporator fan control no defrost control.

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

Walk In cooler and Freezer

Compressor Units on Roof

Freezer Evaporator fans

Milk Cooler

2.12 Plug Load & Vending Machines

The utility bill analysis indicates that plug loads consume approximately 2.27% percent of total building energy use. This is lower than a typical building.

You seem to already be doing a great job managing your electrical plug loads. This report makes additional suggestions for ECMs in this area as well as Energy Efficient Best Practices.

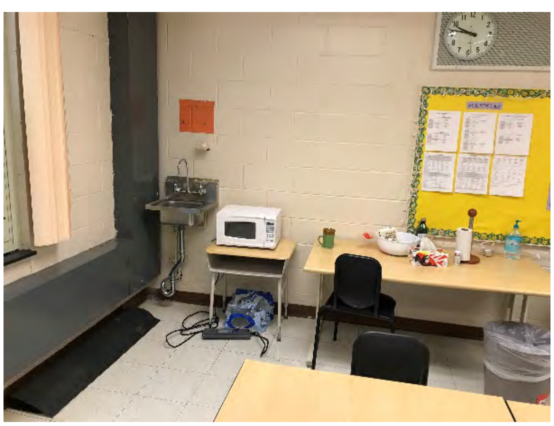
There are approximately 180 computer work stations throughout the facility. Plug loads throughout the building include general cafeteria serving tables and office equipment. There are classroom typical loads such as smart boards, projectors, Portable fans and printers.

There are several residential style refrigerators throughout the building that are used to store staff lunches and cold beverages. These vary in condition and efficiency.

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

Vending Machine

Classroom Projector



Microwave

Copy Machine

2.13 Water-Using Systems

There are 12 restrooms with toilets, urinals, and sinks. Faucet flow rates are at 2.5 gallons per minute (gpm) or higher. Toilets are rated at 1.6 gallons per flush (gpf) and urinals are rated at 1.2 gpf.

2.14 On-Site Generation

Davenport Elementary School has a 189.41 kW photovoltaic (PV) array with approximately 806 modules that was installed in 2011. This system provides approximately 20-30% of the electricity used at the Elementary School.

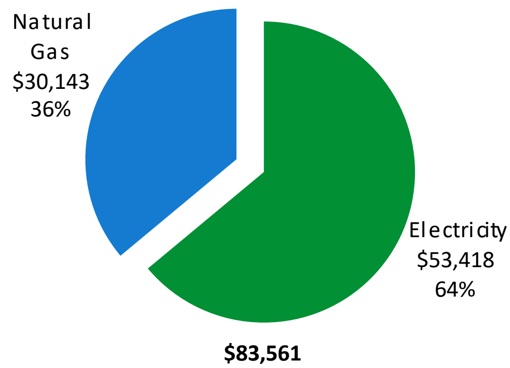
Solar Panels on Roof

Solar Array

3 Energy Use and Costs

Twelve months of utility billing data are used to develop annual energy consumption and cost data. This information creates a profile of the annual energy consumption and energy costs.

Utility Summary		
Fuel	**Usage**	**Cost**
Electricity	535,363 kWh	$53,418
Natural Gas	24,496 Therms	$30,143
Total		**$83,561**



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.

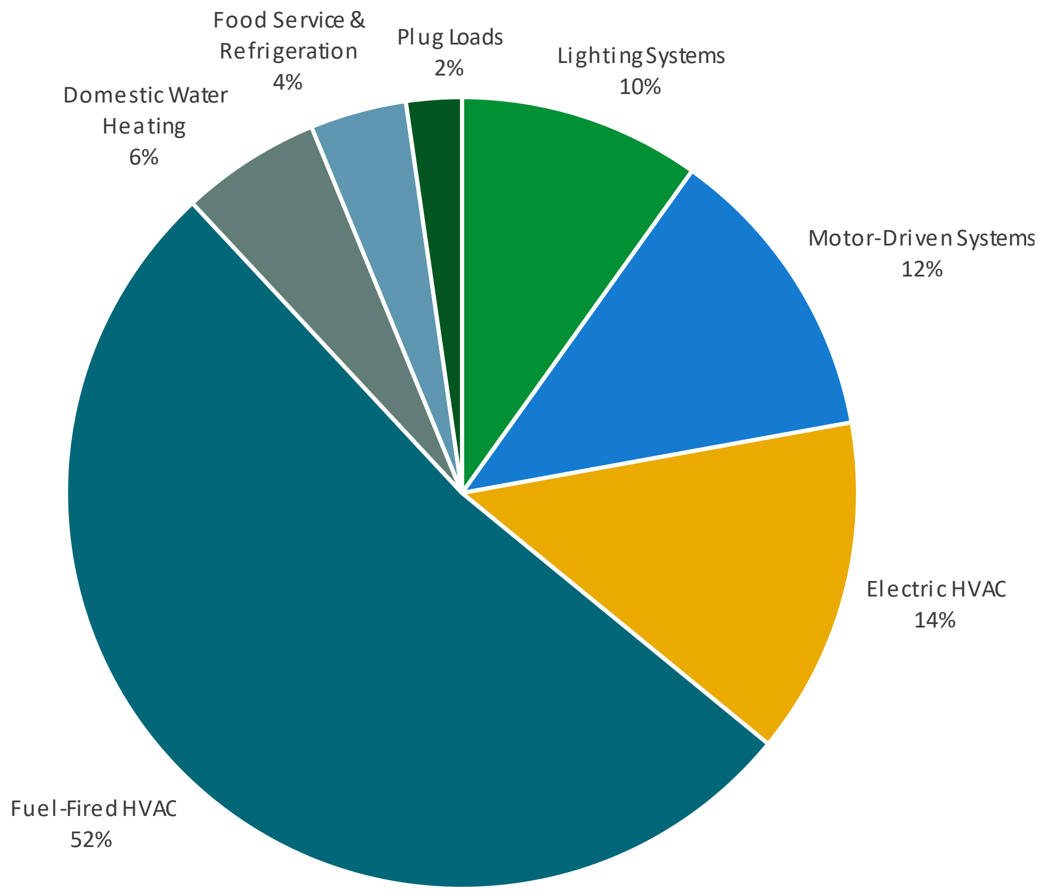
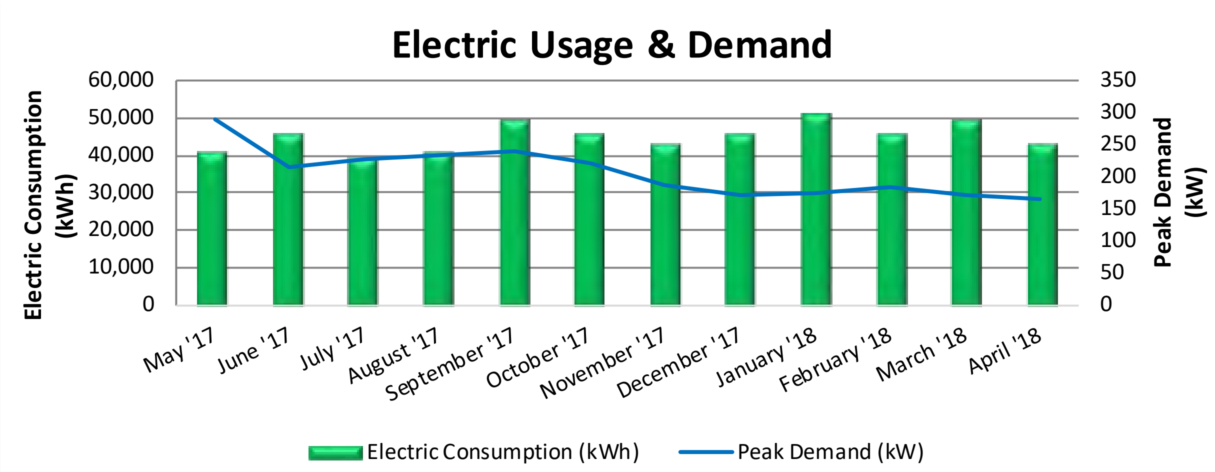


Figure 5 - Energy Balance

3.1 Electricity

Atlantic City Electric delivers electricity under rate class Annual General Service Secondary.



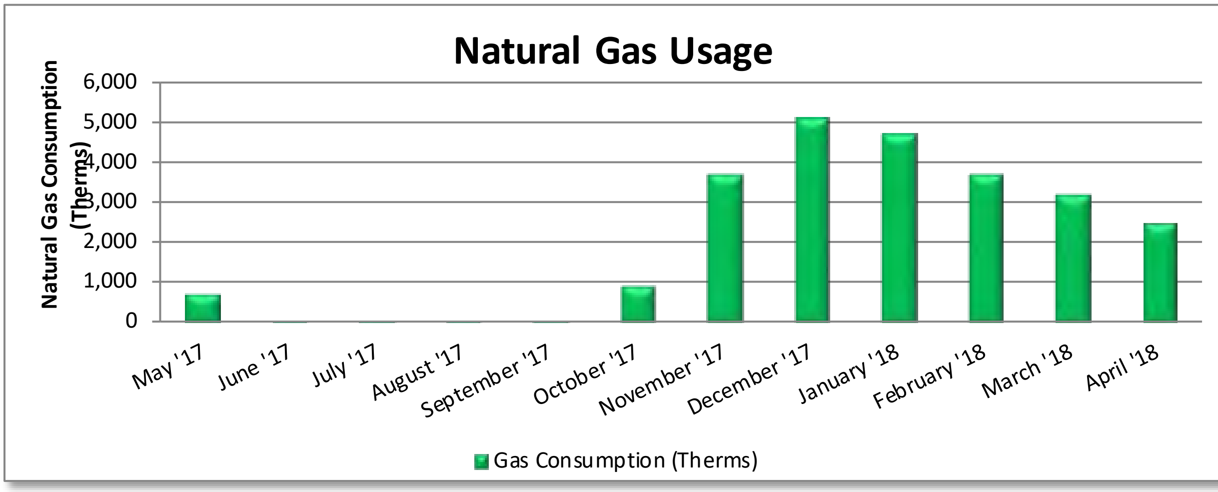
Electric Billing Data					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
5/31/17	31	40,638	289	$2,632	$6,119
6/30/17	30	45,377	215	$2,196	$3,768
7/31/17	31	38,765	227	$2,269	$3,784
8/31/17	31	40,844	235	$2,269	$4,085
9/30/17	30	49,343	240	$2,196	$4,177
10/31/17	31	45,493	221	$2,234	$4,131
11/30/17	30	42,447	187	$1,875	$4,081
12/31/17	31	45,129	171	$1,937	$5,407
1/31/18	31	50,599	173	$1,933	$5,471
2/28/18	28	45,204	185	$1,746	$5,098
3/31/18	31	49,058	170	$1,933	$3,980
4/30/18	30	42,466	166	$1,812	$3,318
Totals	**365**	**535,363**	**289**	**$25,032**	**$53,418**
Annual	**365**	**535,363**	**289**	**$25,032**	**$53,418**

Notes:

- Peak demand of 289 kW occurred in May '17.
- The average electric cost over the past 12 months was $0.100/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.
- Some of the electricity generated on-site is used on-site and the remainder is exported to the grid.

3.2 Natural Gas

South Jersey Gas delivers natural gas under rate class General Service.



Gas Billing Data				
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**	**TRC Estimated Usage?**
5/31/17	31	703	$766	No
6/30/17	30	31	$63	Yes
7/31/17	31	31	$63	No
8/31/17	31	31	$63	No
9/30/17	30	31	$56	No
10/31/17	31	942	$1,095	No
11/30/17	30	3,685	$4,545	No
12/31/17	31	5,069	$6,251	No
1/31/18	31	4,664	$5,796	No
2/28/18	28	3,661	$4,579	No
3/31/18	31	3,193	$3,927	No
4/30/18	30	2,455	$2,939	No
Totals	**365**	**24,496**	**$30,143**	
Annual	**365**	**24,496**	**$30,143**	

Notes:

- The average gas cost for the past 12 months is $1.231/therm, which is the blended rate used throughout the analysis.
- In summer months, very little usage of natural gas can be seen because of boilers mostly running for a very little period of time and minimal heating load needs.

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 county, 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.

Benchmarking Score	86

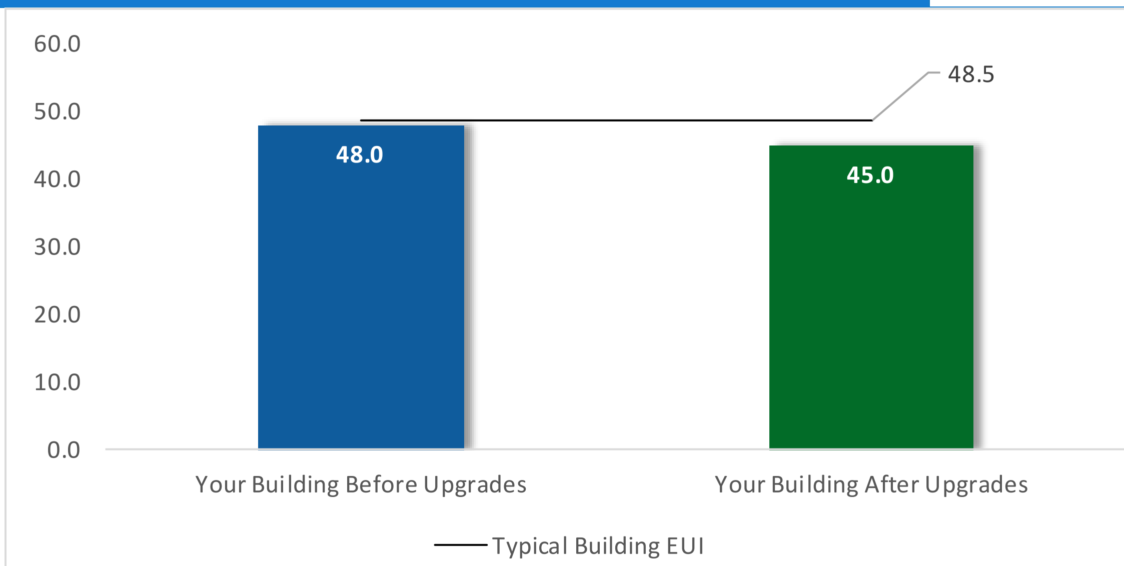


Figure 6 - Energy Use Intensity Comparison

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

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

Tracking Your Energy Performance

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

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

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

For more information on ENERGY STAR® and Portfolio Manager®, visit their website[3].

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

4 Energy Conservation Measures

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

Calculations of energy use and savings are based on the current version of the *New Jersey's Clean Energy Program Protocols to Measure Resource Savings*, which is approved by the New Jersey Board of Public Utilities. 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.

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**76,677**	**26.3**	**-12**	**$7,498**	**$54,131**	**$10,733**	**$43,398**	**5.8**	**75,758**
ECM 1	Install LED Fixtures	16,010	3.3	-1	$1,584	$18,215	$1,400	$16,815	10.6	15,997
ECM 2	Retrofit Fixtures with LED Lamps	60,666	23.0	-11	$5,913	$35,916	$9,333	$26,583	4.5	59,760
Lighting Control Measures		**14,711**	**6.0**	**-3**	**$1,430**	**$23,296**	**$2,460**	**$20,836**	**14.6**	**14,454**
	Install Occupancy Sensor Lighting Controls	13,271	5.4	-3	$1,290	$20,296	$2,460	$17,836	13.8	13,039
	Install High/Low Lighting Controls	1,440	0.6	0	$140	$3,000	$0	$3,000	21.4	1,415
Motor Upgrades		**1,859**	**0.9**	**0**	**$185**	**$14,625**	**$0**	**$14,625**	**78.9**	**1,872**
	Premium Efficiency Motors	1,859	0.9	0	$185	$14,625	$0	$14,625	78.9	1,872
Variable Frequency Drive (VFD) Measures		**48,032**	**19.9**	**0**	**$4,793**	**$38,883**	**$5,500**	**$33,383**	**7.0**	**48,368**
	Install VFD on Variable Air Volume (VAV) Fans	16,759	11.4	0	$1,672	$18,105	$5,500	$12,605	7.5	16,876
	Install VFDs on Chilled Water Pumps	15,637	5.6	0	$1,560	$10,389	$0	$10,389	6.7	15,746
	Install VFDs on Heating Water Pumps	15,637	2.9	0	$1,560	$10,389	$0	$10,389	6.7	15,746
Electric Unitary HVAC Measures		**3,900**	**4.9**	**0**	**$389**	**$41,098**	**$1,228**	**$39,870**	**102.5**	**3,927**
	Install High Efficiency Air Conditioning Units	3,900	4.9	0	$389	$41,098	$1,228	$39,870	102.5	3,927
Domestic Water Heating Upgrade		**4,056**	**0.0**	**0**	**$405**	**$222**	**$0**	**$222**	**0.5**	**4,084**
ECM 3	Install Low-Flow DHW Devices	4,056	0.0	0	$405	$222	$0	$222	0.5	4,084
Food Service & Refrigeration Measures		**4,625**	**0.5**	**0**	**$462**	**$5,265**	**$50**	**$5,215**	**11.3**	**4,658**
	Refrigerator/Freezer Case Electrically Commutated Motors	983	0.1	0	$98	$1,517	$0	$1,517	15.5	990
	Replace Refrigeration Equipment	2,030	0.2	0	$203	$3,518	$0	$3,518	17.4	2,045
ECM 4	Vending Machine Control	1,612	0.2	0	$161	$230	$50	$180	1.1	1,623
TOTALS		**153,860**	**58.5**	**-16**	**$15,161**	**$177,520**	**$19,971**	**$157,549**	**10.4**	**153,120**

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

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

Figure 7 – All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**76,677**	**26.3**	**-12**	**$7,498**	**$54,131**	**$10,733**	**$43,398**	**5.8**	**75,758**
ECM 1	Install LED Fixtures	16,010	3.3	-1	$1,584	$18,215	$1,400	$16,815	10.6	15,997
ECM 2	Retrofit Fixtures with LED Lamps	60,666	23.0	-11	$5,913	$35,916	$9,333	$26,583	4.5	59,760
Domestic Water Heating Upgrade		**4,056**	**0.0**	**0**	**$405**	**$222**	**$0**	**$222**	**0.5**	**4,084**
ECM 3	Install Low-Flow DHW Devices	4,056	0.0	0	$405	$222	$0	$222	0.5	4,084
Food Service & Refrigeration Measures		**1,612**	**0.2**	**0**	**$161**	**$230**	**$50**	**$180**	**1.1**	**1,623**
ECM 4	Vending Machine Control	1,612	0.2	0	$161	$230	$50	$180	1.1	1,623
TOTALS		**82,345**	**26.5**	**-12**	**$8,063**	**$54,584**	**$10,783**	**$43,801**	**5.4**	**81,465**

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

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

Figure 8 – Cost Effective ECMs

4.1 Lighting

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**76,677**	**26.3**	**-12**	**$7,498**	**$54,131**	**$10,733**	**$43,398**	**5.8**	**75,758**
ECM 1	Install LED Fixtures	16,010	3.3	-1	$1,584	$18,215	$1,400	$16,815	10.6	15,997
ECM 2	Retrofit Fixtures with LED Lamps	60,666	23.0	-11	$5,913	$35,916	$9,333	$26,583	4.5	59,760

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 is proposed, we suggest converting all of a specific lighting type (e.g. linear fluorescent) to LED lamps to minimize the number of lamp types in use at the facility, which should help reduce future maintenance costs.

ECM 1: Install LED Fixtures

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

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

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

Affected building areas: gymnasium and exterior fixtures.

ECM 2: Retrofit Fixtures with LED Lamps

Replace linear fluorescent, CFLs, 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 while providing 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: offices, classrooms, gymnasium, library, restrooms, storage rooms, and all other areas with fluorescent fixtures with T8 tubes.

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**14,711**	**6.0**	**-3**	**$1,430**	**$23,296**	**$2,460**	**$20,836**	**14.6**	**14,454**
	Install Occupancy Sensor Lighting Controls	13,271	5.4	-3	$1,290	$20,296	$2,460	$17,836	13.8	13,039
	Install High/Low Lighting Controls	1,440	0.6	0	$140	$3,000	$0	$3,000	21.4	1,415

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.

Install Occupancy Sensor Lighting Controls

Install occupancy sensors to control lighting fixtures in areas that are frequently unoccupied, even for short periods. For most spaces, we recommend lighting controls that 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, on the ceiling, or in remote locations. In general, wall switch replacement sensors are best suited to single occupant offices and other small rooms. Ceiling-mounted or remote-mounted sensors are used in large spaces, locations without local switching, and where wall switches are not in the line-of-sight of the main work area.

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

Affected building areas: offices, conference rooms, classrooms, gymnasium, library, restrooms, and storage rooms.

Install High/Low Lighting Controls

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

Lighting fixtures with these controls operate at default low levels when the area is unoccupied to provide minimal lighting to meet security or safety requirements. Sensors detect occupancy using ultrasonic and/or infrared sensors. When an occupant enters the space, the lighting fixtures switch to full lighting levels. Fixtures automatically switch back to low level after a predefined period of vacancy. 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: hallways.

The occupancy sensors for this type of measure 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 approach.

4.3 Motors

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Motor Upgrades		**1,859**	**0.9**	**0**	**$185**	**$14,625**	**$0**	**$14,625**	**78.9**	**1,872**
	Premium Efficiency Motors	1,859	0.9	0	$185	$14,625	$0	$14,625	78.9	1,872

Premium Efficiency Motors

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

Premium efficiency motors have been proposed to be installed only in conjunction with proposed variable frequency drive (VFD) motor measures. Non-inverter duty rated motors will need to be replaced when the VFD measure is implemented.

Affected motors:

Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Additional Motor Description
Gym	AHU-1A	1	Supply Fan	10.0	Supply fan motor
Gym	AHU-1B	1	Supply Fan	10.0	Supply fan motor
Auditorium	AHU-2A	1	Supply Fan	7.5	Supply fan motor
Auditorium	AHU-2B	1	Supply Fan	7.5	Supply fan motor
Locker Rooms	HRU-1	1	Supply Fan	5.0	Supply fan motor
Boiler Room	HHWP-1	1	Heating Hot Water Pump	15.0	Pump motor
Boiler Room	HHWP-2	1	Heating Hot Water Pump	15.0	Pump motor
Boiler Room	CWP-5	1	Chilled Water Pump	15.0	Chiller Pump
Boiler Room	CWP-6	1	Chilled Water Pump	15.0	Chiller Pump

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

4.4 Variable Frequency Drives (VFD)

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**48,032**	**19.9**	**0**	**$4,793**	**$38,883**	**$5,500**	**$33,383**	**7.0**	**48,368**
	Install VFD on Variable Air Volume (VAV) Fans	16,759	11.4	0	$1,672	$18,105	$5,500	$12,605	7.5	16,876
	Install VFDs on Chilled Water Pumps	15,637	5.6	0	$1,560	$10,389	$0	$10,389	6.7	15,746
	Install VFDs on Heating Water Pumps	15,637	2.9	0	$1,560	$10,389	$0	$10,389	6.7	15,746

Variable frequency drives (VFDs) control motors for fans, pumps, and process equipment based on the actual output required of the driven equipment. Energy savings result from more efficient control of motor energy usage when equipment operates at partial load. The magnitude of energy savings depends on the estimated amount of time that the motor would operate at partial load. For equipment with proposed VFDs, we have included replacing the controlled motor with a new motor—unless the existing motor meets or exceeds IHP 2014 standards—to conservatively account for the cost of an inverter duty rated motor. The savings and cost associated with the new motor are presented with the Premium Efficiency Motor measures. If the proposed VFD measure is not selected for implementation, the motor replacement should be reevaluated.

Install VFD on Variable Air Volume (VAV) Fans

Replace existing air volume control devices on variable volume fans, such as inlet vanes and variable pitch fan blades, with VFDs. Inlet guide vanes and variable pitch fan blades are an inefficient means of controlling the air volume compared to VFDs. The existing volume control device will be removed or permanently disabled, and the control signal will be redirected to the VFD to determine proper fan motor speed.

Energy savings result from using a more efficient control device to regulate the air flow provided by the fan. Additional maintenance savings may result from this measure. VFDs are solid state electronic devices, which generally requires less maintenance than mechanical air volume control devices.

Affected air handlers: AHU-1A, 1B, 2A, 2B, and HRU-1.

Install VFDs on Chilled Water Pumps

Install VFDs to control chilled water pumps. Two-way valves must serve the chilled water coils being served and the chilled water loop must have a differential pressure sensor installed. If the chilled water distribution currently uses three-way valves or a bypass leg, they will need to be modified when this measure is implemented. As the chilled water valves close, the differential pressure increases, and the VFD modulates the pump speed to maintain a differential pressure setpoint.

For systems with variable chilled water flow through the chiller, the minimum flow to prevent the chiller from tripping off will need to be determined during the final project design. The control system should be programmed to maintain the minimum flow through the chiller and to prevent pump cavitation.

Energy savings result from reducing the pump motor speed (and power) as chilled water valves close. The magnitude of energy savings is based on the estimated amount of time that the system operates at reduced loads.

Affected pumps: CWP-5 and 6.

Install VFDs on Heating Water Pumps

Install variable frequency drives to control heating water pumps. Two-way valves must serve the hot water coils and the hot water loop must have a differential pressure sensor installed. If the hot water distribution currently uses three-way valves or a bypass leg, they will need to be modified when this measure is implemented. As the hot water valves close, the differential pressure increases and the VFD modulates the pump speed to maintain a differential pressure setpoint.

Energy savings result from reducing pump motor speed (and power) as hot water valves close. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

Affected pumps: HHWP-1 and 2.

4.5 Electric Unitary HVAC

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Electric Unitary HVAC Measures		**3,900**	**4.9**	**0**	**$389**	**$41,098**	**$1,228**	**$39,870**	**102.5**	**3,927**
	Install High Efficiency Air Conditioning Units	3,900	4.9	0	$389	$41,098	$1,228	$39,870	102.5	3,927

Install High-Efficiency Air Conditioning Units

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

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 the Elementary School are nearing or have reached the end of their normal useful life. Typically, the marginal cost of purchasing a high-efficiency unit can be justified by the marginal savings from the improved efficiency. When the equipment is eventually replaced, consider purchasing equipment that exceeds the minimum efficiency required by building codes.

4.6 Domestic Water Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**4,056**	**0.0**	**0**	**$405**	**$222**	**$0**	**$222**	**0.5**	**4,084**
ECM 3	Install Low-Flow DHW Devices	4,056	0.0	0	$405	$222	$0	$222	0.5	4,084

ECM 3: Install Low-Flow DHW Devices

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

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

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

Additional cost savings may result from reduced water usage.

4.7 Food Service & Refrigeration Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Food Service & Refrigeration Measures		**4,625**	**0.5**	**0**	**$462**	**$5,265**	**$50**	**$5,215**	**11.3**	**4,658**
	Refrigerator/Freezer Case Electrically Commutated Motors	983	0.1	0	$98	$1,517	$0	$1,517	15.5	990
	Replace Refrigeration Equipment	2,030	0.2	0	$203	$3,518	$0	$3,518	17.4	2,045
ECM 4	Vending Machine Control	1,612	0.2	0	$161	$230	$50	$180	1.1	1,623

Refrigerator/Freezer Case Electrically Commutated Motors

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

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

Replace Refrigeration Equipment

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

ECM 4: 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 power up the machines at necessary regular intervals or when the surrounding area is occupied. Energy savings are dependent on the vending machine and activity level in the area surrounding the machines.

5 Energy Efficient Best Practices

A whole building maintenance plan will extend equipment life; improve occupant comfort, health, and safety; and reduce energy and maintenance costs. You may already be doing some of these things— see our list below for potential additions to your maintenance plan. Be sure to consult with qualified equipment specialists for details on proper maintenance and system operation.

Energy Tracking with ENERGY STAR® Portfolio Manager®

You've heard it before - you can't manage what you don't measure. ENERGY STAR® Portfolio Manager® is an online tool that you can use to measure and track energy and water consumption, as well as greenhouse gas emissions[4]. Your account has already been established. Now you can continue to keep tabs on your energy performance every month.

Doors and Windows

Close exterior doors and windows in heated and cooled areas. Leaving doors and windows open leads to a loss of heat during the winter and chilled air during the summer. Reducing air changes per hour (ACH) can lead to increased occupant comfort as well as heating and cooling savings, especially when combined with proper HVAC controls and adequate ventilation.

Window Treatments/Coverings

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

Lighting 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.

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

Motor Controls

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

Motor Short Cycling Reduction

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

Motor Maintenance

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

Thermostat Schedules and Temperature Resets

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

Economizer Maintenance

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

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

AC System Evaporator/Condenser Coil Cleaning

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

HVAC Filter Cleaning and Replacement

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

Duct Sealing

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

Steam Trap Repair and Replacement

Steam traps are a crucial part of delivering heat from the boiler to the space heating units. Repair or replace traps that are blocked or allowing steam to pass. Inspect steam traps as part of a regular steam system maintenance plan.

Boiler Maintenance

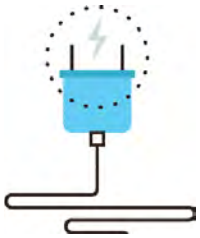
Many boiler problems develop slowly over time, so regular inspection and maintenance is essential to keeping the heating system running efficiently and preventing expensive repairs. Annual tune-ups should include a combustion analysis to analyze the exhaust from the boilers and to ensure the boiler is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

Water Heater Maintenance

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

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

Plug Load Controls



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

Computer Power Management Software

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

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

Water Conservation

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

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

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

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

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

Procurement Strategies

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

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

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

6 On-site Generation

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

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

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

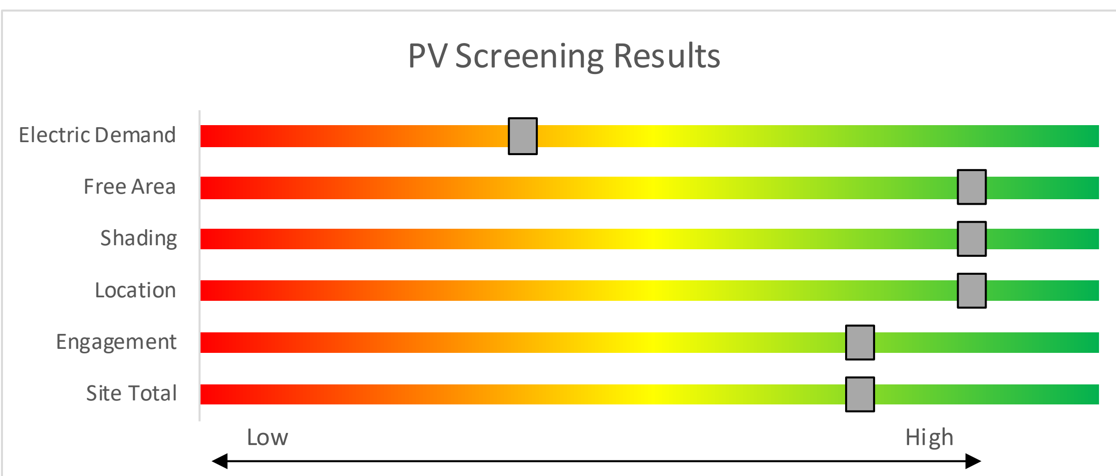


Figure 9 - Photovoltaic Screening

Solar Renewable Energy Credit (SREC) Registration Program

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

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

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

- **Basic Info on Solar PV in New Jersey**: www.njcleanenergy.com/whysolar
- **New Jersey Solar Market FAQs**: www.njcleanenergy.com/renewable-energy/program-updates-and-background-information/solar-transition/solar-market-faqs
- **Approved Solar Installers in the New Jersey 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) generate electricity at the Elementary School and put waste heat energy to good use. Common types of CHP systems are reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines.

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

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

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

Based on a preliminary analysis, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation. The lack of gas service, low or infrequent thermal load, and lack of space for siting the equipment are the most significant factors contributing to the lack of CHP potential.

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

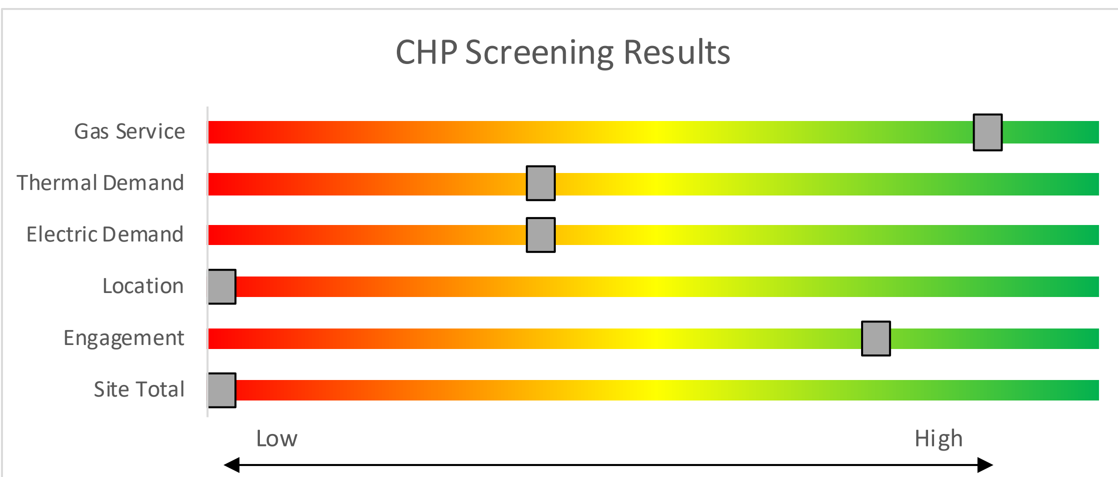


Figure 10 - Combined Heat and Power Screening

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

7 PROJECT FUNDING AND INCENTIVES

Ready to improve your building's performance? 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's Clean Energy Programs.

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

7.1 SmartStart

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

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

Equipment with Prescriptive Incentives Currently Available:

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

Incentives

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

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

How to Participate

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

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

7.2 Pay for Performance - Existing Buildings

Pay for Performance works for larger customers with a peak demand over 200 kW. The minimum installed scope of work must include at least two unique measures that results in at least 15% source energy savings, and lighting cannot make up the majority of the savings. P4P is a generally a good option for medium-to-large sized facilities looking to implement as many measures as possible under a single project to achieve deep energy savings. This program has an added benefit of addressing measures that may not qualify for other programs. Many facilities pursuing an Energy Savings Improvement Program loan also use this program.

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

Incentives

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

How to Participate

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

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

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

7.3 Energy Savings Improvement Program

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

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

How to Participate

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

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

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

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

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

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

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

7.4 SREC Registration Program

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

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

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

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

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

8 Energy Purchasing and Procurement Strategies

8.1 Retail Electric Supply Options

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

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

A list of licensed third-party electric suppliers is available at the NJBPU website[8].

8.2 Retail Natural Gas Supply Options

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

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

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

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

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

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

APPENDIX A: EQUIPMENT INVENTORY & RECOMMENDATIONS

Lighting Inventory & Recommendations

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Cafeteria	30	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,600	2, NR	Relamp	Yes	30	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,104	1.6	3,906	-1	$380	$2,731	$670	5.4
Cafeteria	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Cafeteria	16	Halogen Incandescent: Floods	Wall Switch	S	50	1,600	2, NR	Relamp	Yes	16	LED - Fixtures: Architectural Flood/Spot Luminaire	Occupancy Sensor	8	1,104	0.5	1,262	0	$123	$854	$35	6.7
Classroom	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.1	296	0	$29	$416	$75	11.9
Kids Club Hall	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,104	0.2	443	0	$43	$419	$60	8.3
Kids Club Hall	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Custodian	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,600	2, NR	Relamp	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,104	0.3	651	0	$63	$635	$135	7.9
Parents Storage	1	Halogen Incandescent: Floods	Wall Switch	S	50	1,600	2	Relamp	No	1	LED - Fixtures: Architectural Flood/Spot Luminaire	Wall Switch	8	1,600	0.0	74	0	$7	$37	$0	5.1
Principal Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.1	296	0	$29	$262	$40	7.7
D146	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	6	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,104	0.2	414	0	$40	$705	$95	15.1
Cafeteria	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.1	148	0	$14	$189	$40	10.4
Kitchen	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2	Relamp	No	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,600	0.2	523	0	$51	$329	$90	4.7
Kitchen Office	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.2	370	0	$36	$453	$85	10.2
Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.1	148	0	$14	$189	$20	11.8
Restroom	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
Custodian	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.1	148	0	$14	$189	$40	10.4
Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,600	0.0	58	0	$6	$37	$10	4.7
Kitchen	29	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	29	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.9	2,143	0	$208	$1,599	$360	5.9
Kitchen	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.1	148	0	$14	$189	$40	10.4
Walk In Refrigerator	2	LED Screw-In Lamps: Refrigerator Case Light	Wall Switch	S	9	1,600		None	No	2	LED Screw-In Lamps: Refrigerator Case Light	Wall Switch	9	1,600	0.0	0	0	$0	$0	$0	0.0
Walk In Freezer	2	LED Screw-In Lamps: Freezer Case Light	Wall Switch	S	9	1,600		None	No	2	LED Screw-In Lamps: Freezer Case Light	Wall Switch	9	1,600	0.0	0	0	$0	$0	$0	0.0
26 Music Room	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.4	887	0	$86	$708	$155	6.4
Maintenance	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.1	296	0	$29	$416	$75	11.9
Boiler Room	19	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2	Relamp	No	19	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,600	0.5	1,104	0	$107	$694	$190	4.7
Electric Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,600	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,600	0.0	87	0	$8	$55	$15	4.7

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Restroom	1	Incandescent: Bulb (60W) - 1L	Wall Switch	S	60	1,600	2	Relamp	No	1	LED Screw-In Lamps: Bulb - 1L	Wall Switch	9	1,600	0.0	90	0	$9	$17	$1	1.9
Principal	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.1	296	0	$29	$416	$75	11.9
Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	1,600	2	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	1,600	0.0	28	0	$3	$33	$6	9.7
Restroom	1	Compact Fluorescent: Spiral Bulb	Wall Switch	S	20	1,600	2	Relamp	No	1	LED Screw-In Lamps: Bulb - 1L	Wall Switch	14	1,600	0.0	11	0	$1	$17	$1	15.8
IT Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,600	0.0	58	0	$6	$37	$10	4.7
Room 43	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.4	1,035	0	$101	$781	$175	6.0
Room 44	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.4	1,035	0	$101	$781	$175	6.0
Room 44	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	1,600	2	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,600	0.0	62	0	$6	$37	$10	4.4
Hallway	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,104	0.2	370	0	$36	$383	$50	9.3
Computer Lab	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.4	887	0	$86	$708	$155	6.4
Computer Lab	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	1,600	2, NR	Relamp	Yes	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,104	0.1	150	0	$15	$246	$44	13.9
Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.1	148	0	$14	$189	$20	11.8
Computer Lab	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.4	887	0	$86	$708	$155	6.4
Computer Lab	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	1,600	2, NR	Relamp	Yes	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,104	0.1	150	0	$15	$246	$44	13.9
Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.1	148	0	$14	$189	$20	11.8
Conference Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.1	296	0	$29	$416	$75	11.9
Room 40	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.4	887	0	$86	$708	$155	6.4
Room 40	1	Incandescent: Bulb (60W) - 1L	Wall Switch	S	60	1,600	2	Relamp	No	1	LED Screw-In Lamps: Bulb - 1L	Wall Switch	9	1,600	0.0	90	0	$9	$17	$1	1.9
Custodian	2	Compact Fluorescent: Spiral Bulb	Wall Switch	S	20	1,600	2, NR	Relamp	Yes	2	LED Screw-In Lamps: Bulb - 1L	Occupancy Sensor	14	1,104	0.0	36	0	$4	$150	$2	42.0
Room 30	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.4	961	0	$93	$745	$165	6.2
Custodian	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	1,600	2, NR	Relamp	Yes	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,104	0.0	75	0	$7	$181	$12	23.2
Boys	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.1	222	0	$22	$380	$65	14.6
Girls	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.1	222	0	$22	$380	$65	14.6
Faculty Room	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.5	1,182	0	$115	$854	$195	5.7
Faculty Room	1	Incandescent: Bulb (60W) - 1L	Wall Switch	S	60	1,600	2	Relamp	No	1	LED Screw-In Lamps: Bulb - 1L	Wall Switch	9	1,600	0.0	90	0	$9	$17	$1	1.9

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
IT Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.1	148	0	$14	$189	$40	10.4
Room 1	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.5	1,182	0	$115	$854	$195	5.7
Room 3	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.4	961	0	$93	$745	$165	6.2
Room 5	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.4	961	0	$93	$745	$165	6.2
Room 6	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.4	887	0	$86	$708	$155	6.4
Room 4	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.4	887	0	$86	$708	$155	6.4
Room 2	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.4	887	0	$86	$708	$155	6.4
Reading Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.2	443	0	$43	$489	$95	9.1
Library Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.1	296	0	$29	$416	$75	11.9
Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.1	148	0	$14	$189	$20	11.8
Storage	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	1,600	2	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	1,600	0.0	56	0	$5	$65	$12	9.7
Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.1	148	0	$14	$189	$40	10.4
AV Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.1	148	0	$14	$189	$20	11.8
Library	44	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,600	2, NR	Relamp	Yes	44	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,104	2.3	5,729	-1	$557	$3,483	$915	4.6
Library	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.1	148	0	$14	$189	$40	10.4
Library	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	1,600	2	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	1,600	0.0	28	0	$3	$33	$6	9.7
Book Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.1	148	0	$14	$189	$20	11.8
Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.1	296	0	$29	$416	$75	11.9
Room 21	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.4	887	0	$86	$708	$155	6.4
Room 23	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.4	887	0	$86	$708	$155	6.4
Room 25	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.4	887	0	$86	$708	$155	6.4
Room 24	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.4	887	0	$86	$708	$155	6.4
Room 22	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.4	887	0	$86	$708	$155	6.4
Room 20	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.4	887	0	$86	$708	$155	6.4
Room 19	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,600	2, NR	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.4	887	0	$86	$708	$155	6.4

Motor Inventory & Recommendations

		Existing Conditions							Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Gym	AHU-1A	1	Supply Fan	10.0	90.2%	No	W	1,130	NR, NR	Yes	91.7%	Yes	1	2.9	3,609	0	$360	$5,895	$1,200	13.0
Gym	AHU-1B	1	Supply Fan	10.0	90.2%	No	W	1,130	NR, NR	Yes	91.7%	Yes	1	2.9	3,609	0	$360	$5,895	$1,200	13.0
Auditorium	AHU-2A	1	Supply Fan	7.5	88.5%	No	W	1,130	NR, NR	Yes	91.0%	Yes	1	2.2	2,812	0	$281	$4,738	$1,163	12.7
Auditorium	AHU-2B	1	Supply Fan	7.5	88.5%	No	W	1,130	NR, NR	Yes	91.0%	Yes	1	2.2	2,812	0	$281	$4,738	$1,163	12.7
A117,A118,A119	FC-1	3	Fan Coil Unit	0.1	68.0%	No	W	1,373		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
D124,D125	FC-2	2	Fan Coil Unit	0.1	68.0%	No	W	1,373		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
D130	FC-3	1	Fan Coil Unit	0.3	68.0%	No	W	1,373		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
D130	FC-4	1	Fan Coil Unit	0.3	68.0%	No	W	1,373		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
D131,D132	FC-5	2	Fan Coil Unit	0.1	68.0%	No	W	1,373		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
D135	FC-6	1	Fan Coil Unit	0.1	68.0%	No	W	1,373		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
D135	FC-7	1	Fan Coil Unit	0.1	68.0%	No	W	1,373		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
D136	FC-8	1	Fan Coil Unit	0.1	68.0%	No	W	1,373		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
D137	FC-9	1	Fan Coil Unit	0.2	68.0%	No	W	1,373		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
D145	FC-10	1	Fan Coil Unit	0.1	68.0%	No	W	1,373		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
D140,D141,D146	FC-11	3	Fan Coil Unit	0.2	68.0%	No	W	1,373		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
D143	FC-12	1	Fan Coil Unit	0.1	68.0%	No	W	1,373		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
D142	FC-13	1	Fan Coil Unit	0.1	68.0%	No	W	1,373		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
Locker Rooms	HRU-1	1	Supply Fan	5.0	87.5%	No	W	2,745	NR, NR	Yes	89.5%	Yes	1	1.5	4,565	0	$455	$4,076	$775	7.2
Locker Rooms	HRU-2	1	Supply Fan	5.0	87.5%	No	W	0		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
Locker Rooms	HRU-3	1	Supply Fan	2.0	84.0%	No	W	0		No	84.0%	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
Locker Rooms	HRU-4	1	Supply Fan	5.0	87.5%	No	W	0		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
Locker Rooms	HRU-5	1	Supply Fan	5.0	87.5%	No	W	0		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
Locker Rooms	HRU-6	1	Supply Fan	2.0	84.0%	No	W	0		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Locker Rooms	HRU-7	1	Supply Fan	1.5	84.0%	No	W	0		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Locker Rooms	HRU-8	1	Supply Fan	5.0	87.5%	No	W	0		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
Library	BCU-1	1	Fan Coil Unit	1.0	74.0%	No	W	2,745		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Locker Rooms	HRU-1	1	Exhaust Fan	3.0	86.5%	No	W	2,745		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Locker Rooms	HRU-2	1	Exhaust Fan	3.0	86.5%	No	W	0		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Locker Rooms	HRU-3	1	Exhaust Fan	1.5	84.0%	No	W	0		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Locker Rooms	HRU-4	1	Exhaust Fan	3.0	86.5%	No	W	0		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Locker Rooms	HRU-5	1	Exhaust Fan	3.0	86.5%	No	W	0		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Locker Rooms	HRU-6	1	Exhaust Fan	1.0	74.0%	No	W	0		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Locker Rooms	HRU-7	1	Exhaust Fan	0.8	81.1%	No	W	0		No	81.1%	No		0.0	0	0	$0	$0	$0	0.0
Locker Rooms	HRU-8	1	Exhaust Fan	3.0	86.5%	No	W	0		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Classrooms	UV-1	1	Supply Fan	0.1	68.0%	No	W	1,373		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
Classrooms	UV-2	1	Supply Fan	0.1	68.0%	No	W	1,373		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
Classrooms	UV-3	1	Supply Fan	0.1	68.0%	No	W	1,373		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
Classrooms	UV-4	1	Supply Fan	0.1	68.0%	No	W	1,373		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
Ceiling	EF-1	1	Exhaust Fan	0.1	68.0%	No	W	2,745		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	EF-2	1	Exhaust Fan	0.2	68.0%	No	W	2,745		No	68.0%	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
Roof	EF-3	1	Exhaust Fan	0.2	68.0%	No	W	2,745		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	EF-4	1	Exhaust Fan	0.3	68.0%	No	W	2,745		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	EF-5	1	Exhaust Fan	0.2	68.0%	No	W	2,745		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	EF-6	1	Exhaust Fan	0.3	68.0%	No	W	2,745		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
Ceiling	EF-7	1	Exhaust Fan	0.5	68.0%	No	W	2,745		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	EF-8	1	Exhaust Fan	0.2	68.0%	No	W	2,745		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	EF-9	1	Exhaust Fan	0.5	72.0%	No	W	2,745		No	72.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	EF-10	1	Exhaust Fan	0.5	72.0%	No	W	2,745		No	72.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	EF-11	1	Exhaust Fan	0.2	68.0%	No	W	2,745		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	EF-12	1	Exhaust Fan	0.3	68.0%	No	W	2,745		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	EF-13	1	Exhaust Fan	0.3	68.0%	No	W	2,745		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	HHWP-1	1	Heating Hot Water Pump	15.0	91.0%	No	B	1,696	NR, NR	Yes	93.0%	Yes	1	1.6	8,121	0	$810	$7,041	$0	8.7
Boiler Room	HHWP-2	1	Heating Hot Water Pump	15.0	91.0%	No	B	1,696	NR, NR	Yes	93.0%	Yes	1	1.6	8,121	0	$810	$7,041	$0	8.7
Boiler Room	CWP-5	1	Chilled Water Pump	15.0	91.0%	No	B	1,696	NR, NR	Yes	93.0%	Yes	1	2.9	8,121	0	$810	$7,041	$0	8.7
Boiler Room	CHP-6	1	Chilled Water Pump	15.0	91.0%	No	B	1,696	NR, NR	Yes	93.0%	Yes	1	2.9	8,121	0	$810	$7,041	$0	8.7
Boiler Room	SCP-3	1	Chilled Water Pump	25.0	91.7%	Yes	W	1,356		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	SCP-4	1	Chilled Water Pump	25.0	91.7%	Yes	W	1,356		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	DHW Pump	1	Water Supply Pump	0.5	72.0%	No	W	1,373		No	72.0%	No		0.0	0	0	$0	$0	$0	0.0
Health office	RTU-1	1	Supply Fan	2.0	85.5%	No	B	1,373		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Main Office	RTU-2	1	Supply Fan	1.0	82.6%	No	B	1,373		No	82.6%	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
CST	RTU-3	1	Supply Fan	0.5	72.0%	No	B	1,373		No	72.0%	No		0.0	0	0	$0	$0	$0	0.0
Health office	RTU-1	1	Exhaust Fan	1.0	82.6%	No	B	1,373		No	82.6%	No		0.0	0	0	$0	$0	$0	0.0
Main Office	RTU-2	1	Exhaust Fan	0.5	76.2%	No	B	1,373		No	76.2%	No		0.0	0	0	$0	$0	$0	0.0
CST	RTU-3	1	Exhaust Fan	0.5	76.5%	No	B	1,373		No	76.5%	No		0.0	0	0	$0	$0	$0	0.0

Electric HVAC Inventory & Recommendations

		Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Health office	RTU-1	1	Packaged AC	8.00		B	NR	Yes	1	Packaged AC	8.00		11.50		1.5	1,161	0	$116	$14,257	$584	118.0
Main Office	RTU-2	1	Packaged AC	5.00		B	NR	Yes	1	Packaged AC	5.00		14.00		1.4	1,093	0	$109	$11,345	$460	99.8
CST	RTU-3	1	Packaged AC	2.00		B	NR	Yes	1	Packaged AC	2.00		14.00		0.6	437	0	$44	$4,538	$184	99.8
IDF D105	AC-1	1	Ductless Mini-Split AC	1.00		B	NR	Yes	1	Ductless Mini-Split AC	1.00		18.00		0.4	294	0	$29	$2,739	$0	93.5
MDF B122	AC-2	1	Ductless Mini-Split AC	2.00		B	NR	Yes	1	Ductless Mini-Split AC	2.00		18.00		0.7	587	0	$59	$5,479	$0	93.5
IDFA106	AC-3	1	Ductless Mini-Split AC	1.00		B	NR	Yes	1	Ductless Mini-Split AC	1.00		18.00		0.4	328	0	$33	$2,739	$0	83.6
Boiler Room	UH-1	1	Electric Resistance Heat		27.40	W		No							0.0	0	0	$0	$0	$0	0.0
Boiler Room	UH-2	1	Electric Resistance Heat		30.00	W		No							0.0	0	0	$0	$0	$0	0.0

Electric Chiller Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Chiller Quantity	System Type	Cooling Capacity per Unit (Tons)	Remaining Useful Life	ECM #	Install High Efficiency Chillers?	Chiller Quantity	System Type	Constant/ Variable Speed	Cooling Capacity (Tons)	Full Load Efficiency (kW/Ton)	IPLV Efficiency (kW/Ton)	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
Outdoor	CH-1	1	Air-Cooled Screw Chiller	160.00	W		No							0.0	0	0	$0	$0	$0	0.0
Outdoor	CH-2	1	Air-Cooled Screw Chiller	160.00	W		No							0.0	0	0	$0	$0	$0	0.0

Fuel Heating Inventory & Recommendations

		Existing Conditions				Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	B-1	1	Condensing Hot Water Boiler	######	W		No						0.0	0	0	$0	$0	$0	0.0
Boiler Room	B-2	1	Condensing Hot Water Boiler	######	W		No						0.0	0	0	$0	$0	$0	0.0
Boiler Room	B-3	1	Condensing Hot Water Boiler	######	W		No						0.0	0	0	$0	$0	$0	0.0

DHW Inventory & Recommendations

		Existing Conditions			Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Remaining Useful Life	ECM #	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	School	1	Tankless Water Heater	W		No						0.0	0	0	$0	$0	$0	0.0
Closet	School	1	Storage Tank Water Heater (≤ 50 Gal)	W		No						0.0	0	0	$0	$0	$0	0.0
Closet	School	1	Storage Tank Water Heater (≤ 50 Gal)	W		No						0.0	0	0	$0	$0	$0	0.0
Closet	School	1	Storage Tank Water Heater (≤ 50 Gal)	W		No						0.0	0	0	$0	$0	$0	0.0

Low-Flow Device Recommendations

	Recommendation Inputs					Energy Impact & Financial Analysis						
Location	ECM #	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Restrooms	3	31	Faucet Aerator (Lavatory)	2.50	0.50	0.0	4,056	0	$405	$222	$0	0.5

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions		Proposed Conditions				Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	ECM #	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Evaporator Fan Control?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Cooler (35F to 55F)	NR	Yes	No	No	0.0	393	0	$39	$607	$0	15.5
Kitchen	1	Low Temp Freezer (-35F to -5F)	NR	Yes	No	No	0.1	590	0	$59	$910	$0	15.5

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions			Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	2	Refrigerator Chest	No	NR	Yes	0.2	2,030	0	$203	$3,518	$0	17.4
Kitchen	1	Stand-Up Freezer, Solid Door (16 - 30 cu. ft.)	Yes		No	0.0	0	0	$0	$0	$0	0.0

Cooking Equipment Inventory & Recommendations

	Existing Conditions			Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	High Efficiency Equipement?	ECM #	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Insulated Food Holding Cabinet (Full Size)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	2	Electric Convection Oven (Full Size)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Insulated Food Holding Cabinet (Full Size)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Gas Steamer	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Electric Steamer	Yes		No	0.0	0	0	$0	$0	$0	0.0

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Kitchen	4	Steam Table	120.0	Yes
Classrooms	180	Computers	120.0	Yes
Staffroom	2	Laptop	30.0	Yes
Classrooms	35	Small Printer	55.0	Yes
Staffroom	4	Medium Printer	60.0	Yes
Copy Room	3	Copy Machine	600.0	Yes
Staffroom	1	Paper Shredder	80.0	No
Classrooms	33	Projector	120.0	Yes
Break Room	9	Microwave	800.0	Yes
Classrooms	7	Small Refrigerator	120.0	No
Classrooms	5	Large Refrigerator	255.0	Yes
Staffroom	2	Coffee Machine	300.0	No
Break Room	2	Toaster Oven	500.0	No
Classrooms	3	Ceiling Fan	45.0	No
Classrooms	1	Portable Fan	45.0	No
Classrooms	6	CRT Tv	244.0	No

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	ECM #	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Break Room	1	Refrigerated	4	Yes	0.2	1,612	0	$161	$230	$50	1.1

Appendix B: ENERGY STAR® Statement of Energy Performance

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

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ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Clayton J Davenport ES

Primary Property Type: K-12 School
Gross Floor Area (ft²): 89,100
Built: 1975

For Year Ending: April 30, 2018
Date Generated: February 01, 2019

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
Clayton J Davenport ES 2499 Spruce Avenue Egg Harbor Township, New Jersey 08234	________________ , (___)___-_____	____ ________ , (___)___-_____ ________________

Property ID: 6628310

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
48 kBtu/ft²

Source EUI
86.3 kBtu/ft²

Annual Energy by Fuel

Natural Gas (kBtu)	2,449,594 (57%)
Electric - Solar (kBtu)	651,034 (15%)
Electric - Grid (kBtu)	1,175,625 (28%)

National Median Comparison

National Median Site EUI (kBtu/ft²)	74.2
National Median Source EUI (kBtu/ft²)	133.5
% Diff from National Median Source EUI	-35%

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO2e/year)	315

Signature & Stamp of Verifying Professional

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

Signature: ______________________ Date: __________

Licensed Professional

____ ________
,
(___)___-_____
____

Professional Engineer Stamp
(if applicable)

APPENDIX C: GLOSSARY

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

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

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