Local Government Energy Audit Report

East Amwell School

October 3, 2023

Prepared for:
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Disclaimer

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

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

TRC bases estimated material and labor costs primarily on RS Means cost manuals as well as on our experience at similar facilities. This approach is based on standard cost estimating manuals and is vendor neutral. Cost estimates include material and labor pricing associated with one for one equipment replacements. Cost estimates do not include demolition or removal of hazardous waste. The actual implementation costs for energy savings projects are anticipated to be significantly higher based on the specific conditions at your site(s). We strongly recommend that you work with your design engineer or contractor to develop actual project costs for your specific scope of work for the installation of high efficiency equipment. We encourage you to obtain multiple estimates when considering measure installations. Actual installation costs can vary widely based on selected products and installers. TRC and NJBPU do not guarantee cost estimates and shall in no event be held liable should actual installed costs vary from these material and labor estimates.

Incentive values provided in this report are estimated based on previously run state efficiency programs. Incentive levels are not guaranteed. The NJBPU reserves the right to extend, modify, or terminate programs without prior notice. Please review all available utility program incentives and eligibility requirements prior to selecting and installing any energy conservation measures.

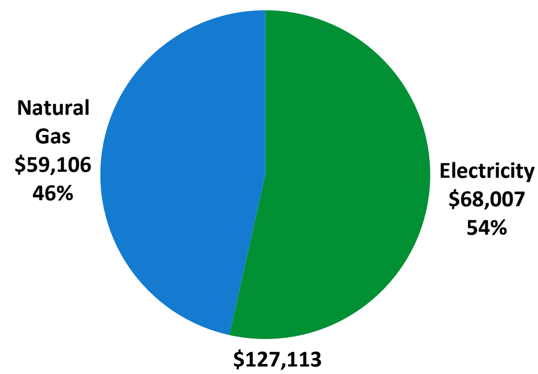
The customer and their respective contractor(s) are responsible to implement energy conservation measures in complete conformance with all applicable local, state, and federal requirements.

Table of Contents

1 Executive Summary

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

BUILDING PERFORMANCE REPORT

Annual Utilities	Costs: $127,113 Electricity: 527,065 kWh Natural Gas: 44,171 Therms	
ENERGY STAR® Benchmarking Score	41 *(1-100 scale)*	This building performs at or below the national average. This report contains suggestions about how to improve building performance and reduce energy costs.

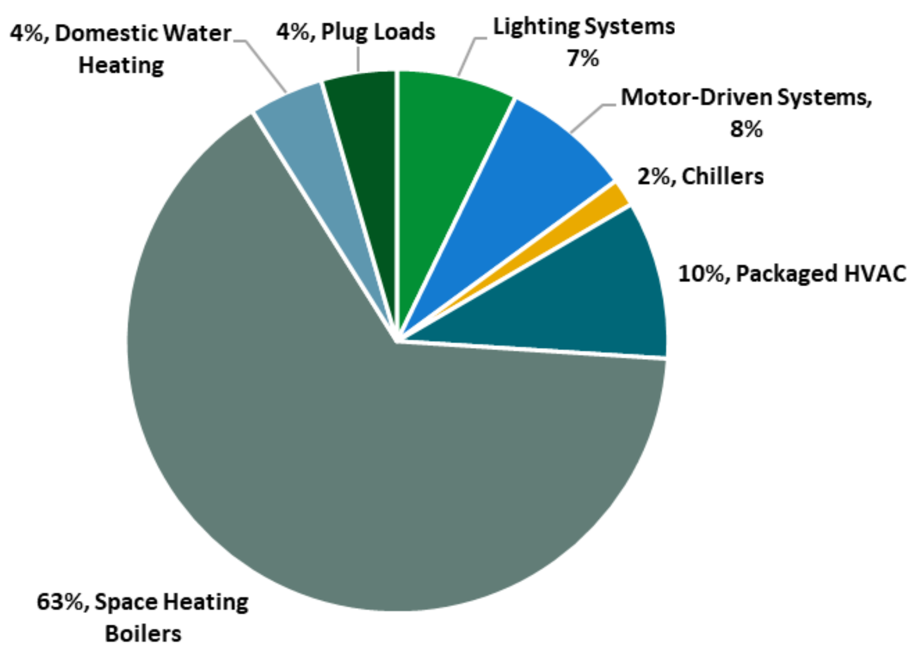


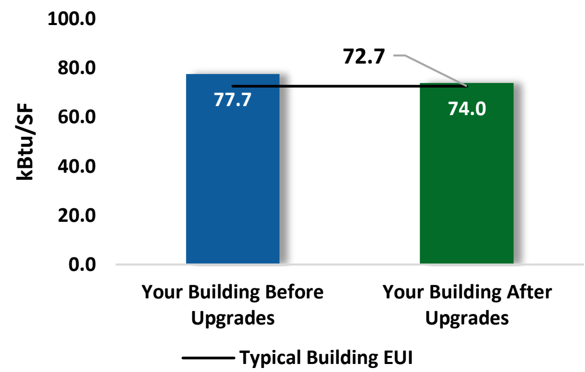
Figure 1 - Energy Use by System

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.

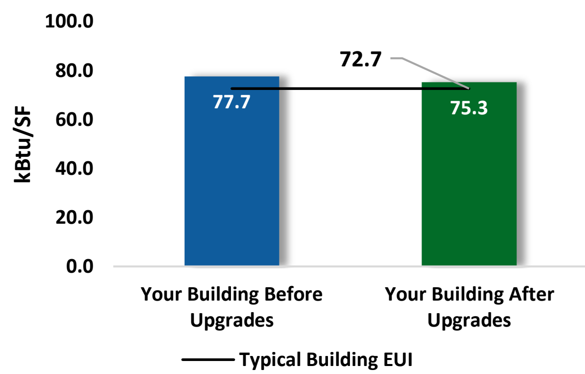
Scenario 1: Full Package (All Evaluated Measures)

Installation Cost	$245,576
Potential Rebates & Incentives[1]	$19,199
Annual Cost Savings	$9,190
Annual Energy Savings	Electricity: 62,636 kWh Natural Gas: 828 Therms
Greenhouse Gas Emission Savings	36 Tons
Simple Payback	24.6 Years
Site Energy Savings (All Utilities)	5%



Scenario 2: Cost Effective Package[2]

Installation Cost	$53,024
Potential Rebates & Incentives	$11,606
Annual Cost Savings	$7,232
Annual Energy Savings	Electricity: 55,769 kWh Natural Gas: 27 Therms
Greenhouse Gas Emission Savings	28 Tons
Simple Payback	5.7 Years
Site Energy Savings (all utilities)	3%



On-site Generation Potential

Photovoltaic	High
Combined Heat and Power	None

[1] Incentives are based on previously run state rebate programs. Contact your utility provider for current program incentives that may apply.

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**5,071**	**0.9**	**-1**	**$641**	**$2,582**	**$473**	**$2,109**	**3.3**	**4,993**
ECM 1	Install LED Fixtures	Yes	438	0.0	0	$57	$309	$50	$259	4.6	441
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	228	0.0	0	$29	$69	$10	$59	2.0	224
ECM 3	Retrofit Fixtures with LED Lamps	Yes	4,404	0.9	-1	$556	$2,204	$413	$1,791	3.2	4,327
Lighting Control Measures			**25,972**	**4.8**	**-5**	**$3,279**	**$20,718**	**$6,075**	**$14,643**	**4.5**	**25,518**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	20,934	4.1	-4	$2,643	$15,318	$1,980	$13,338	5.0	20,568
ECM 5	Install High/Low Lighting Controls	Yes	5,038	0.8	-1	$636	$5,400	$4,095	$1,305	2.1	4,950
Variable Frequency Drive (VFD) Measures			**27,089**	**7.4**	**0**	**$3,495**	**$42,084**	**$5,200**	**$36,884**	**10.6**	**27,278**
ECM 6	Install VFDs on Constant Volume (CV) Fans	No	4,269	1.9	0	$551	$12,768	$300	$12,468	22.6	4,299
ECM 7	Install VFDs on Chilled Water Pumps	Yes	13,043	3.9	0	$1,683	$13,393	$2,200	$11,193	6.7	13,134
ECM 8	Install VFDs on Heating Water Pumps	Yes	9,777	1.5	0	$1,262	$15,922	$2,700	$13,222	10.5	9,846
Unitary HVAC Measures			**728**	**1.0**	**0**	**$94**	**$23,969**	**$1,260**	**$22,709**	**241.8**	**733**
ECM 9	Install High Efficiency Air Conditioning Units	No	728	1.0	0	$94	$23,969	$1,260	$22,709	241.8	733
Electric Chiller Replacement			**1,870**	**4.2**	**0**	**$241**	**$85,623**	**$1,552**	**$84,071**	**348.4**	**1,883**
ECM 10	Install High Efficiency Chillers	No	1,870	4.2	0	$241	$85,623	$1,552	$84,071	348.4	1,883
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**70**	**$941**	**$59,499**	**$3,784**	**$55,715**	**59.2**	**8,235**
ECM 11	Install High Efficiency Hot Water Boilers	No	0	0.0	70	$941	$59,499	$3,784	$55,715	59.2	8,235
Domestic Water Heating Upgrade			**1,963**	**0.0**	**19**	**$506**	**$8,902**	**$855**	**$8,047**	**15.9**	**4,184**
ECM 12	Install High Efficiency Gas-Fired Water Heater	No	0	0.0	10	$131	$8,493	$697	$7,797	59.5	1,146
ECM 13	Install Low-Flow DHW Devices	Yes	1,963	0.0	9	$375	$409	$158	$250	0.7	3,038
TOTALS (COST EFFECTIVE MEASURES)			**55,826**	**11.2**	**3**	**$7,239**	**$53,024**	**$11,606**	**$41,417**	**5.7**	**56,529**
TOTALS (ALL MEASURES)			**62,693**	**18.3**	**83**	**$9,197**	**$243,376**	**$19,199**	**$224,178**	**24.4**	**72,824**

* - All incentives presented in this table are included as placeholders for planning purposes and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

** - 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

Utility-run energy efficiency programs and 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.

Options from Your Utility Company

Prescriptive and Custom Rebates

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 Prescriptive and Custom Rebates 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 may be required for some incentives. Contact your utility company for more details prior to project installation.

Direct Install

The Direct Install program provides turnkey installation of multiple measures through an authorized contractor. This program can provide incentives up to 70% or 80% of the cost of selected measures. A Direct Install contractor will assess and verify individual measure eligibility and perform the installation work. The Direct Install program is available to sites with an average peak demand of less than 200 kW.

Engineered Solutions

The Engineered Solutions program provides tailored energy-efficiency assistance and turnkey engineering services to municipalities, universities, schools, hospitals, and healthcare facilities (MUSH), non-profit entities, and multifamily buildings. The program provides all professional services from audit, design, construction administration, to commissioning and measurement and verification for custom whole-building energy-efficiency projects. Engineered Solutions 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.

For more details on these programs please contact your utility provider.

Options from New Jersey's Clean Energy Program

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 and Power (CHP)

The CHP program provides incentives for combined heat and power (i.e., 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.

Successor Solar Incentive Program (SuSI)

New Jersey is committed to supporting solar energy. Solar projects help the state reach the renewable goals outlined in the state's Energy Master Plan. The SuSI program is used to register and certify solar projects in New Jersey. Rebates are not available, but certified solar projects are able to earn one SREC II (Solar Renewable Energy Certificates II) for each megawatt-hour of solar electricity produced from a qualifying solar facility.

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.

Large Energy User Program (LEUP)

LEUP is designed to promote self-investment in energy efficiency. It incentivizes owners/users of buildings to upgrade or install energy conserving measures in existing buildings to help offset the capital costs associated with the project. The efficiency upgrades are customized to meet the requirements of the customers' existing facilities, while advancing the State's energy efficiency, conservation, and greenhouse gas reduction goals.

For more details on these programs please visit [New Jersey's Clean Energy Program website](#) .

2 Existing Conditions

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for East Amwell 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.

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

2.1 Site Overview

On July 7, 2023, TRC performed an energy audit at East Amwell School located in Ringoes, New Jersey. TRC met with Jesse Fry to review the facility operations and help focus our investigation on specific energy-using systems.

East Amwell School is a regional public elementary school serving students K-8. The building is a one-story, 80,000 square foot building built in 1938. The facility has undergone several expansions over the years to accommodate the growing student population. The most recent extension took place in 2018. Spaces include classrooms, offices, corridors, media center, restrooms, storage rooms, locker rooms, gymnasium, kitchen, and mechanical space.

Apart from the elementary school, the facility has a 3,200 square foot maintenance barn built in 1938.

Recent improvements and Facility Concerns

In 2016, the facility replaced all its existing T8 fluorescent fixtures with LED.

Facility concerns include upgrading aging pumps.

2.2 Building Occupancy

The elementary school and maintenance barn operates on a ten-month schedule. During a typical weekday, the elementary school is occupied by approximately 350 students and 80 staff. There are some after school programs. The facility shut down around 11:00 PM after the cleaning process.

It should be noted that the energy and economic analysis for the facilities is based on the use of the building during the utility billing period, and that results will vary based on changes to building use patterns.

Building Name	Weekday/Weekend	Operating Schedule
East Amwell Township School - General Operating Hours	Weekday	7:00 AM - 11:00 PM
	Weekend	Closed
East Amwell Township School - Classes Hours	Weekday	8:30 AM - 3:30 PM
	After School Program	3:30 PM - 6:00 PM

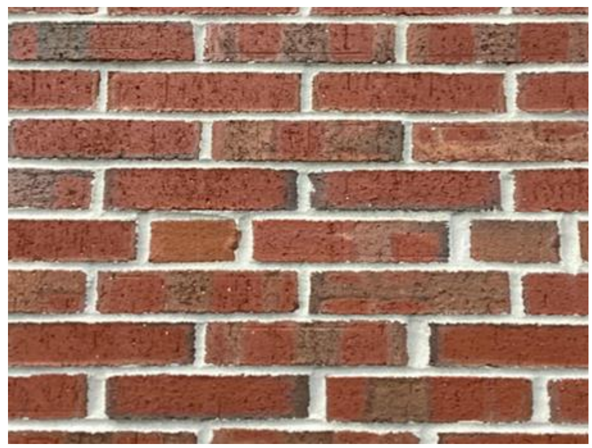
Figure 3 - Building Occupancy Schedule

2.3 Building Envelope

The elementary school building walls are concrete masonry units (CMU) block over structural steel with a brick veneer façade, with gypsum drywall and painted CMU interior finish. The level of exterior wall insulation is unknown. The school's architectural landscape is crowned with a trio of distinct roofing styles, including a classic pitched roof covered with asphalt shingles, flat roof covered with gravel, and modern flat roof covered with a black rubber membrane.

All the windows are double-paned and have aluminum frames with a thermal break. Most of the school premises have undergone window replacements, apart from the 99 wing and nurse's office. The operable window weather seals are in good condition, showing little evidence of excessive wear. Exterior doors are mostly FRP-rated (fiberglass-reinforced polymers) doors and some metal doors. They are in good condition.

The maintenance barn walls, and pitched roof are metal. The maintenance barn has overhead metal-framed motorized doors that appear in good condition. Degraded window and door seals increase drafts and outside air infiltration.

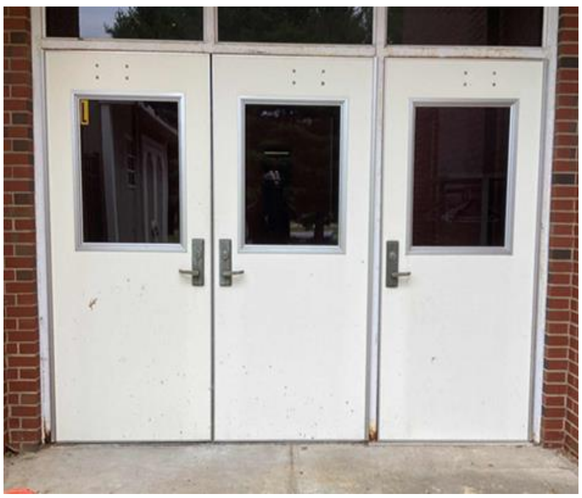
East Amwell School – Building Walls

Flat Roof with Black Rubber Membrane

Flat Roof with Gravel Finish

Pitched Roof with Asphalt Shingles

Elementary School - Windows



FRP Rated Doors

Metal Doors

Maintenance Barn

2.4 Lighting Systems

The primary interior lighting system throughout the entire complex uses LED linear tubes and LED fixtures. There are some incandescent and LED lamps. Additionally, there are several compact fluorescent lamps (CFL), fluorescent T8 and T12 lamps. Typically, T8 fluorescent lamps use electronic ballast and T12 fluorescent lamps use less efficient magnetic ballasts. Fixture types include 1-lamp, 2-lamp, 3-lamp, or 4-lamp, 2-foot or 4-foot-long troffer, recessed, and surface mounted fixtures. LED fixtures are found in spaces including restrooms, corridors, closets, maintenance barn, and offices. Classrooms, gymnasium, locker rooms, kitchen, and other offices are illuminated with LED linear tubes. The M.D.F. room uses linear fluorescent T12 lamps while the boiler room, server room, trophy display, and gymnasium attic uses linear fluorescent T8 lamps. Incandescent lamps can be found in the attic situated above the main office as well as in classroom 7B.

Most fixtures are in good condition. Interior lighting levels were generally sufficient. Most lighting fixtures in the classrooms and offices are controlled by wall switches, while some are equipped with occupancy sensors. The lights in the hallway and lobbies are controlled by wall switches.

The maintenance barn lights are controlled by wall switches.

Exterior fixtures are mostly LED apart from one high pressure sodium fixture. Fixture types include wall packs, flood, ceiling mounted, and pole lights. They are controlled by timeclocks, wall switches, and photocells.

LED Fixtures

LED Linear Tubes

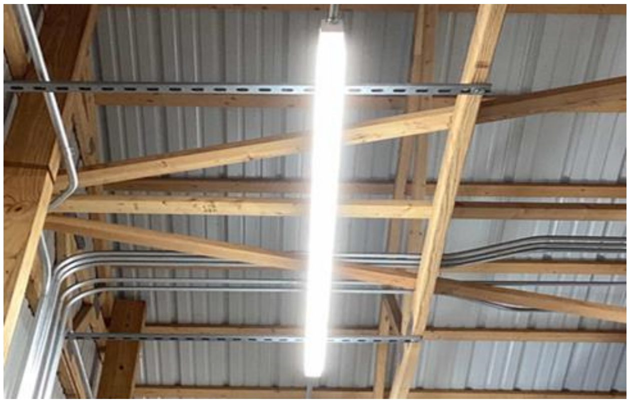
Fluorescent Linear Tubes

LED Exit Sign

Incandescent A-Lamps

LED A-Lamp

Fluorescent PL Lamp



Maintenance Barn – LED Fixtures

Wall-Mounted

Ceiling-Mounted Occupancy Sensors

Wall Switches

LED Wall Pack

LED Flood Fixture

LED Pole

High-Pressure Sodium Wall Pack

Maintenance Barn – LED Wall Pack

Maintenance Barn –Ceiling Mounted LED Fixture

2.5 Air Handling Systems

Unit Ventilators

The elementary school unit ventilators are equipped with supply fan motors and fan coil valves connected to the hot water distribution system. They provide heating and ventilation to classrooms and other spaces. The units are original to the building and are in good operating condition. The units are controlled by the building automation system (BAS).

Unit Ventilator

Unitary Electric HVAC Equipment

The copy room, BA's office, board secretary's office, various classrooms, and teacher's lounge use window air conditioning (AC) units. The units cooling capacity are either 0.50-tons or 1-ton. Most units are in good condition. One unit is in fair condition and has been evaluated for replacement.

The nurses' office, art room, classroom 10A, and media server room are air conditioned by four mini-split system ACs that vary in size between 1.50 tons and 5 tons. Two units are in fair condition and have been evaluated for replacement. The units are controlled by programmable thermostats.

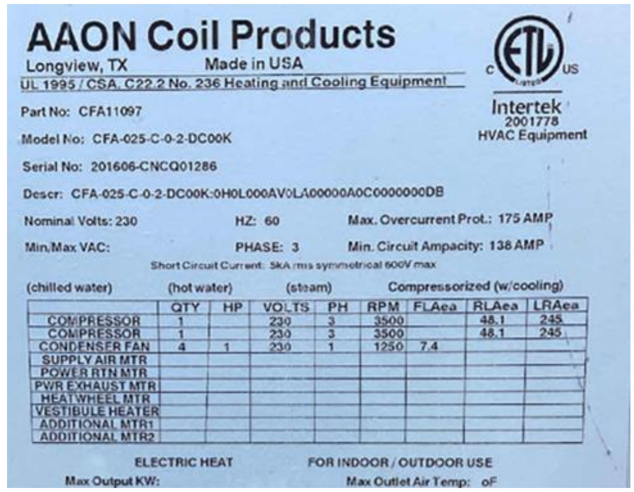
The M.D.F. room and Room 8A are served by 0.75-ton mini-split heat pumps controlled by room thermostats. Various spaces in the 2018 wing are served two Variable Refrigerant Flow (VRF) air source heat pumps. The VRF units have 6.0-ton to 8.0-ton cooling capacities and heating capacities ranging between 80 MBh to 108 MBh. They all appear in good working condition and are controlled the building management system.

Window AC

Condensing Unit

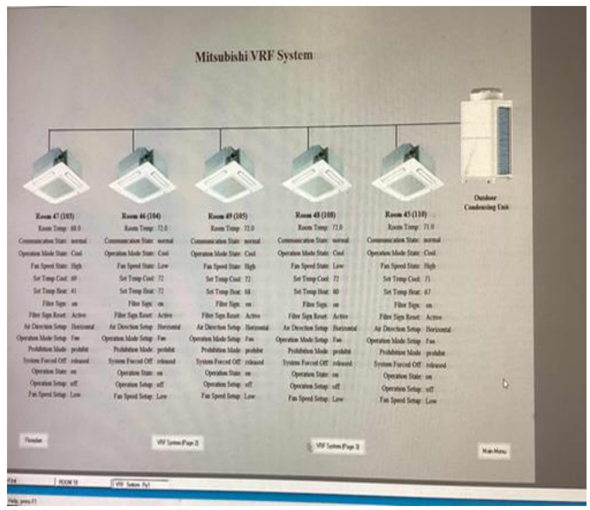
Condensing Unit

Evaporator



Condensing Unit

Air-Source Heat Pump



BAS Screenshot – VRF System and Air-Source Heat Pump

Unitary Heating Equipment

The entrance and main office area is conditioned by two furnaces located in the attic, which are equipped with a direct expansion coil connected to two outside condensing units: 2 ton and 5 ton. The furnaces have a gas-fired heating output capacities of 65 MBh and 98 MBh, both with an efficiency rating of 82%. The system is controlled by a local thermostat and is in good condition.

The maintenance barn is heated by six, 17 MBh suspended electric unit heaters. The units are in good condition and controlled by manual thermostats.


Attic Furnace


Outdoor Condensing Units

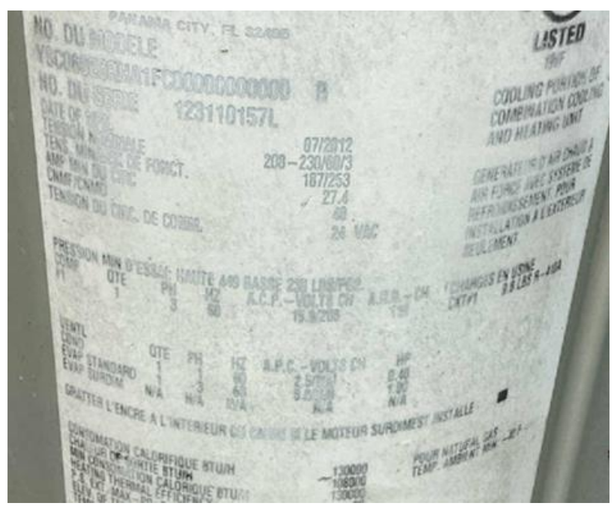

Suspended Electric Resistance Heater

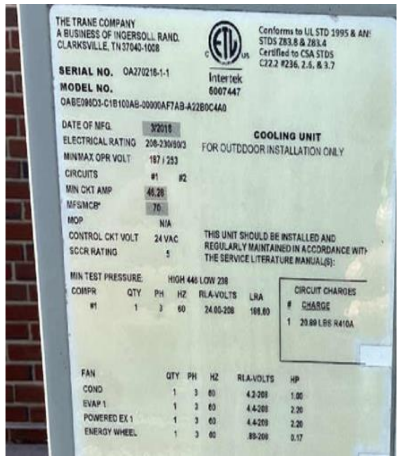
Packaged Units

Rooms 23, 17A, 17B, and 17C, are conditioned by a roof-mounted unit and an exterior unit positioned on the ground. Both units are equipped with economizers. They provide cooling through direct expansion (DX) coils and are equipped with gas-fired sections for heating. The units cooling capacities are 5 tons with heating capacities of 108 MBh. The units are constant volume systems. The units are in good condition and are controlled by the BAS.

The dedicated outside air system (DOAS) unit located in the exterior grounds provides ventilation and cooling through DX coils for different spaces. The unit has a cooling capacity of 8 tons and is equipped with supply and return fan motors, each with a 2 hp capability. The unit is a constant volume system. It is in good condition and is controlled by the BAS.


Exterior Ground Package Unit


Ground Package Unit Tag

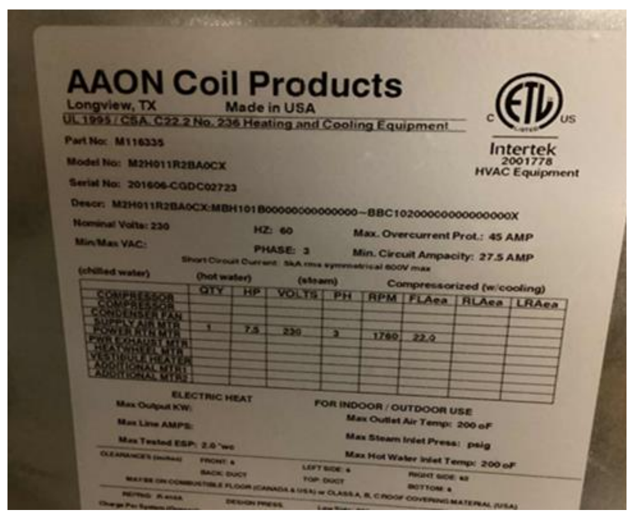


DOAS Unit

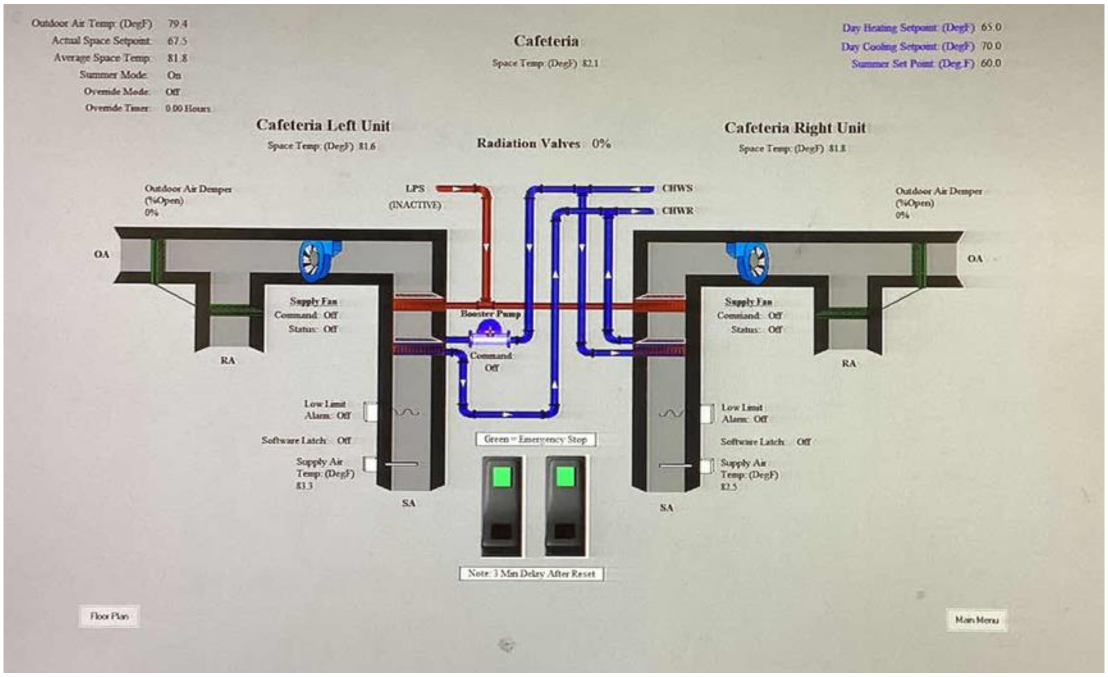
Roof Top Package Unit

Air Handling Units (AHUs)

Some of the larger elementary spaces including auditorium/cafeteria, gymnasium, music room, tech lab, science lab, and library are conditioned by seven air handling units (AHUs) connected to ducted distribution systems. The units are furnished with hot water heating coil, and a refrigerant coil for cooling. The AHUs are equipped with supply fan motors ranging from 0.5 to 7.5 hp. Some of the units are difficult to access; as such, the fan capacities have been estimated.



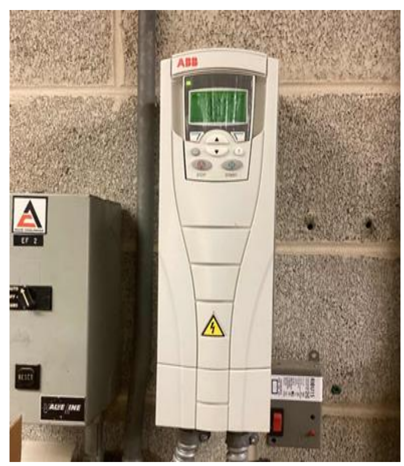
Gymnasium AHU



BAS Screenshot – Cafeteria AHUs

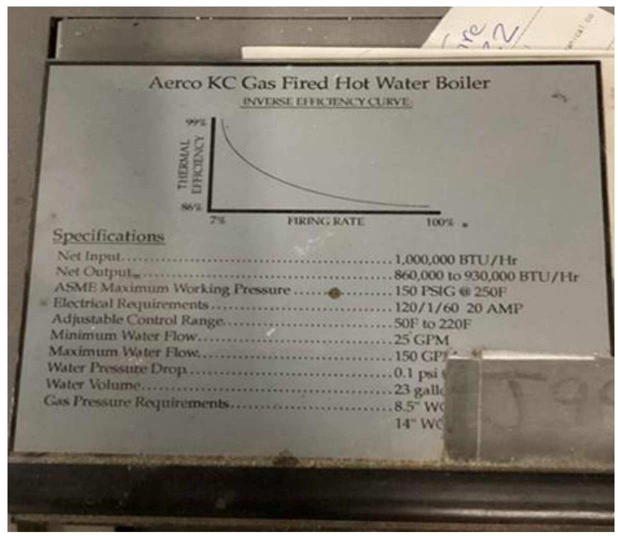
2.6 Building Exhaust Air Systems

The elementary school restrooms, corridors, offices, kitchen, and other areas are exhausted by motor-driven exhaust fans. The kitchens have exhaust fans which serve all the kitchen hoods. The attic houses the gymnasium exhaust fan, which is equipped with VFD. Equipment is in good condition, controlled by BAS or manual switches, depending on the system.

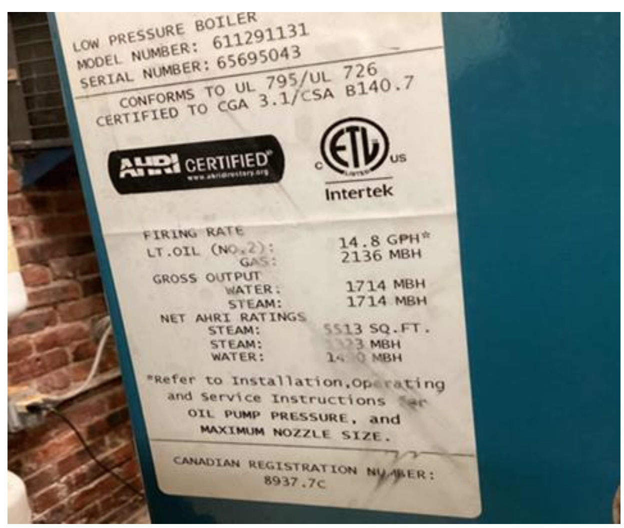
		
Exhaust Fans	*Gymnasium Exhaust*	*VFD – Gymnasium Exhaust Fan*

2.7 Heating Steam to Hot Water Systems

The elementary school has two boiler plants with a total of four boilers: two non-condensing BURNHAM boilers and two steam AERCO boilers. The heating output capacity of the non-condensing boilers is 1,714 MBh, while the heating output capacity of the steam boilers is 860 MBh. The burners are fully modulating. Each boiler plant serves a specific building area. The boilers are configured in an automated sequence, and they all run together to meet the heating demand and they stage based on outside air temperature. The BURNHAM boilers, installed in 2019, remain in good condition. Meanwhile, the AERCO boilers, which were installed in 1998 have been evaluated for replacement. Steam in the AERCO boilers is converted to hot water by a heat exchanger, and hot water is distributed to heating end uses. The hydronic distribution system is a two-pipe heating-only system. Three constant flow 5 hp pumps and one variable speed 5 hp pump distribute heating hot water to unit ventilators (UVs), hydronic baseboards, and unit heaters. The boilers operate based on outside air temperature. The boilers and the hot water loop are controlled by the BAS.

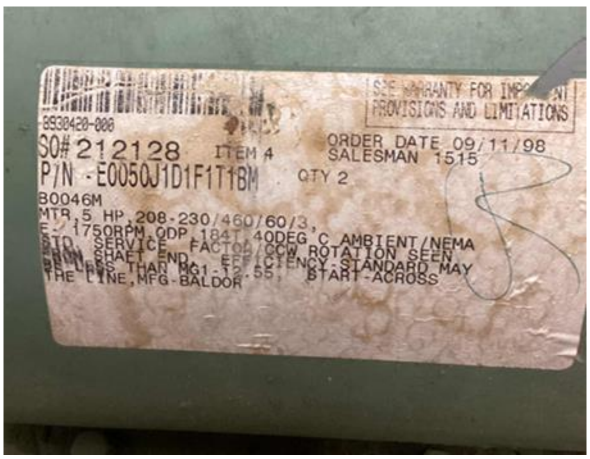


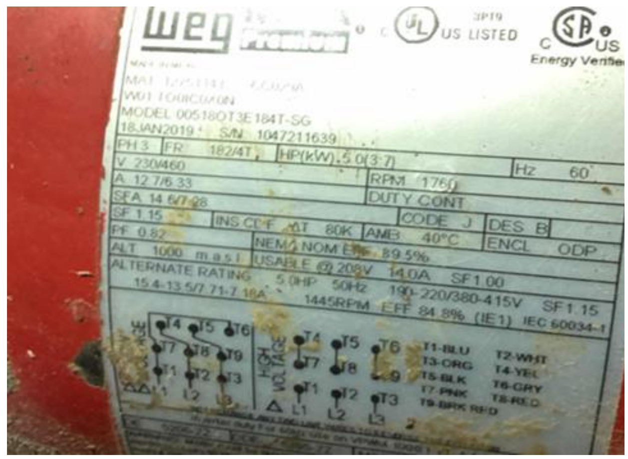
Gas-fired Boilers



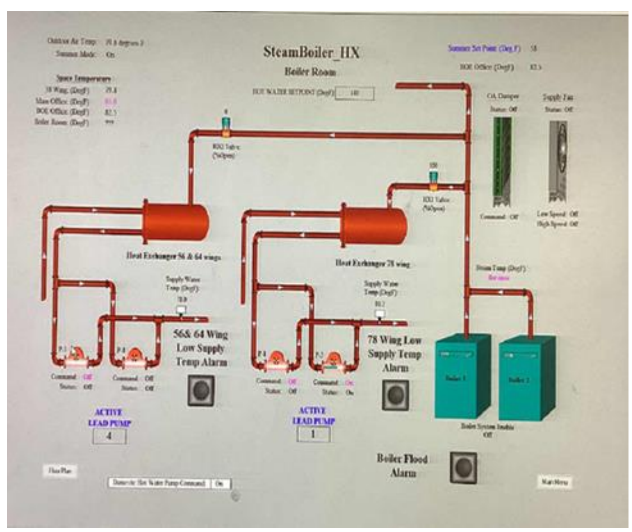
Steam Boilers


Heat and Hot Water Pumps





Heating Hot Water Pump Labels

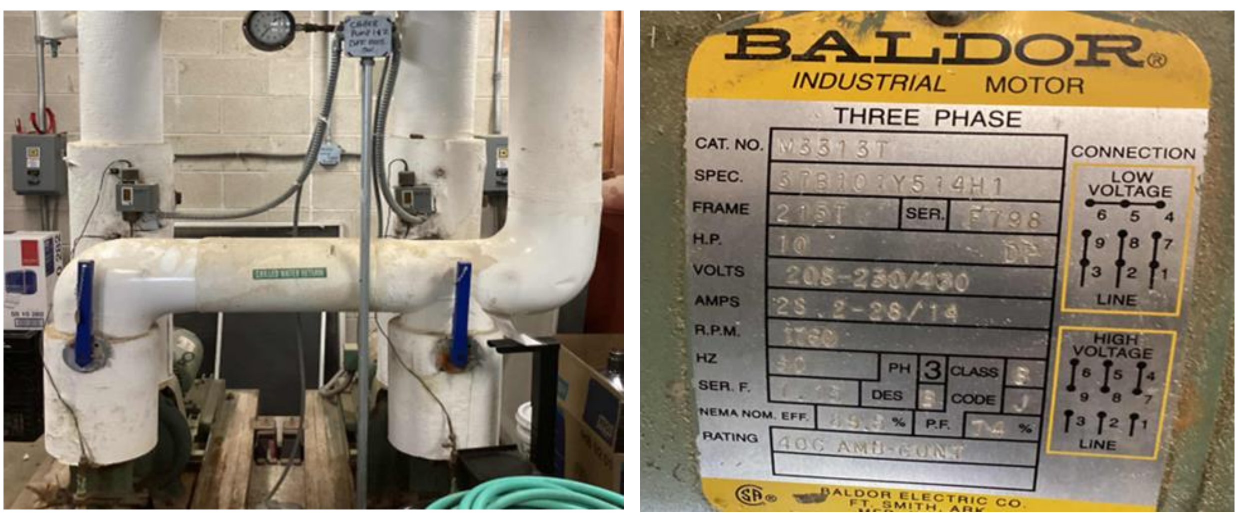
VFD and Heat Exchanger. BAS Screenshot – Steam Boilers

2.8 Chilled Water Systems

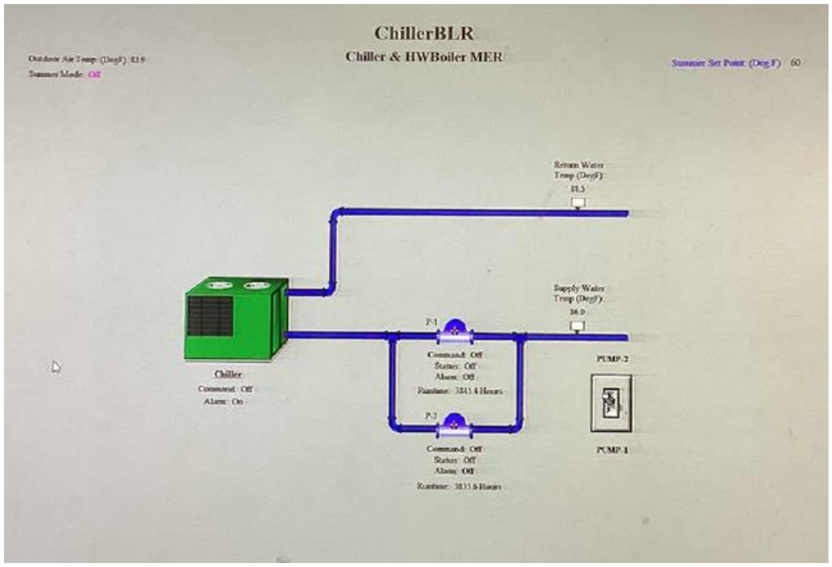
The building chilled water system consists of an 81.9-ton R-22 air cooled reciprocating chiller located on the exterior ground. Installed in 1998, the chiller has reached its useful life and appears in poor condition. It has been evaluated for replacement. Two, 10 hp constant flow pumps (P1 and P2) located in the Boiler Room #2 circulate chilled water to AHUs serving the 99 wing, library, science rooms, computer and tech rooms, cafeteria, and music room. The pumps are configured in an automated lead-lag control scheme.

The chilled water supply temperature is reset based on outside air temperature. Chilled water is distributed at 42°F when the outside air temperature is above 60°F.

Air-Cooled Chiller



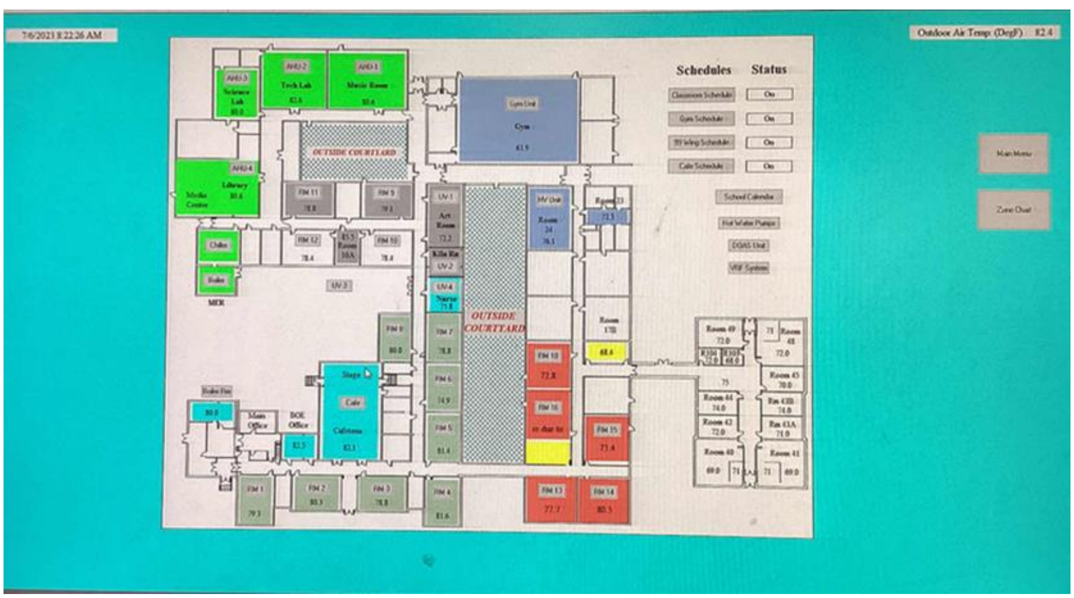
Chilled Water Pumps and Tag



BAS Screenshot - Chiller

2.9 Building Automation System (BAS)

A BAS controls the HVAC equipment, boilers, chiller, air handlers, exhaust fans, and the package units. The BAS provides equipment scheduling control, monitors and controls space temperatures, supply air temperature, humidity, and hot water loop temperatures.

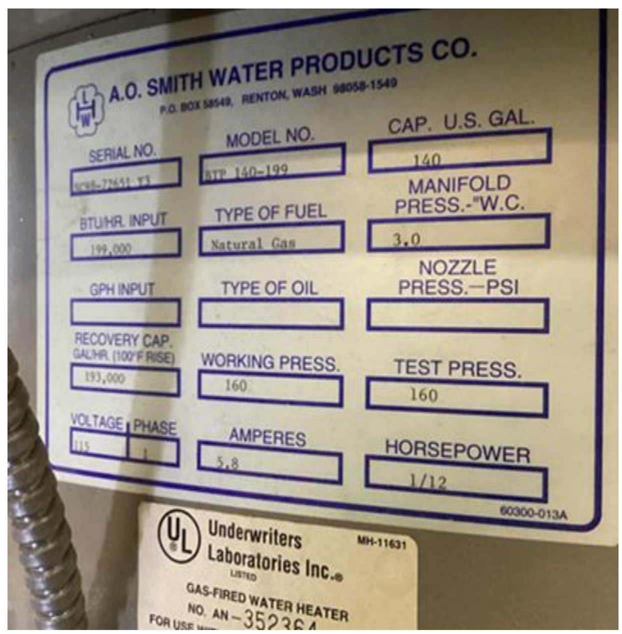


BAS Screenshot – Main Screen

2.10 Domestic Hot Water

Domestic hot water is produced by a combination of 12 electric storage tank water heaters, ranging from 1.50 kW to 4.50 kW, alongside two gas-fired storage tank water heaters. Of the two gas-fired heaters, one has a capacity of 199 Mbh while the other has a capacity of 250 Mbh, each with an 80% efficiency rating. The electric storage tanks serve classrooms and some offices, while the gas-fired storage tanks serve various restrooms, main office, and kitchen.

Electric Water Heater



Gas-fired Water Heater

2.11 Food Service Equipment

The kitchen has all electric equipment that is used to prepare meals for students and staff. Most cooking is done using an electric oven. Bulk prepared foods are held in one electric holding cabinet. Equipment is high efficiency and is in good condition.

The dishwasher is an ENERGY STAR, low-temperature, rack-type unit. It is in good condition.

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

Electric Convection Oven

Electric Stove

Dishwasher

2.12 Refrigeration

The kitchen has two stand-up refrigerators with solid doors, three stand-up freezers with solid doors, and two refrigerator chests. The equipment is standard efficiency and in good condition.

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

Stand-up Freezer

Stand-up Refrigerator

Refrigerator Chest

2.13 Plug Load and Vending Machines

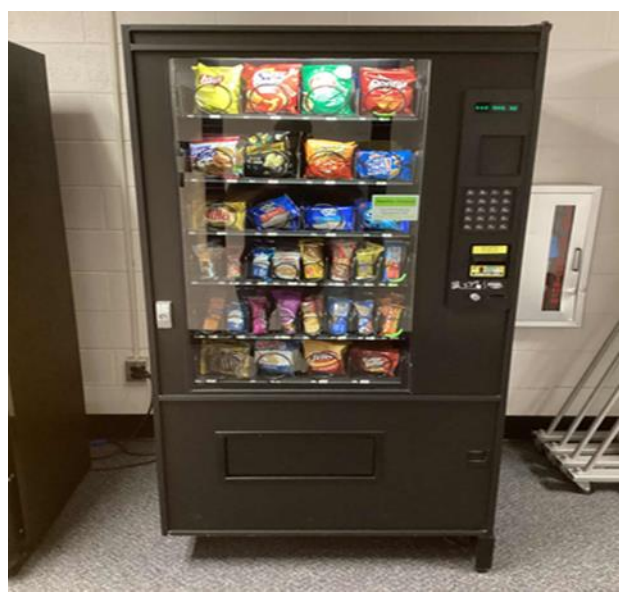
You may wish to consider paying particular attention to minimizing your plug load usage. This report makes suggestions for ECMs in this area as well as energy efficient best practices.

There are 57 computer workstations throughout the complex. Plug loads include general cafe and office equipment. There are typical classroom loads such as smartboards, projectors, scanner/copier, small printer, microwaves, charging stations, mini-fridges, and televisions. STEM classrooms have plug loads that include pottery equipment and 3D printers.

There are several residential style refrigerators, and these vary in condition and efficiency.

There are two refrigerated beverage vending machines, and one non-refrigerated vending machine. The vending machines are equipped with occupancy-based controls.

Scanner/Copier



Non-Refrigerated Vending Machine

2.14 Water-Using Systems

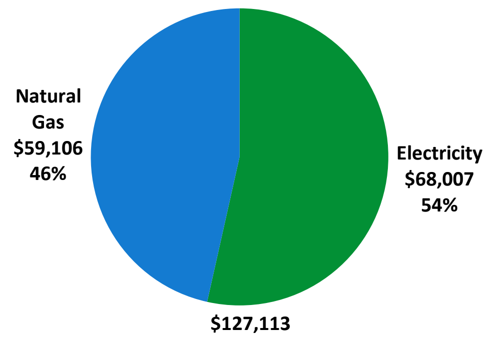
There are several restrooms with sinks, toilets and/or urinals. Faucet flow rates are at 2.0 gallons per minute (gpm) or higher. Some restrooms have low-flow devices.

Lavatory Sink

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	527,065 kWh	$68,007
Natural Gas	44,171 Therms	$59,106
Total		**$127,113**



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.

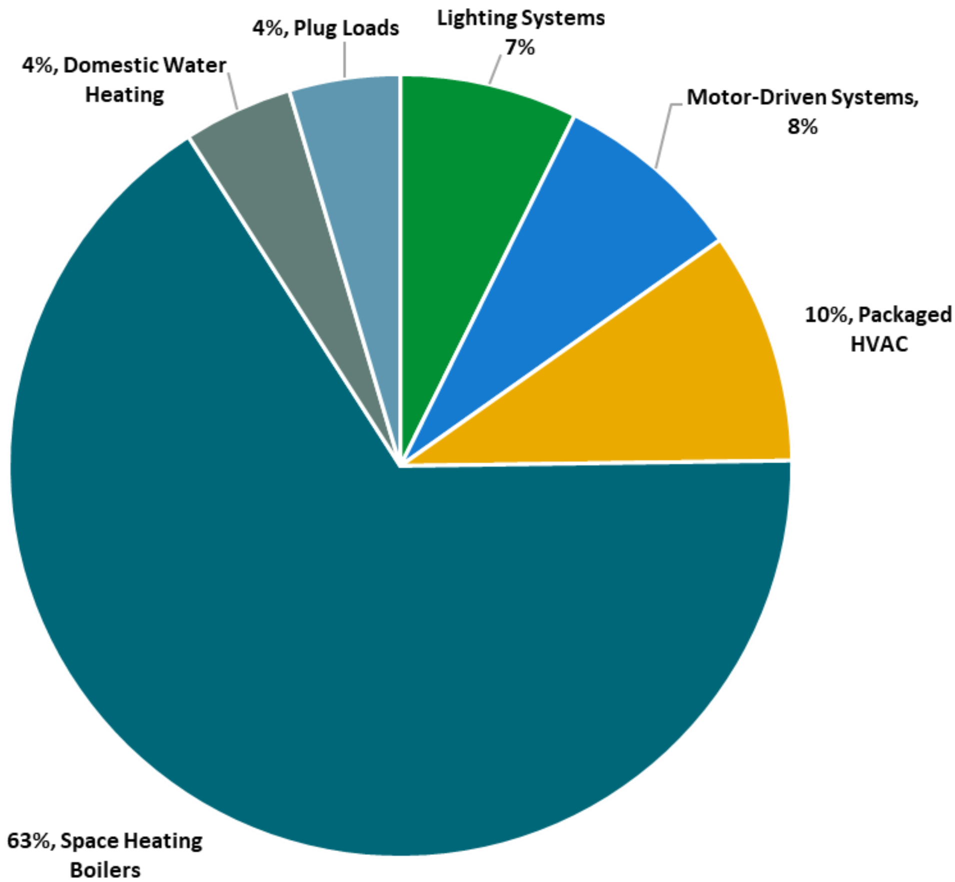
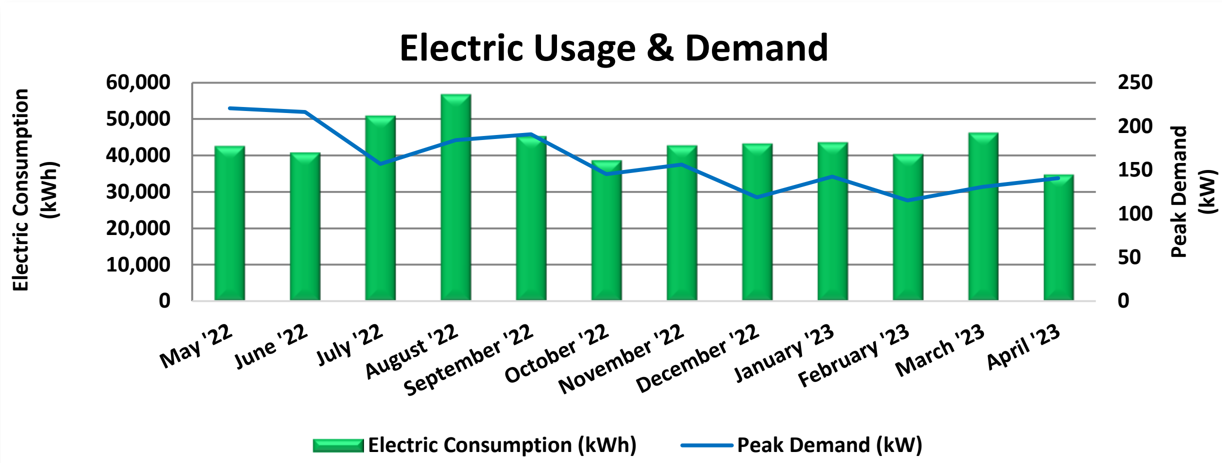


Figure 4 - Energy Balance

3.1 Electricity

JCP&L delivers electricity under rate class General Service Secondary (JC_GS3_01F), with electric production provided by JCP&L, a third-party supplier.



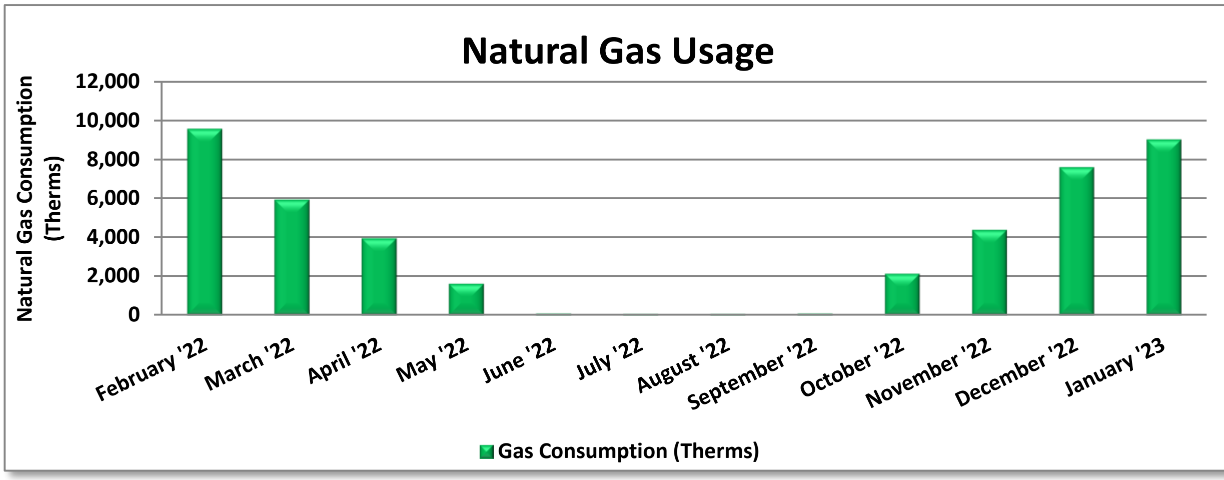
Electric Billing Data					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
5/27/22	30	42,547	221	$1,802	$4,918
6/28/22	32	40,763	216	$1,714	$4,956
7/29/22	31	50,868	157	$1,244	$6,078
8/29/22	31	56,768	184	$1,460	$6,838
9/28/22	30	45,280	191	$1,512	$6,423
10/27/22	29	38,634	145	$1,072	$5,304
11/28/22	32	42,730	156	$1,153	$5,822
12/27/22	29	43,209	119	$875	$5,549
1/27/23	31	43,548	142	$1,050	$5,767
2/24/23	28	40,337	115	$851	$5,233
3/28/23	32	46,214	131	$966	$6,042
4/26/23	29	34,723	141	$1,038	$4,892
Totals	**364**	**525,621**	**221**	**$14,736**	**$67,821**
Annual	**365**	**527,065**	**221**	**$14,777**	**$68,007**

Notes:

- Peak demand of 221 kW occurred in May '22.
- Average demand over the past 12 months was 160 kW.
- The average electric cost over the past 12 months was $0.129/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges. This report uses this blended rate to estimate energy cost savings.

3.2 Natural Gas

Elizabethtown Gas delivers natural gas under rate class General Delivery Service - Transportation, with natural gas supply provided by Direct Energy, a third-party supplier.



Gas Billing Data			
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**
2/22/22	29	9,546	$10,937
3/24/22	30	5,929	$6,911
4/22/22	29	3,946	$4,890
5/23/22	31	1,615	$2,611
6/23/22	31	91	$816
7/22/22	29	63	$772
8/24/22	33	63	$777
9/26/22	33	77	$934
10/25/22	29	2,131	$3,502
11/22/22	28	4,374	$5,764
12/22/22	30	7,583	$10,063
1/26/23	35	8,995	$11,453
Totals	**367**	**44,413**	**$59,430**
Annual	**365**	**44,171**	**$59,106**

Notes:

- The average gas cost for the past 12 months is $1.338/therm, which is the blended rate used throughout the analysis.

3.3 Benchmarking

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

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

Benchmarking Score	41

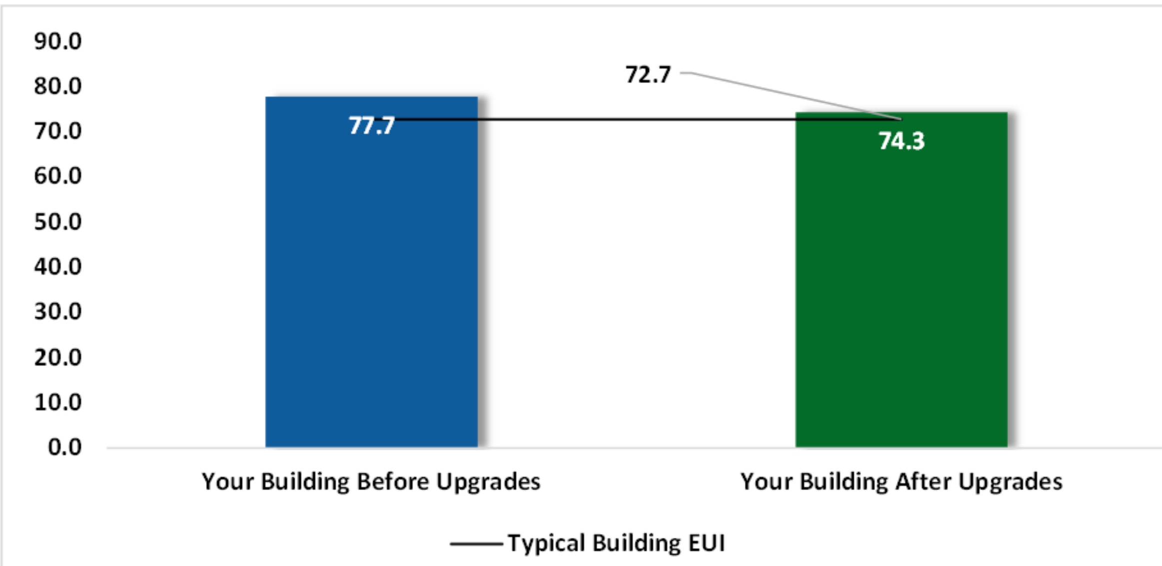


Figure 5 - Energy Use Intensity Comparison[3]

This building performs at, or below the national average. This report contains suggestions about how to improve building performance and reduce energy costs.

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. Several factors can cause a building to vary from typical energy usage. Local weather conditions, building age and insulation levels, equipment efficiency, daily occupancy hours, changes in occupancy throughout the year, equipment operating hours, and occupant behavior all contribute to a building's energy use and the benchmarking score.

[3] Based on all evaluated ECMs

Tracking Your Energy Performance

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

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

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

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

4 Energy Conservation Measures

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

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

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

Financial incentives in this report are based on the previously run state rebate program SmartStart, which has been retired. Now, all investor-owned gas and electric utility companies are offering complementary energy efficiency programs directly to their customers. Some measures and proposed upgrades may be eligible for higher incentives than those shown below. The incentives in the summary tables should be used for high-level planning purposes. To verify incentives, reach out to your utility provider or visit the NJCEP website for more information.

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**5,071**	**0.9**	**-1**	**$641**	**$2,582**	**$473**	**$2,109**	**3.3**	**4,993**
ECM 1	Install LED Fixtures	Yes	438	0.0	0	$57	$309	$50	$259	4.6	441
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	228	0.0	0	$29	$69	$10	$59	2.0	224
ECM 3	Retrofit Fixtures with LED Lamps	Yes	4,404	0.9	-1	$556	$2,204	$413	$1,791	3.2	4,327
Lighting Control Measures			**25,972**	**4.8**	**-5**	**$3,279**	**$20,718**	**$6,075**	**$14,643**	**4.5**	**25,518**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	20,934	4.1	-4	$2,643	$15,318	$1,980	$13,338	5.0	20,568
ECM 5	Install High/Low Lighting Controls	Yes	5,038	0.8	-1	$636	$5,400	$4,095	$1,305	2.1	4,950
Variable Frequency Drive (VFD) Measures			**27,089**	**7.4**	**0**	**$3,495**	**$42,084**	**$5,200**	**$36,884**	**10.6**	**27,278**
ECM 6	Install VFDs on Constant Volume (CV) Fans	No	4,269	1.9	0	$551	$12,768	$300	$12,468	22.6	4,299
ECM 7	Install VFDs on Chilled Water Pumps	Yes	13,043	3.9	0	$1,683	$13,393	$2,200	$11,193	6.7	13,134
ECM 8	Install VFDs on Heating Water Pumps	Yes	9,777	1.5	0	$1,262	$15,922	$2,700	$13,222	10.5	9,846
Unitary HVAC Measures			**728**	**1.0**	**0**	**$94**	**$23,969**	**$1,260**	**$22,709**	**241.8**	**733**
ECM 9	Install High Efficiency Air Conditioning Units	No	728	1.0	0	$94	$23,969	$1,260	$22,709	241.8	733
Electric Chiller Replacement			**1,870**	**4.2**	**0**	**$241**	**$85,623**	**$1,552**	**$84,071**	**348.4**	**1,883**
ECM 10	Install High Efficiency Chillers	No	1,870	4.2	0	$241	$85,623	$1,552	$84,071	348.4	1,883
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**70**	**$941**	**$59,499**	**$3,784**	**$55,715**	**59.2**	**8,235**
ECM 11	Install High Efficiency Hot Water Boilers	No	0	0.0	70	$941	$59,499	$3,784	$55,715	59.2	8,235
Domestic Water Heating Upgrade			**1,963**	**0.0**	**19**	**$506**	**$8,902**	**$855**	**$8,047**	**15.9**	**4,184**
ECM 12	Install High Efficiency Gas-Fired Water Heater	No	0	0.0	10	$131	$8,493	$697	$7,797	59.5	1,146
ECM 13	Install Low-Flow DHW Devices	Yes	1,963	0.0	9	$375	$409	$158	$250	0.7	3,038
TOTALS			**62,693**	**18.3**	**83**	**$9,197**	**$243,376**	**$19,199**	**$224,178**	**24.4**	**72,824**

* - All incentives presented in this table are included as placeholders for planning purposes and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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

Figure 6 – All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**5,071**	**0.9**	**-1**	**$641**	**$2,582**	**$473**	**$2,109**	**3.3**	**4,993**
ECM 1	Install LED Fixtures	438	0.0	0	$57	$309	$50	$259	4.6	441
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	228	0.0	0	$29	$69	$10	$59	2.0	224
ECM 3	Retrofit Fixtures with LED Lamps	4,404	0.9	-1	$556	$2,204	$413	$1,791	3.2	4,327
Lighting Control Measures		**25,972**	**4.8**	**-5**	**$3,279**	**$20,718**	**$6,075**	**$14,643**	**4.5**	**25,518**
ECM 4	Install Occupancy Sensor Lighting Controls	20,934	4.1	-4	$2,643	$15,318	$1,980	$13,338	5.0	20,568
ECM 5	Install High/Low Lighting Controls	5,038	0.8	-1	$636	$5,400	$4,095	$1,305	2.1	4,950
Variable Frequency Drive (VFD) Measures		**22,820**	**5.4**	**0**	**$2,944**	**$29,315**	**$4,900**	**$24,415**	**8.3**	**22,979**
ECM 7	Install VFDs on Chilled Water Pumps	13,043	3.9	0	$1,683	$13,393	$2,200	$11,193	6.7	13,134
ECM 8	Install VFDs on Heating Water Pumps	9,777	1.5	0	$1,262	$15,922	$2,700	$13,222	10.5	9,846
Domestic Water Heating Upgrade		**1,963**	**0.0**	**9**	**$375**	**$409**	**$158**	**$250**	**0.7**	**3,038**
ECM 13	Install Low-Flow DHW Devices	1,963	0.0	9	$375	$409	$158	$250	0.7	3,038
TOTALS		**55,826**	**11.2**	**3**	**$7,239**	**$53,024**	**$11,606**	**$41,417**	**5.7**	**56,529**

* - All incentives presented in this table are included as placeholders for planning purposes and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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

Figure 7 – 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 ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**5,071**	**0.9**	**-1**	**$641**	**$2,582**	**$473**	**$2,109**	**3.3**	**4,993**
ECM 1	Install LED Fixtures	438	0.0	0	$57	$309	$50	$259	4.6	441
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	228	0.0	0	$29	$69	$10	$59	2.0	224
ECM 3	Retrofit Fixtures with LED Lamps	4,404	0.9	-1	$556	$2,204	$413	$1,791	3.2	4,327

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 HID, fluorescent, or incandescent 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 or fluorescent 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: offices, closets, restrooms, and locker rooms

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

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

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

Affected Building Areas: M.D.F. room

ECM 3: Retrofit Fixtures with LED Lamps

Replace fluorescent T8 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. Be sure to specify replacement lamps that are compatible with existing dimming controls, where applicable. In some circumstances, you may need to upgrade your dimming system for optimum performance.

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

Affected Building Areas: auditorium stage closet, boiler alcove room, offices, trophy display, and server room

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**25,972**	**4.8**	**-5**	**$3,279**	**$22,918**	**$6,075**	**$16,843**	**5.1**	**25,518**
ECM 4	Install Occupancy Sensor Lighting Controls	20,934	4.1	-4	$2,643	$15,318	$1,980	$13,338	5.0	20,568
ECM 5	Install Photocell Controls	0	0.0	0	$0	$2,200	$0	$2,200	0.0	0
ECM 6	Install High/Low Lighting Controls	5,038	0.8	-1	$636	$5,400	$4,095	$1,305	2.1	4,950

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

ECM 4: Install Occupancy Sensor Lighting Controls

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

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

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

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

Affected Building Areas: offices, closets, auditorium/cafeteria, boiler rooms, restrooms, classrooms, and maintenance barn

ECM 5: Install High/Low Lighting Controls

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

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

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

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

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

Affected Building Areas: rooms 38, 50, 56, 64, 78, 99, and new addition wing corridors

4.3 Variable Frequency Drives (VFD)

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

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

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

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

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

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

Affected Air Handlers: DOAS-1

ECM 7: 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 three-way valves or a bypass leg are used in the chilled water distribution, 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: boiler room #2 P1 and P2

ECM 8: Install VFDs on Heating Water Pumps

Install variable frequency drives (VFD) 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 three-way valves or a bypass leg are used in the hot water distribution, 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: boiler room #1 HP-2 and Boiler room #2 heating hot water pumps (2)

4.4 Unitary HVAC

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Unitary HVAC Measures		**728**	**1.0**	**0**	**$94**	**$23,969**	**$1,260**	**$22,709**	**241.8**	**733**
ECM 10	Install High Efficiency Air Conditioning Units	728	1.0	0	$94	$23,969	$1,260	$22,709	241.8	733

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

ECM 9: Install High Efficiency Air Conditioning Units

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

Affected Units: classroom 10A, Nurses' office, and room 8A

4.5 Electric Chillers

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Electric Chiller Replacement		**1,870**	**4.2**	**0**	**$241**	**$85,623**	**$1,552**	**$84,071**	**348.4**	**1,883**
ECM 11	Install High Efficiency Chillers	1,870	4.2	0	$241	$85,623	$1,552	$84,071	348.4	1,883

ECM 10: Install High Efficiency Chillers

Replace older inefficient electric chillers with new high efficiency chillers. The type of chiller to be installed depends on the magnitude of the cooling load and variability of the cooling load profile, for example:

- Positive displacement chillers are usually under 600 tons of cooling capacity, and centrifugal chillers generally start at 150 tons of cooling capacity.
- Constant speed chillers should be used to meet cooling loads with little or no variation, while variable speed chillers are more efficient for variable cooling load profiles.
- Water cooled chillers are more efficient than air cooled chillers but require cooling towers and additional pumps to circulate the cooling water.
- In any given size range, variable speed chillers tend to have better partial load efficiency, but worse full load efficiency, than constant speed chillers.

Energy savings result from the improvement in chiller efficiency and matching the right type of chiller to the cooling load. The energy savings are calculated based on the cooling capacity of the new chiller, the improvement in efficiency compared with the base case equipment, the cooling load profile, and the estimated annual operating hours of the chiller before and after the upgrade.

For the purposes of this analysis, we evaluated the replacement of chillers on a one-for-one basis with equipment of the same capacity. We recommend that you work with your design team to select chillers that are sized appropriately for the cooling load. In some cases, the plant energy use can be reduced by selecting multiple chillers that match the facility load profile, rather than one or two large chillers. This can also improve the chiller plant reliability through increased redundancy. Energy savings are maximized by proper selection of new equipment based on the cooling load profile.

Replacing the chiller has a long payback based on energy savings and may not be justifiable based simply on energy considerations. However, the chiller is nearing the end of its normal useful life. Typically, the marginal cost of purchasing a high-efficiency chiller can be justified by the marginal savings from the improved efficiency. When the chiller is eventually replaced, consider purchasing equipment that exceed the minimum efficiency required by building codes.

4.6 Gas-Fired Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**70**	**$941**	**$59,499**	**$3,784**	**$55,715**	**59.2**	**8,235**
ECM 12	Install High Efficiency Hot Water Boilers	0	0.0	70	$941	$59,499	$3,784	$55,715	59.2	8,235

ECM 11: Install High Efficiency Hot Water Boilers

Replace older inefficient hot water boilers with high efficiency hot water boilers. Energy savings results from improved combustion efficiency and reduced standby losses at low loads.

The most notable efficiency improvement is condensing hydronic boilers that can achieve over 90% efficiency under the proper conditions. Condensing hydronic boilers typically operate at efficiencies between 85% and 87% (comparable to other high efficiency boilers) when the return water temperature is above 130°F. The boiler efficiency increases as the return water temperature drops below 130°F. Therefore, condensing hydronic boilers are evaluated when the return water temperature is less than 130°F during most of the operating hours.

For the purposes of this analysis, we evaluated the replacement of boilers on a one-for-one basis with equipment of the same capacity. We recommend that you work with your mechanical design team to select boilers that are sized appropriately for the heating load. In many cases installing multiple modular boilers, rather than one or two large boilers, will result in higher overall plant efficiency while providing additional system redundancy.

Replacing the boilers has a long payback and may not be justifiable based simply on energy considerations. However, the boilers have reached the end of their normal useful life. Typically, the marginal cost of purchasing high efficiency boilers can be justified by the marginal savings from the improved efficiency. When the boiler is eventually replaced, consider purchasing boilers that exceed the minimum efficiency required by building codes. We also recommend working with your mechanical design team to determine whether the heating system can operate with return water temperatures below 130°F, which would allow the use of condensing boilers.

4.7 Domestic Water Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**1,963**	**0.0**	**19**	**$506**	**$8,902**	**$855**	**$8,047**	**15.9**	**4,184**
ECM 13	Install High Efficiency Gas-Fired Water Heater	0	0.0	10	$131	$8,493	$697	$7,797	59.5	1,146
ECM 14	Install Low-Flow DHW Devices	1,963	0.0	9	$375	$409	$158	$250	0.7	3,038

ECM 12: Install High Efficiency Gas-Fired Water Heater

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

ECM 13: 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.

5 Energy Efficient Best Practices

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

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

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

Energy Tracking with ENERGY STAR Portfolio Manager

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

Weatherization

Caulk or weather strip leaky doors and windows to reduce drafts and loss of heated or cooled air. Sealing cracks and openings can reduce heating and cooling costs, improve building durability, and create a healthier indoor environment. Materials used may include caulk, polyurethane foam, and other weather-stripping materials. There is an energy savings opportunity by reducing the uncontrolled air exchange between the outside and inside of the building. Blower door assisted comprehensive building air sealing will reduce the amount of air exchange, which will in turn reduce the load on the buildings heating and cooling equipment, providing energy savings and increased occupant comfort.

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 can lead to increased occupant comfort as well as heating and cooling savings, especially when combined with proper HVAC controls and adequate ventilation.

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

Lighting Maintenance

- Clean lamps, reflectors and lenses of dirt, dust, oil, and smoke buildup every six to twelve months. Light levels decrease over time due to lamp aging, lamp and ballast failure, and buildup of dirt and dust. Together, this can reduce total light output by up to 60% while still drawing full power.

In addition to routine cleaning, developing a maintenance schedule can ensure that maintenance is performed regularly, and it can reduce the overall cost of fixture re-lamping and re-ballasting. Group re-lamping and re-ballasting maintains lighting levels and minimizes the number of site visits by a lighting technician or contractor, decreasing the overall cost of maintenance.

Lighting Controls

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

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 Maintenance

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

Fans to Reduce Cooling Load

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

Thermostat Schedules and Temperature Resets

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

Chiller Maintenance

Service chillers regularly to keep them operating properly. Chillers are responsible for a substantial portion of a commercial building's overall energy usage, and when they do not work well, there is usually a noticeable increase in energy bills and increased occupant complaints. Regular diagnostics and service can save 5% to 10% of the cost of operating your chiller. If you already have a maintenance contract in place, your existing service company should be able to provide these services.

AC System Evaporator/Condenser Coil Cleaning

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

HVAC Filter Cleaning and Replacement

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

Ductwork Maintenance

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

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

Duct leakage in commercial buildings can account for 5%–25% of the supply airflow. In the case of rooftop air handlers, duct leakage can occur to the outside of the building wasting conditioned air. Check ductwork for leakage. Eliminating duct leaks can improve ventilation system performance and reduce heating and cooling system operation.

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

Boiler Maintenance

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

Furnace Maintenance

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

Label HVAC Equipment

For improved coordination in maintenance practices, we recommend labeling or re-labeling the site HVAC equipment. Maintain continuity in labeling by following labeling conventions as indicated in the facility drawings or BAS building equipment list. Use weatherproof or heatproof labeling or stickers for permanence, but do not cover over original equipment nameplates, which should be kept clean and readable whenever possible. Besides equipment, label piping for service and direction of flow when possible. Ideally, maintain a log of HVAC equipment, including nameplate information, asset tag designation, areas served, installation year, service dates, and other pertinent information.

This investment in your equipment will enhance collaboration and communication between your staff and your contracted service providers and may help you with regulatory compliance.

Optimize HVAC Equipment Schedules

Energy management systems (BAS) typically provide advanced controls for building HVAC systems, including chillers, boilers, air handling units, rooftop units and exhaust fans. The BAS monitors and reports operational status, schedules equipment start and stop times, locks out equipment operation based on outside air or space temperature, and often optimizes damper and valve operation based on complex algorithms. These BAS features, when in proper adjustment, can improve comfort for building occupants and save substantial energy.

Know your BAS scheduling capabilities. Regularly monitor HVAC equipment operating schedules and match them to building operating hours in order to eliminate unnecessary equipment operation and save energy. Monitoring should be performed often at sites with frequently changing usage patterns – daily in some cases. We recommend using the *optimal start* feature of the BAS (if available) to optimize the building warmup sequence. Most BAS scheduling programs provide for holiday schedules, which can be used during reduced use or shutdown periods. Finally, many systems are equipped with a one-time override function, which can be used to provide additional space conditioning due to a one-time, special event. When available this override feature should be used rather than changing the base operating schedule.

Water Heater Maintenance

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

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

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

Water Conservation

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

For more information regarding water conservation go to the EPA's WaterSense website[5] or download a copy of EPA's "WaterSense at Work: Best Management Practices for Commercial and Institutional Facilities"[6] 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.

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

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

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 On-site Generation

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

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

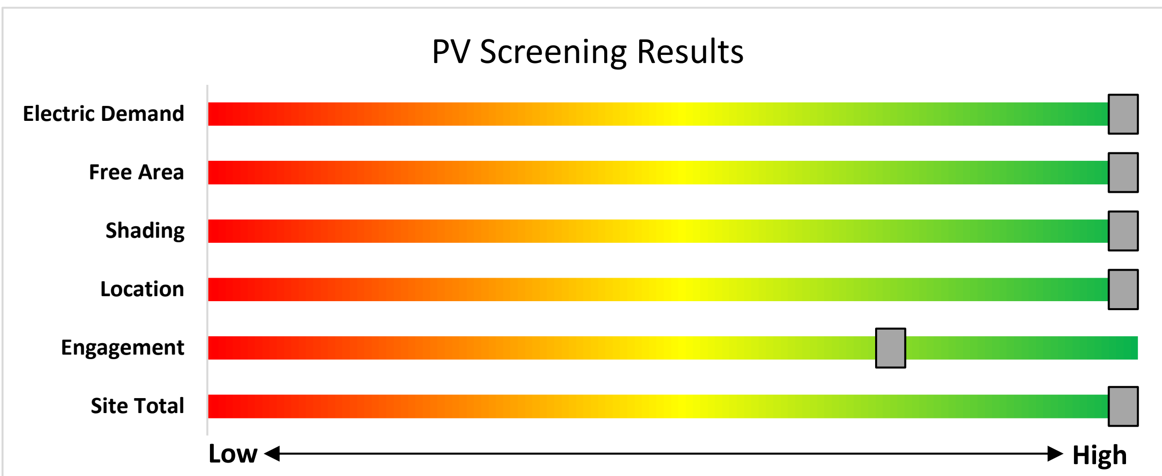
6.1 Solar Photovoltaic

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

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

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

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



Potential	High	
System Potential	160	kW DC STC
Electric Generation	190,619	kWh/yr
Displaced Cost	$24,600	/yr
Installed Cost	$416,000	

Figure 8 - Photovoltaic Screening

Successor Solar Incentive Program (SuSI)

The SuSI program replaces the SREC Registration Program (SRP) and the Transition Incentive (TI) program. The SuSI program is used to register and certify solar projects in New Jersey. Rebates are not available for solar projects. Solar projects may qualify to earn SREC- IIs (Solar Renewable Energy Certificates-II), however, the project owners *must* register their solar projects prior to the start of construction to establish the project's eligibility.

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:

Successor Solar Incentive Program (SuSI): https://www.njcleanenergy.com/renewable-energy/programs/susi-program

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

6.2 Combined Heat and Power

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

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

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

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

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

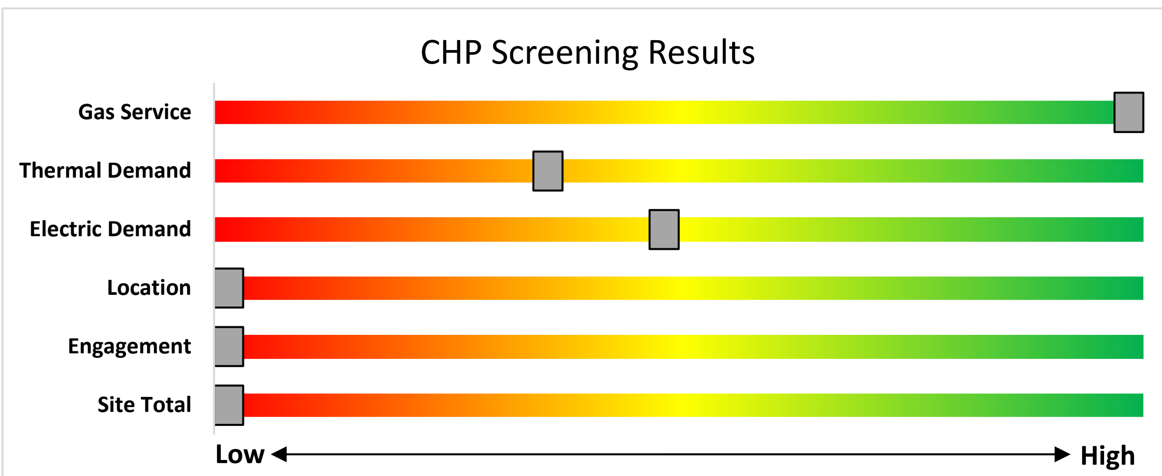


Figure 9 - Combined Heat and Power Screening

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 ELECTRIC VEHICLES (EV)

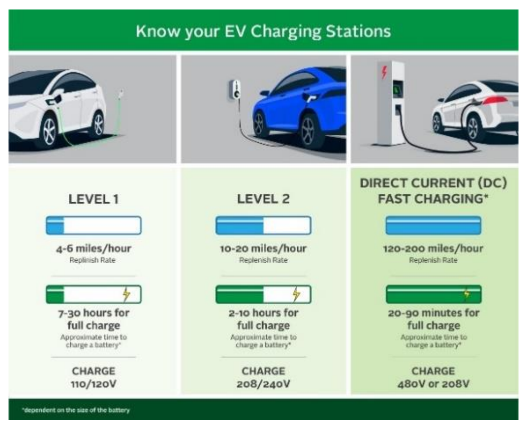
All electric vehicles (EVs) have an electric motor instead of an internal combustion engine. EVs function by plugging into a charge point, taking electricity from the grid, and then storing it in rechargeable batteries. Although electricity production may contribute to air pollution, the U.S. EPA categorizes all-electric vehicles as zero-emission vehicles because they produce no direct exhaust or tailpipe emissions.

EVs are typically more expensive than similar conventional and hybrid vehicles, although some cost can be recovered through fuel savings, federal tax credit, or state incentives.

7.1 Electric Vehicle Charging

EV charging stations provide a means for electric vehicle operators to recharge their batteries at a facility. While many EV drivers charge at home, others do not have access to regular home charging, and the ability to charge at work or in public locations is critical to making EVs practical for more drivers. Charging can also be used for electric fleet vehicles, which can reduce fuel and maintenance costs for fleets that replace gas or diesel vehicles with EVs.

EV charging comes in three main types. For this assessment, the screening considers addition of Level 2 charging, which is most common at workplaces and other public locations. Depending on the site type and usage, other levels of charging power may be more appropriate.



The preliminary assessment of EV charging at the facility shows that there is high potential for adding EV chargers to the facility's parking, based on potential costs of installation and other site factors.

The primary costs associated with installing EV charging are the charger hardware and the cost to extend power from the facility to parking spaces. This may include upgrades to electric panels to serve increased loads.

The type and size of the parking area impact the costs and feasibility of adding EV charging. Parking structure installations can be less costly than surface lot installations as power may be readily available, and equipment and wiring can be surface mounted. Parking lot installations often require trenching through concrete or asphalt surface. Large parking areas provide greater flexibility in charger siting than smaller lots.

The location and capacity of facility electric panels also impact charger installation costs. A Level 2 charger generally requires a dedicated 208-240V, 40 Amp circuit. The electric panel nearest the planned installation may not have available capacity and may need to be upgraded to serve new EV charging loads. Alternatively, chargers could be powered from a more distant panel. The distance from the panel to the location of charging stations ties directly to costs, as conduits, cables, and potential trenching costs all increase on a per-foot basis. The more charging stations planned, the more likely it is that additional electrical capacity will be needed.

Other factors to consider when planning for EV charging at a facility include who the intended users are, how long they park vehicles at the site, and whether they will need to pay for the electricity they use.

The graphic below displays the results of the EV charging assessment conducted as part of this audit. The position of each slider indicates the impact each factor has on the feasibility of installing EV charging at the site.

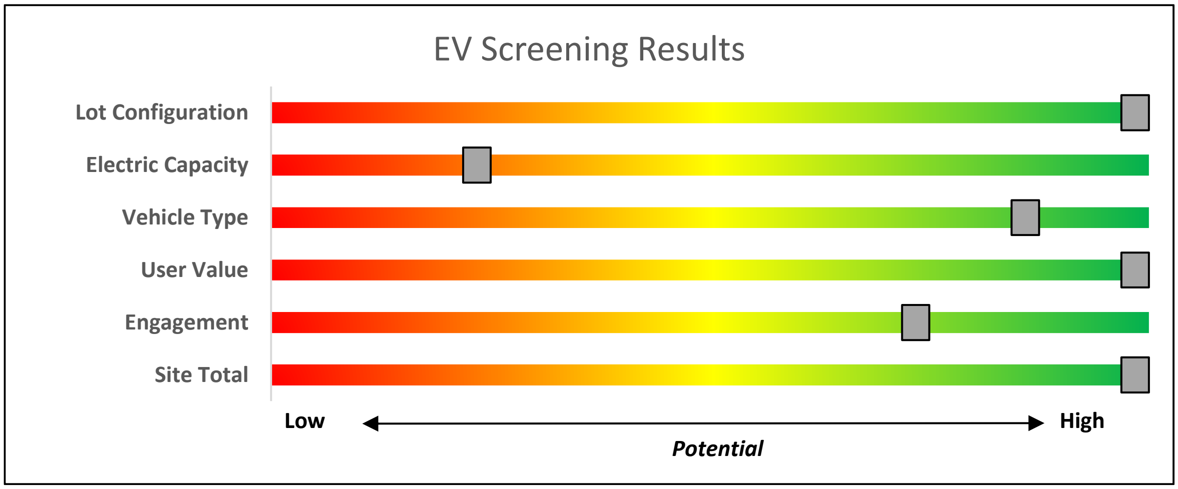


Figure 10 – EV Charger Screening

Electric Vehicle Programs Available

New Jersey is leading the way on electric vehicle (EV) adoption on the East Coast. There are several programs designed to encourage EV adoption in New Jersey, which is crucial to reaching a 100% clean energy future.

NJCEP offers a variety of EV programs for vehicles, charging stations, and fleets. Certain EV charging stations that receive electric utility service from Atlantic City Electric Company (ACE) or Public Service Electric & Gas Company (PSE&G), may be eligible for additional electric vehicle charging incentives directly from the utility. Projects may be eligible for both the incentives offered by this BPU program and incentives offered by ACE or PSE&G, up to 90% of the combined charger purchase and installation costs. Please check ACE or PSE&G program eligibility requirements before purchasing EV charging equipment, as additional conditions on types of eligible chargers may apply for utility incentives.

Both Jersey Central Power & Light (JCP&L) and Rockland Electric (RECO) have filed proposals for EV charging programs. BPU staff is currently reviewing those proposals.

For more information and to keep up to date on all EV programs please visit https://www.njcleanenergy.com/commercial-industrial/programs/electric-vehicle-programs

8 Project Funding and Incentives

Ready to improve your building's performance? New Jersey's Clean Energy Programs and Utility Energy Efficiency Programs can help. Pick the program that works best for you. This section provides an overview of currently available incentive programs in.

8.1 Utility Energy Efficiency Programs

The Clean Energy Act, signed into law by Governor Murphy in 2018, requires New Jersey's investor-owned gas and electric utilities to reduce their customers' use by set percentages over time. To help reach these targets the New Jersey Board of Public Utilities approved a comprehensive suite of energy efficiency programs to be run by the utility companies.

Prescriptive and Custom

The Prescriptive and Custom rebate program through your utility provider 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.

Equipment Examples

Lighting
Lighting Controls
HVAC Equipment
Refrigeration
Gas Heating
Gas Cooling
Commercial Kitchen Equipment
Food Service Equipment
Variable Frequency Drives
Electronically Commutate Motors
Variable Frequency Drives
Plug Loads Controls
Washers and Dryers
Agricultural
Water Heating

The Prescriptive program provides fixed incentives for specific energy efficiency measures. Prescriptive incentives vary by equipment type. The Custom program provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentives.

Direct Install

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

Incentives

The program pays up to 70% of the total installed cost of eligible measures.

How to Participate

To participate in Direct Install, you will work with a participating contractor. The contractor will be paid the measure incentives directly by the program, which will pass on to you in the form of reduced material and implementation costs. This means up to 70% of eligible costs are covered by the Direct Install program, subject to program rules and eligibility, while the remaining percent of the cost is paid to the contractor by the customer.

Engineered Solutions

The Engineered Solutions Program provides tailored energy-efficiency assistance and services to municipalities, universities, schools, hospitals and healthcare facilities (MUSH), non-profit entities, and multifamily buildings. Customers receive expert guided services, including investment-grade energy auditing, engineering design, installation assistance, construction administration, commissioning, and measurement and verification (M&V) services to support the implementation of cost-effective and comprehensive efficiency projects. Engineered Solutions is generally a good option for medium to large sized facilities with a peak demand over 200 kW looking to implement as many measures as possible under a single project to achieve deep energy savings. Engineered Solutions has an added benefit of addressing measures that may not qualify for other programs. Many facilities pursuing an Energy Savings Improvement Program loan also use this program. Incentives for this program are based on project scope and energy savings achieved.

For more information on any of these programs, contact your local utility provider or visit https://www.njcleanenergy.com/transition.

8.2 New Jersey's Clean Energy Programs

Save money while saving the planet! New Jersey's Clean Energy Program is a statewide program that offers incentives, programs, and services that benefit New Jersey residents, businesses, educational, non-profit, and government entities to help them save energy, money, and the environment.

Large Energy Users

The Large Energy Users Program (LEUP) is designed to foster self-directed investment in energy projects. This program is offered to New Jersey's largest energy customers that annually contribute at least $200,000 to the NJCEP aggregate of all buildings/sites. This equates to roughly $5 million in energy costs in the prior fiscal year.

Incentives

Incentives are based on the specifications below. The maximum incentive per entity is the lesser of:

- $4 million
- 75% of the total project(s) cost
- 90% of total NJCEP fund contribution in previous year
- $0.33 per projected kWh saved; $3.75 per projected Therm saved annually

How to Participate

To participate in LEUP, you will first need submit an enrollment application. This program requires all qualified and approved applicants to submit an energy plan that outlines the proposed energy efficiency work for review and approval. Applicants may submit a Draft Energy Efficiency Plan (DEEP), or a Final Energy Efficiency Plan (FEEP). Once the FEEP is approved, the proposed work can begin.

Detailed program descriptions, instructions for applying, and applications can be found at www.njcleanenergy.com/LEUP.

Combined Heat and Power

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

Incentives

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

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

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

How to Participate

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

Successor Solar Incentive Program (SuSI)

The SuSI program replaces the SREC Registration Program (SRP) and the Transition Incentive (TI) program. The program is used to register and certify 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 SREC-IIs (Solar Renewable Energy Certificates-II). SuSI consists of two sub-programs. The Administratively Determined Incentive (ADI) Program and the Competitive Solar Incentive (CSI) Program.

Administratively Determined Incentive (ADI) Program

The ADI Program provides administratively set incentives for net metered residential projects, net metered non-residential projects 5 MW or less, and all community solar projects.

After the registration is accepted, construction is complete, and a complete final as-built packet has been submitted, the project is issued a New Jersey certification number, which enables it to generate New Jersey SREC- IIs.

Market Segments	Size MW dc	Incentive Value ($/SREC II)	Public Entities Incentive Value - $20 Adder ($/SRECII)
Net Metered Residential	All types and sizes	$90	N/A
Small Net Metered Non-Residential located on Rooftop, Carport, Canopy and Floating Solar	Projects smaller than 1 MW	$100	$120
Large Net Metered Non-Residential located on Rooftop, Carport, Canopy and Floating Solar	Projects 1 MW to 5 MW	$90	$110
Small Net Metered Non-Residential Ground Mount	Projects smaller than 1 MW	$85	$105
Large Net Metered Non-Residential Ground Mount	Projects 1 MW to 5 MW	$80	$100
LMI Community Solar	Up to 5 MW	$90	N/A
Non-LMI Community Solar	Up to 5 MW	$70	N/A
Interim Subsection (t)	All types and sizes	$100	N/A

Eligible projects may generate SREC-IIs for 15 years following the commencement of commercial operations which is defined as permission to operate (PTO) from the Electric Distribution Company. After 15 years, projects may be eligible for a NJ Class I REC.

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

The ADI Program online portal is now open to new registrations.

Competitive Solar Incentive Program

The Competitive Solar Incentive (CSI) Program will provide competitively set incentives for grid supply projects and net metered non-residential projects greater than 5MW (dc). The program is currently under development. For updates, please continue to check the Solar Proceedings page on the New Jersey's Clean Energy Program website.

Solar projects help the State of New Jersey reach renewable energy goals outlined in the state's Energy Master Plan.

If you are considering installing solar photovoltaics on your building, visit the following link for more information: https://njcleanenergy.com/renewable-energy/programs/susi-program.

Energy Savings Improvement Program

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

9 Project Development

Energy conservation measures (ECMs) have been identified for your site, and their energy and economic analyses are provided within this LGEA report. Note that some of the identified projects may be mutually exclusive, such as replacing equipment versus upgrading motors or controls. The next steps with project development are to set goals and create a comprehensive project plan. The graphic below provides an overview of the process flow for a typical energy efficiency or renewable energy project. We recommend implementing as many ECMs as possible prior to undertaking a feasibility study for a renewable project. The cyclical nature of this process flow demonstrates the ongoing work required to continually improve building energy efficiency over time. If your building(s) scope of work is relatively simple to implement or small in scope, the measurement and verification (M&V) step may not be required. It should be noted through a typical project cycle, there will be changes in costs based on specific scopes of work, contractor selections, design considerations, construction, etc. The estimated costs provided throughout this LGEA report demonstrate the unburdened turn-key material and labor cost only. There will be contingencies and additional costs at the time of implementation. We recommend comprehensive project planning that includes the review of multiple bids for project work, incorporates potential operations and maintenance (O&M) cost savings, and maximizes your incentive potential.

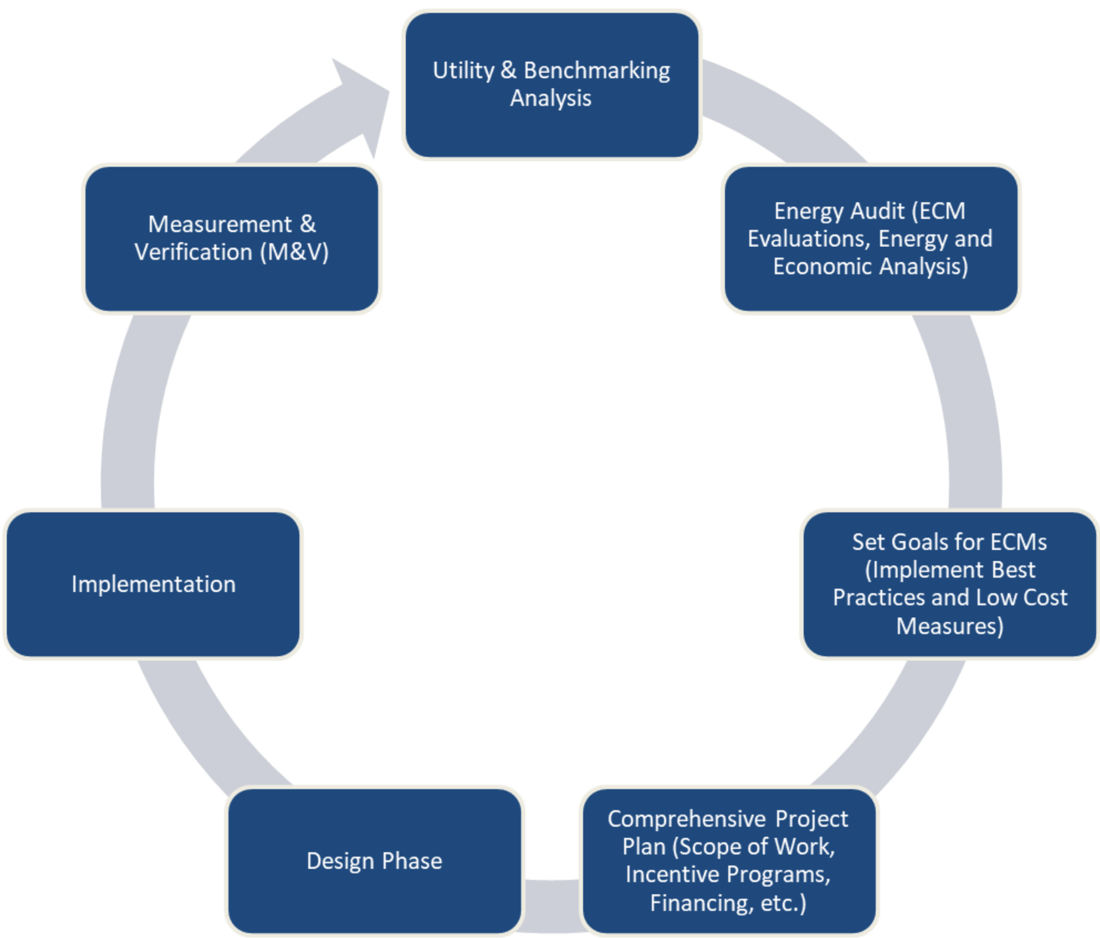


Figure 11 – Project Development Cycle

10 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

10.1 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. 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[7].

10.2 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 fluctuate monthly. The utility provides basic gas supply service 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[8].

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

[8] 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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
38 Wing BA's Office	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,520	4	None	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,429	0.0	139	0	$18	$116	$20	5.5
38 Wing Board Secretary	1	Compact Fluorescent: (3) 13W Biaxial Plug-In Lamps	Wall Switch	S	39	3,520	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	13	3,520	0.0	101	0	$13	$38	$3	2.7
38 Wing Board Secretary	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,520	4	None	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,429	0.0	139	0	$18	$116	$20	5.5
38 Wing Custodial Closet	1	Compact Fluorescent: (3) 13W Biaxial Plug-In Lamps	Occupancy Sensor	S	39	2,429	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	13	2,429	0.0	69	0	$9	$38	$3	3.9
38 Wing Human Resource Restroom	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,429		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	0	0	$0	$0	$0	0.0
38 Wing Men Restroom	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	32	2,429		None	No	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	32	2,429	0.0	0	0	$0	$0	$0	0.0
38 Wing Women Restroom	3	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	S	23	2,429		None	No	3	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	23	2,429	0.0	0	0	$0	$0	$0	0.0
56 Wing Custodial Closet	1	Compact Fluorescent: (3) 7W Biaxial Plug-In Lamps	Wall Switch	S	21	3,520	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	7	3,520	0.0	54	0	$7	$38	$3	5.0
56 Wing Custodial Closet	2	Exit Signs: LED - 2W Lamp	None		2	8,760		None	No	2	Exit Signs: LED - 2W Lamp	None	2	8,760	0.0	0	0	$0	$0	$0	0.0
78 Wing Custodial Closet	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	10	3,520		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	10	3,520	0.0	0	0	$0	$0	$0	0.0
99 Wing Boys Restroom	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,429		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	0	0	$0	$0	$0	0.0
99 Wing Girls Restroom	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,429		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	0	0	$0	$0	$0	0.0
99 Wing Janitor's Closet	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.0	0	0	$0	$0	$0	0.0
2018 Custodial Closet	1	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	32	2,429		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	32	2,429	0.0	0	0	$0	$0	$0	0.0
Archive Room	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520	4	None	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	174	0	$22	$270	$35	10.7
Attic Above Main Office	3	Incandescent: (1) 75W A19 Screw-In Lamp	Wall Switch	S	75	3,520	3, 4	Relamp	Yes	3	LED Lamps: A19 Lamps	Occupancy Sensor	75	2,429	0.1	270	0	$34	$322	$38	8.3
Auditorium/ Cafeteria	6	Exit Signs: LED - 2W Lamp	None		2	8,760		None	No	6	Exit Signs: LED - 2W Lamp	None	2	8,760	0.0	0	0	$0	$0	$0	0.0
Auditorium/ Cafeteria	24	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,520	4	None	Yes	24	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.2	1,253	0	$158	$540	$70	3.0
Auditorium/ Cafeteria	6	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,520	4	None	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,429	0.1	418	0	$53	$270	$35	4.5
Auditorium Stage Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,520	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.0	128	0	$16	$37	$10	1.6
Auditorium Stage Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,520	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.1	488	0	$62	$380	$65	5.1
Boiler Alcove Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	3,520	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,520	0.0	68	0	$9	$18	$5	1.5
Boiler Alcove Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,520	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.0	128	0	$16	$37	$10	1.6
Boiler Alcove Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,520	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,520	0.0	217	0	$27	$73	$20	1.9
Boiler Room	1	Exit Signs: LED - 2W Lamp	None		2	8,760		None	No	1	Exit Signs: LED - 2W Lamp	None	2	8,760	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520	4	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	139	0	$18	$270	$35	13.4
Boiler Room	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,520		None	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,520	0.0	0	0	$0	$0	$0	0.0
Boiler Room #2	2	Exit Signs: LED - 2W Lamp	None		2	8,760		None	No	2	Exit Signs: LED - 2W Lamp	None	2	8,760	0.0	0	0	$0	$0	$0	0.0
Boiler Room #2	7	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520	4	None	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	244	0	$31	$270	$35	7.6
Book Room Closet	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520	4	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	139	0	$18	$116	$0	6.6
Classroom 1	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	S	44	2,100		None	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.0	0	0	$0	$0	$0	0.0
Classroom 10	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,100		None	No	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.0	0	0	$0	$0	$0	0.0
Classroom 10A	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	S	58	2,100		None	No	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,100	0.0	0	0	$0	$0	$0	0.0
Classroom 11	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,100		None	No	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.0	0	0	$0	$0	$0	0.0
Classroom 12	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,100		None	No	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.0	0	0	$0	$0	$0	0.0
Classroom 13	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,100		None	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.0	0	0	$0	$0	$0	0.0
Classroom 13 Restroom	2	LED Lamps: (1) 8W A19 Screw-In Lamp	Wall Switch	S	8	3,520		None	No	2	LED Lamps: (1) 8W A19 Screw-In Lamp	Wall Switch	8	3,520	0.0	0	0	$0	$0	$0	0.0
Classroom 14	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,100		None	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.0	0	0	$0	$0	$0	0.0
Classroom 14 Restroom	2	LED Lamps: (1) 8W A19 Screw-In Lamp	Wall Switch	S	8	3,520		None	No	2	LED Lamps: (1) 8W A19 Screw-In Lamp	Wall Switch	8	3,520	0.0	0	0	$0	$0	$0	0.0
Classroom 15	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,100		None	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.0	0	0	$0	$0	$0	0.0
Classroom 15 Restroom	2	LED Lamps: (1) 8W A19 Screw-In Lamp	Wall Switch	S	8	3,520		None	No	2	LED Lamps: (1) 8W A19 Screw-In Lamp	Wall Switch	8	3,520	0.0	0	0	$0	$0	$0	0.0
Classroom 16	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,100		None	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.0	0	0	$0	$0	$0	0.0
Classroom 16 Restroom	2	LED Lamps: (1) 8W A19 Screw-In Lamp	Wall Switch	S	8	3,520		None	No	2	LED Lamps: (1) 8W A19 Screw-In Lamp	Wall Switch	8	3,520	0.0	0	0	$0	$0	$0	0.0
Classroom 17A	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,100	4	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,449	0.1	374	0	$47	$540	$70	10.0
Classroom 17B	2	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	32	2,100	4	None	Yes	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	32	1,449	0.0	46	0	$6	$116	$20	16.6
Classroom 17C	4	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	32	2,100	4	None	Yes	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	32	1,449	0.0	92	0	$12	$270	$35	20.3
Classroom 18	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,100		None	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.0	0	0	$0	$0	$0	0.0
Classroom 18 Restroom	2	LED Lamps: (1) 8W A19 Screw-In Lamp	Wall Switch	S	8	3,520		None	No	2	LED Lamps: (1) 8W A19 Screw-In Lamp	Wall Switch	8	3,520	0.0	0	0	$0	$0	$0	0.0
Classroom 19	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,100		None	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.0	0	0	$0	$0	$0	0.0
Classroom 19 Restroom	1	Compact Fluorescent: (3) 7W Biaxial Plug-In Lamps	Wall Switch	S	21	3,520	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	7	3,520	0.0	54	0	$7	$38	$3	5.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 2	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	S	44	2,100		None	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.0	0	0	$0	$0	$0	0.0
Classroom 20	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,100		None	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.0	0	0	$0	$0	$0	0.0
Classroom 20 Restroom	1	Compact Fluorescent: (3) 7W Biaxial Plug-In Lamps	Wall Switch	S	21	3,520	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	7	3,520	0.0	54	0	$7	$38	$3	5.0
Classroom 21	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,100		None	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.0	0	0	$0	$0	$0	0.0
Classroom 21 Restroom	1	Compact Fluorescent: (3) 7W Biaxial Plug-In Lamps	Wall Switch	S	21	3,520	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	7	3,520	0.0	54	0	$7	$38	$3	5.0
Classroom 22	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,100		None	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.0	0	0	$0	$0	$0	0.0
Classroom 24	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,100		None	No	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.0	0	0	$0	$0	$0	0.0
Classroom 24 Restroom	1	Compact Fluorescent: (3) 7W Biaxial Plug-In Lamps	Wall Switch	S	21	3,520	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	7	3,520	0.0	54	0	$7	$38	$3	5.0
Classroom 29 - Music Room	2	Exit Signs: LED - 2W Lamp	None		2	8,760		None	No	2	Exit Signs: LED - 2W Lamp	None	2	8,760	0.0	0	0	$0	$0	$0	0.0
Classroom 29 - Music Room	24	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,520	4	None	Yes	24	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.2	1,253	0	$158	$540	$70	3.0
Classroom 29 - Instrument Room	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520	4	None	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.1	348	0	$44	$270	$35	5.3
Classroom 3	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	S	44	2,100		None	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.0	0	0	$0	$0	$0	0.0
Classroom 30 - Closet	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520	4	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	139	0	$18	$116	$0	6.6
Classroom 30 - Tech Lab	30	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,520	4	None	Yes	30	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.3	1,566	0	$198	$540	$70	2.4
Classroom 31 - Science Lab	28	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,520	4	None	Yes	28	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.3	1,462	0	$185	$540	$70	2.5
Classroom 4	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	S	44	2,100		None	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.0	0	0	$0	$0	$0	0.0
Classroom 40	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,100		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.0	0	0	$0	$0	$0	0.0
Classroom 40 Restroom	1	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	32	2,429		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	32	2,429	0.0	0	0	$0	$0	$0	0.0
Classroom 41	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,429		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	0	0	$0	$0	$0	0.0
Classroom 41 Restroom	1	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	32	2,429		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	32	2,429	0.0	0	0	$0	$0	$0	0.0
Classroom 42	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,429		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	0	0	$0	$0	$0	0.0
Classroom 43A	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,429		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	0	0	$0	$0	$0	0.0
Classroom 43B	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,429		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	0	0	$0	$0	$0	0.0
Classroom 46	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	32	2,429		None	No	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	32	2,429	0.0	0	0	$0	$0	$0	0.0
Classroom 47	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	32	2,429		None	No	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	32	2,429	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 48	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,429		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	0	0	$0	$0	$0	0.0
Classroom 48 Restroom	1	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	32	2,429		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	32	2,429	0.0	0	0	$0	$0	$0	0.0
Classroom 49 - Occupational Therapy	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,429		None	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	0	0	$0	$0	$0	0.0
Classroom 5	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	S	44	2,429		None	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.0	0	0	$0	$0	$0	0.0
Classroom 6	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	S	44	2,429		None	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.0	0	0	$0	$0	$0	0.0
Classroom 7	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	S	44	2,429		None	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.0	0	0	$0	$0	$0	0.0
Classroom 7A - Closet	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,520	4	None	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.0	104	0	$13	$116	$0	8.8
Classroom 7B - Science Room	1	Exit Signs: LED - 2W Lamp	None		2	8,760		None	No	1	Exit Signs: LED - 2W Lamp	None	2	8,760	0.0	0	0	$0	$0	$0	0.0
Classroom 7B - Science Room	24	Incandescent: (1) 65W PAR30 Screw-In Lamp	Wall Switch	S	65	3,520	3, 4	Relamp	Yes	24	LED Lamps: PAR30 Lamps	Occupancy Sensor	65	2,429	0.3	1,872	0	$236	$1,097	$142	4.0
Classroom 7B - Science Room	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,429		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	0	0	$0	$0	$0	0.0
Classroom 7B - Science Room	18	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	S	44	2,429		None	No	18	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.0	0	0	$0	$0	$0	0.0
Classroom 8	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	S	44	2,429		None	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.0	0	0	$0	$0	$0	0.0
Classroom 9	19	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,429		None	No	19	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	0	0	$0	$0	$0	0.0
Copy Room	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,520	4	None	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.0	104	0	$13	$116	$20	7.3
Copy Room - Restroom	2	LED Lamps: (1) 8W A19 Screw-In Lamp	Wall Switch	S	8	3,520		None	No	2	LED Lamps: (1) 8W A19 Screw-In Lamp	Wall Switch	8	3,520	0.0	0	0	$0	$0	$0	0.0
Corridor - 38 Wing	5	Exit Signs: LED - 2W Lamp	None		2	8,760		None	No	5	Exit Signs: LED - 2W Lamp	None	2	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor - 38 Wing	13	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,380	6	None	Yes	13	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,022	0.1	563	0	$71	$675	$455	3.1
Corridor - 50 Wing	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,380	6	None	Yes	6	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,022	0.0	260	0	$33	$225	$210	0.5
Corridor - 56 Wing	13	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,380	6	None	Yes	13	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,022	0.1	563	0	$71	$675	$455	3.1
Corridor - 64 Wing	2	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	23	4,380	6	None	Yes	2	LED - Fixtures: Ambient 2x2 Fixture	High/Low Control	23	3,022	0.0	69	0	$9	$0	$0	0.0
Corridor - 64 Wing	13	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,380	6	None	Yes	13	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,022	0.1	563	0	$71	$675	$455	3.1
Corridor - 78 Wing	1	Exit Signs: LED - 2W Lamp	None		2	8,760		None	No	1	Exit Signs: LED - 2W Lamp	None	2	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor - 78 Wing	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,380	6	None	Yes	10	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,022	0.1	433	0	$55	$450	$350	1.8
Corridor - 99 Wing	7	Exit Signs: LED - 2W Lamp	None		2	8,760		None	No	7	Exit Signs: LED - 2W Lamp	None	2	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor - 99 Wing	26	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,380	6	None	Yes	26	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,022	0.2	1,126	0	$142	$1,125	$910	1.5

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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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Corridor - Gym	2	Exit Signs: LED - 2W Lamp	None		2	8,760		None	No	2	Exit Signs: LED - 2W Lamp	None	2	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor - Gym	16	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,380	5	None	Yes	16	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,022	0.1	693	0	$87	$675	$560	1.3
Corridor - New Addition	2	Exit Signs: LED - 2W Lamp	None		2	8,760		None	No	2	Exit Signs: LED - 2W Lamp	None	2	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor - New Addition	18	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	23	4,380	5	None	Yes	18	LED - Fixtures: Ambient 2x2 Fixture	High/Low Control	23	3,022	0.1	618	0	$78	$675	$630	0.6
Corridor - New Addition	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	32	4,380		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	32	4,380	0.0	0	0	$0	$0	$0	0.0
Corridor - New Addition	2	LED - Fixtures: Ceiling Mount	Wall Switch	S	50	4,380	5	None	Yes	2	LED - Fixtures: Ceiling Mount	High/Low Control	50	3,022	0.0	149	0	$19	$225	$70	8.2
Electrical Room	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	32	3,520		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	32	3,520	0.0	0	0	$0	$0	$0	0.0
Exterior LED Flood	3	LED - Fixtures: Flood Fixture	Timeclock		25	4,380		None	No	3	LED - Fixtures: Flood Fixture	Timeclock	25	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Poles	10	LED Lamps: (1) 50W Corn Bulb Screw-In Lamp	Timeclock		50	4,380		None	No	10	LED Lamps: (1) 50W Corn Bulb Screw-In Lamp	Timeclock	50	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Wall Pack	27	LED - Fixtures: Wall Pack	Timeclock		13	4,380		None	No	27	LED - Fixtures: Wall Pack	Timeclock	13	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Wall Pack #2	8	LED - Fixtures: Wall Pack	Photocell		45	4,380		None	No	8	LED - Fixtures: Wall Pack	Photocell	45	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Wall Pack #3	1	High-Pressure Sodium: (1) 100W Lamp	Timeclock		138	4,380	1	Fixture Replacement	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	38	4,380	0.0	438	0	$57	$309	$50	4.6
Grounds Office	1	Exit Signs: LED - 2W Lamp	None		2	8,760		None	No	1	Exit Signs: LED - 2W Lamp	None	2	8,760	0.0	0	0	$0	$0	$0	0.0
Grounds Office	1	LED Lamps: (1) 8W A19 Screw-In Lamp	Wall Switch	S	8	3,520		None	No	1	LED Lamps: (1) 8W A19 Screw-In Lamp	Wall Switch	8	3,520	0.0	0	0	$0	$0	$0	0.0
Grounds Office	7	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520	4	None	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	244	0	$31	$270	$35	7.6
Grounds Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,520	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.0	128	0	$16	$37	$10	1.6
Gymnasium	4	Exit Signs: LED - 2W Lamp	None		2	8,760		None	No	4	Exit Signs: LED - 2W Lamp	None	2	8,760	0.0	0	0	$0	$0	$0	0.0
Gymnasium	18	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	30	3,520	4	None	Yes	18	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	30	2,429	0.1	648	0	$82	$540	$70	5.7
Gymnasium	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.0	0	0	$0	$0	$0	0.0
Gymnasium - Boys Locker Room	1	Compact Fluorescent: (3) 7W Biaxial Plug-In Lamps	Wall Switch	S	21	3,520	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	7	3,520	0.0	54	0	$7	$38	$3	5.0
Gymnasium - Boys Locker Room	1	Exit Signs: LED - 2W Lamp	None		2	8,760		None	No	1	Exit Signs: LED - 2W Lamp	None	2	8,760	0.0	0	0	$0	$0	$0	0.0
Gymnasium - Boys Locker Room	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.0	0	0	$0	$0	$0	0.0
Gymnasium - Closet	1	Compact Fluorescent: (3) 7W Biaxial Plug-In Lamps	Wall Switch	S	21	3,520	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	7	3,520	0.0	54	0	$7	$38	$3	5.0
Gymnasium - Girls Locker Room	1	Compact Fluorescent: (3) 13W Biaxial Plug-In Lamps	Occupancy Sensor	S	39	2,429	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	13	2,429	0.0	69	0	$9	$38	$3	3.9
Gymnasium - Girls Locker Room	1	Exit Signs: LED - 2W Lamp	None		2	8,760		None	No	1	Exit Signs: LED - 2W Lamp	None	2	8,760	0.0	0	0	$0	$0	$0	0.0

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Gymnasium - Girls Locker Room	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,429		None	No	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	0	0	$0	$0	$0	0.0
Gymnasium - Storage Room	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520	4	None	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.1	313	0	$40	$270	$0	6.8
Gymnasium - Trophy Display	3	Linear Fluorescent - T8: (1) 3' Lamp	Wall Switch	S	25	3,520	3, 4	Relamp	Yes	3	LED - Linear Tubes: (1) 3' Lamp	Occupancy Sensor	11	2,429	0.0	206	0	$26	$325	$50	10.6
Gymnasium Attic	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,520	3, 4	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.3	1,463	0	$185	$599	$125	2.6
Gymnasium Office - Athletic Director	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520	4	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	70	0	$9	$116	$20	10.9
Gymnasium Office - Mrs Hanzlik	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520	4	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	70	0	$9	$116	$20	10.9
Gymnasium Office - Open Area	1	Exit Signs: LED - 2W Lamp	None		2	8,760		None	No	1	Exit Signs: LED - 2W Lamp	None	2	8,760	0.0	0	0	$0	$0	$0	0.0
Gymnasium Office - Open Area	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520	4	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	70	0	$9	$116	$20	10.9
Kitchen	14	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520	4	None	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.1	487	0	$62	$540	$70	7.6
Kitchen	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,520	4	None	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.0	157	0	$20	$0	$0	0.0
M.D.F. Room	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	S	88	3,520	2	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.0	228	0	$29	$69	$10	2.0
M.D.F. Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,520	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.0	128	0	$16	$37	$10	1.6
Main Entrance	1	Exit Signs: LED - 2W Lamp	None		2	8,760		None	No	1	Exit Signs: LED - 2W Lamp	None	2	8,760	0.0	0	0	$0	$0	$0	0.0
Main Entrance	7	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520	4	None	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	244	0	$31	$270	$35	7.6
Main Office - Coffee Room	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.0	0	0	$0	$0	$0	0.0
Main Office - Conference Room	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520	4	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	70	0	$9	$116	$20	10.9
Main Office - Curriculum Coordinator	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520	4	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	70	0	$9	$116	$20	10.9
Main Office - Mr Stoloski's Office	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520	4	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	139	0	$18	$116	$20	5.5
Main Office - Open Area	1	Exit Signs: LED - 2W Lamp	None		2	8,760		None	No	1	Exit Signs: LED - 2W Lamp	None	2	8,760	0.0	0	0	$0	$0	$0	0.0
Main Office - Open Area	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520	4	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	139	0	$18	$270	$35	13.4
Main Office - Principal Office	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520	4	None	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	104	0	$13	$116	$20	7.3
Main Office - Restroom	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,429		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	0	0	$0	$0	$0	0.0
Main Office Hallway	2	Compact Fluorescent: (3) 13W Biaxial Plug-In Lamps	Wall Switch	S	39	3,520	3, 4	Relamp	Yes	2	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	13	2,429	0.0	233	0	$29	$191	$26	5.6
Main Office Waiting Area	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520	4	None	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	209	0	$26	$270	$35	8.9
Media - Server Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,520	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.1	488	0	$62	$226	$50	2.9

	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Media Center	1	Exit Signs: LED - 2W Lamp	None		2	8,760		None	No	1	Exit Signs: LED - 2W Lamp	None	2	8,760	0.0	0	0	$0	$0	$0	0.0
Media Center	16	LED Lamps: (1) 8W A19 Screw-In Lamp	Wall Switch	S	8	3,520	4	None	Yes	16	LED Lamps: (1) 8W A19 Screw-In Lamp	Occupancy Sensor	8	2,429	0.0	154	0	$19	$0	$0	0.0
Media Center	104	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520	4	None	Yes	104	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.7	3,620	-1	$457	$1,890	$245	3.6
Media Center - Office	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,520	4	None	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.0	209	0	$26	$270	$35	8.9
New Addition Hallway Boys Restroom	1	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	32	2,429		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	32	2,429	0.0	0	0	$0	$0	$0	0.0
New Addition Hallway Girls Restroom	1	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	32	2,429		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	32	2,429	0.0	0	0	$0	$0	$0	0.0
Room 23 - 23A	4	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,520	4	None	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,429	0.1	278	0	$35	$270	$35	6.7
Room 23 - 23B	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,520	4	None	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.0	157	0	$20	$270	$35	11.9
Room 23 - 23C	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,520	4	None	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.0	104	0	$13	$116	$20	7.3
Room 23 - 23D	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,520	4	None	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.0	104	0	$13	$116	$20	7.3
Room 23 - Open Area	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520	4	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	139	0	$18	$270	$35	13.4
Room 23 Restroom	1	Compact Fluorescent: (3) 13W Biaxial Plug-In Lamps	Wall Switch	S	39	3,520	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	13	3,520	0.0	101	0	$13	$38	$3	2.7
Room 44	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,429	3	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.1	529	0	$67	$219	$60	2.4
Room 45	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	32	2,429		None	No	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	32	2,429	0.0	0	0	$0	$0	$0	0.0
Room 7A - Nurse Office	10	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,520	4	None	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,429	0.1	522	0	$66	$270	$35	3.6
Room 7A - Nurse Office	4	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	S	26	3,520	4	None	Yes	4	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	2,429	0.0	122	0	$15	$0	$0	0.0
Room 7A Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Occupancy Sensor	S	53	2,429	3	Relamp	No	1	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	2,429	0.0	73	0	$9	$49	$9	4.3
Room 8A	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520	4	None	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	209	0	$26	$270	$35	8.9
SGI Men Restroom	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,429		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	0	0	$0	$0	$0	0.0
SGI Room	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520	4	None	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	209	0	$26	$270	$35	8.9
SGI Women Restroom	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,429		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.0	0	0	$0	$0	$0	0.0
Teachers Lounge	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,520	4	None	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.1	418	0	$53	$270	$35	4.5
Maintenance Barn - Exterior Recessed Can	7	LED - Fixtures: Ceiling Mount	Wall Switch		20	2,000		None	No	7	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,000	0.0	0	0	$0	$0	$0	0.0
Maintenance Barn - Exterior Recessed Can	3	LED - Fixtures: Wall Pack	Wall Switch		45	2,000		None	No	3	LED - Fixtures: Wall Pack	Wall Switch	45	2,000	0.0	0	0	$0	$0	$0	0.0
Maintenance Barn - Chemical Room	1	Exit Signs: LED - 2W Lamp	None		2	8,760		None	No	1	Exit Signs: LED - 2W Lamp	None	2	8,760	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Maintenance Barn-Chemical Room	8	LED - Fixtures: Linear Strip	Wall Switch	S	35	2,000	4	None	Yes	8	LED - Fixtures: Linear Strip	Occupancy Sensor	35	1,380	0.1	191	0	$24	$270	$35	9.7
Maintenance Barn	2	Exit Signs: LED - 2W Lamp	None		2	8,760		None	No	2	Exit Signs: LED - 2W Lamp	None	2	8,760	0.0	0	0	$0	$0	$0	0.0
Maintenance Barn	25	LED - Fixtures: Linear Strip	Wall Switch	S	35	2,000	4	None	Yes	25	LED - Fixtures: Linear Strip	Occupancy Sensor	35	1,380	0.2	597	0	$75	$540	$70	6.2

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?	Manufacturer	Model	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Custodial Closet	Various sinks and Restrooms in 2018 Section	1	DHW Circulation Pump	0.1	65.0%	No	Bell & Gosset	NBF-12F/LW	W	8,760		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Main Office, Kitchen, & Various Restrooms in Hallway	1	DHW Circulation Pump	0.1	65.0%	No	TACO	006-BTA	W	8,760		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Gymnasium Attic	EF-3 - Gymnasium	1	Exhaust Fan	1.5	86.5%	Yes	CENTRI MASTER VETSE	QBR245	W	2,000		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Room 17A	1	Exhaust Fan	0.2	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Gym Hallway	1	Exhaust Fan	0.2	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Room 23	2	Exhaust Fan	0.2	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Attic	4	Exhaust Fan	0.2	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Copy Room	1	Exhaust Fan	0.2	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Hallway	1	Exhaust Fan	0.2	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Restrooms	1	Exhaust Fan	0.3	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof - Gravel Section	Kitchen - Dishwasher	1	Exhaust Fan	0.5	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof - Gravel Section	Kitchen - Freezer	1	Exhaust Fan	0.5	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof - Gravel Section	Kitchen Hood	1	Kitchen Hood Exhaust Fan	0.5	65.0%	No			W	1,500		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof - Gravel Section	Attic	2	Exhaust Fan	0.3	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof - Gravel Section	Library	1	Exhaust Fan	0.3	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof - Gravel Section	Room 9A	1	Exhaust Fan	0.2	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof - Gravel Section	EF- 2, 3, & 4 - Hallway & Tech Room	3	Exhaust Fan	0.3	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Custodial Closet	P-1 & P-2 - 2018 Section	2	Heating Hot Water Pump	0.5	65.0%	No	TACO	2400-50-3P	W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	78 Wing - Gym & New Addition	1	Heating Hot Water Pump	0.3	65.0%	No	GRUNDFOS	C	W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	78 Wing - Gym & New Addition	1	Heating Hot Water Pump	0.5	65.0%	No			W	2,000		No	65.0%	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?	Manufacturer	Model	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	HP-1 - 64 Wing & Nurses' Office	1	Heating Hot Water Pump	5.0	89.5%	Yes	WEG NEMA	005180T3E184	W	2,000		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	HP-2 - 64 Wing & Nurses' Office	1	Heating Hot Water Pump	5.0	89.5%	No	CENTURY	V304M2	W	2,000	9	No	89.5%	Yes	1	0.5	3,126	0	$403	$5,867	$900	12.3
99 Wing Boys & Girls Restrooms	99 Wing Boys & Girls Restrooms	2	Supply Fan	0.4	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 30	Classroom 30	1	Supply Fan	0.3	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Corridor - Wing 56	Corridor - Wing 56	1	Supply Fan	0.1	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Corridor - Wing 64	Corridor - Wing 64 Hallway	1	Supply Fan	0.3	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Corridor - Wing 99	Corridor - Wing 99	1	Supply Fan	0.1	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Corridor - New Addition	Corridor - New Addition	5	Supply Fan	0.1	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
SGI Room	SGI Room	1	Supply Fan	0.3	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room #2	Chiller P1 & P2 - 99 Wing : Computer Lab, Library, Science Room, Tech Room, Music Room & Cafeteria	2	Chilled Water Pump	10.0	89.5%	No	BALDOR	M3313T	W	2,000	8	No	91.7%	Yes	2	3.9	13,043	0	$1,683	$13,393	$2,200	6.7
Auditorium Stage Closet	AHU - Auditorium / Cafeteria	1	Supply Fan	0.5	65.0%	No	Supply Fan		W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Auditorium Stage Office	AHU - Auditorium / Cafeteria	1	Supply Fan	0.5	65.0%	No	Supply Fan		W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Gymnasium Attic	AHU - Gymnasium	1	Supply Fan	7.5	91.7%	Yes	AAON	M2H011R2BAO	W	2,000		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0
Music Room	AHU-1 - Music Room	1	Supply Fan	5.0	89.5%	No			W	2,000		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Tech Lab	AHU-2 - Tech Lab	1	Supply Fan	3.0	89.5%	No			W	2,000		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Science Lab	AHU-3 - Science Lab	1	Supply Fan	3.0	89.5%	No			W	2,000		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Library	AHU-4 - Library	1	Supply Fan	5.0	89.5%	No			W	2,000		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Various Classroom & Spaces	Unit Ventilators	25	Supply Fan	0.5	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Gymnasium Storage Room	Gymnasium Storage Room	1	Supply Fan	0.2	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Gymnasium Attic	Gymnasium Attic	2	Air Compressor	0.5	65.0%	No	DAYTON	2N103R	W	1,200		No	65.0%	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?	Manufacturer	Model	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Exterior Grounds	DOAS-1 - East Amwell	1	Supply Fan	2.2	86.5%	No			W	2,000	7	No	86.5%	Yes	1	0.6	1,423	0	$184	$4,256	$100	22.6
Exterior Grounds	DOAS-1 - East Amwell	2	Return Fan	2.2	86.5%	No			W	2,000	7	No	86.5%	Yes	2	1.3	2,846	0	$367	$8,512	$200	22.6
Exterior Grounds	Packaged Unit - Room 23	1	Supply Fan	1.0	85.5%	No			W	2,000		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Packaged Unit - Room 17 A, B, & C	1	Supply Fan	1.0	85.5%	No			W	2,000		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Interior.	Various spaces served by the VRF systems	14	Supply Fan	0.1	65.0%	No	Mitsubishi	City Multi	W	2,745		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room #2	Serve 99 & 56 Wing	2	Heating Hot Water Pump	5.0	87.5%	No			W	2,000	9	No	89.5%	Yes	2	1.1	6,651	0	$858	$10,055	$1,800	9.6

Packaged 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)	Cooling Mode Efficiency (SEER/IEER/ EER)	Heating Mode Efficiency	Manufacturer	Model	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/IEER/ EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classrrom 10A	Classroom 10A	1	Split-System	4.00		13.05		LENNOX	HS29-513-2Y	B	10	Yes	1	Split-System	4.00		16.00		0.3	258	0	$33	$7,415	$420	210.4
Exterior Grounds	Nurses' Office	1	Split-System	3.00		13.00		LENNOX	2SCU13LC148T	B	10	Yes	1	Split-System	3.00		16.00		0.3	197	0	$25	$5,517	$315	204.3
Exterior Grounds	Art Room	1	Split-System	5.00		14.00		BROADAIR	BC60-14D322G	W	10	Yes	1	Split-System	5.00		16.00		0.3	204	0	$26	$9,943	$525	358.6
Exterior Grounds	CU-1 - Gymnasium	1	Split-System	25.00		10.10		AAON	CFA-025-C-0-2-DC	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior Grounds	Main Office - Front Side	1	Split-System	5.00		13.00		PAYNE	PA13NA060 - E	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior Grounds	Main Office - Other Side	1	Split-System	2.00		13.00		PAYNE	PA12NA024 - B	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	M.D.F. Room	1	Split-System Air-Source HP	0.75	10.00	16.00	10 HSPF	FUJITSU	AOU9RLE	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior Grounds	Media Server Room	1	Split-System	1.50		19.00		FUJITSU	AOU18CL	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Room 8A	1	Split-System Air-Source HP	0.75	12.00	12.00	13 HSPF	FUJITSU	AOU9RLFC	B		No							0.0	0	0	$0	$0	$0	0.0
Attic Above Main Office	Main Office - Front Side	1	Split-System		98.40		0.82 AFUE	CARRIER	CNPHP6024ALA	W		No							0.0	0	0	$0	$0	$0	0.0
Attic Above Main Office	Main Office - Other Side	1	Split-System		65.60		0.82 AFUE	CARRIER	CNPHP3017ALA	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior Grounds	DOAS-1 - East Amwell	1	Package Unit	8.00		19.00		TRANE	OABE096D3	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior Grounds	Room 23	1	Package Unit	5.00	108.00	15.00	0.8 AFUE	TRANE	YSCO60E3RHA	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Room 17 A, B, & C	1	Package Unit	5.00	108.00	15.00	0.8 AFUE	TRANE	YSCO60E3RHA	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior Grounds	HP-1 - 2018 Wing	1	Split-System Air-Source HP	8.00	108.00	12.20	3.64 COP	MITSUBISHI	PUHY-P96TKMU	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior Grounds	HP-2 - 2018 Wing	1	Split-System Air-Source HP	6.00	80.00	11.90	4.03 COP	MITSUBISHI	PUHY-P72TKMU	W		No							0.0	0	0	$0	$0	$0	0.0
Copy Room	Copy Room	1	Window AC	1.00		9.70		GE		W		No							0.0	0	0	$0	$0	$0	0.0
38 Wing BA's Office	38 Wing BA's Office	1	Window AC	0.50		10.70		FRIEDRICH	CP06G10B	W		No							0.0	0	0	$0	$0	$0	0.0
38 Wing Board Secretary	38 Wing Board Secretary	1	Window AC	0.50		10.70		FRIEDRICH		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 10	Classroom 10	1	Window AC	1.00		9.70		FRIEDRICH	S614M10-B	W		No							0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions								Energy Impact & Financial Analysis							
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/EER)	Heating Mode Efficiency	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 11	Classroom 11	1	Window AC	1.00		9.70		FRIEDRICH		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 12	Classroom 12	1	Window AC	1.00		9.70		FRIEDRICH		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 13	Classroom 13	1	Window AC	1.00		9.70		FRIEDRICH		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 14	Classroom 14	1	Window AC	1.00		9.70		FRIEDRICH		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 15	Classroom 15	1	Window AC	1.00		9.70		FRIEDRICH		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 16	Classroom 16	1	Window AC	1.00		9.70		FRIEDRICH		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 18	Classroom 18	1	Window AC	1.00		9.70		FRIEDRICH		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 19	Classroom 19	1	Window AC	1.00		9.70		FRIEDRICH		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 20	Classroom 20	1	Window AC	1.00		9.70		FRIEDRICH		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 21	Classroom 21	1	Window AC	1.00		9.70		FRIEDRICH		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 22	Classroom 22	1	Window AC	1.00		9.70		FRIEDRICH		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 4	Classroom 4	1	Window AC	1.00		9.70		FRIEDRICH		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 5	Classroom 5	1	Window AC	1.00		9.70		FRIEDRICH		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 6	Classroom 6	1	Window AC	1.00		9.70		FRIEDRICH		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 7	Classroom 7	1	Window AC	1.00		9.70		FRIEDRICH		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 8	Classroom 8	1	Window AC	1.00		9.70		FRIEDRICH		W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 9	Classroom 9	1	Window AC	1.00		9.70		FRIEDRICH		W		No							0.0	0	0	$0	$0	$0	0.0
Grounds Office	Grounds Office	1	Window AC	1.00		9.90		Comfort-Aire	RAD-141A	B		No							0.0	0	0	$0	$0	$0	0.0
Teachers Lounge	Teachers Lounge	1	Window AC	1.50		10.70		Comfort-Aire	CGRADS-183H	W	10	Yes	1	Window AC	1.50		12.00		0.1	69	0	$9	$1,094	$0	122.4
Maintenance Barn - Chemical Room	Maintenance - Chemical Room	2	Electric Resistance Heat		17.00		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions								Energy Impact & Financial Analysis							
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/EER)	Heating Mode Efficiency	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Maintenance - Barn	Maintenance - Barn	4	Electric Resistance Heat		17.00		1 COP			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)	Manufacturer	Model	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Exterior Grounds	99 Wing - Computer Lab, Library, Science Room, Tech Room, Music Room & Cafeteria	1	Air-Cooled Reciprocating Chiller	81.90	YORK	YCAZ88DB3	B	11	Yes	1	Air-Cooled Scroll Chiller	Constant	77.60	1.17	0.88	4.2	1,870	0	$241	$85,623	$1,552	348.4

Space Heating Boiler 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)	Manufacturer	Model	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	East Amwell	2	Non-Condensing Hot Water Boiler	1,714	BURNHAM	611291131	W		No						0.0	0	0	$0	$0	$0	0.0
Boiler Room #2	99 & 56 Wing	2	Condensing Hot Water Boiler	860	AERCO	G-98-849	B	12	Yes	2	Condensing Hot Water Boiler	860	91.00%	Et	0.0	0	70	$941	$59,499	$3,784	59.2

DHW Inventory & Recommendations

		Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	**Area(s)/System(s) Served**	**System Quantity**	**System Type**	**Manufacturer**	**Model**	**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**	**Estimated M&L Cost ($)**	**Total Incentives**	**Simple Payback w/ Incentives in Years**
56 Wing Custodial Closet	Art Room and Nurses' Office	1	Storage Tank Water Heater (≤ 50 Gal)	RHEEM	81VP20S	W		No						0.0	0	0	$0	$0	$0	0.0
78 Wing Custodial Closet	Custodial Closet & Classroom 23's Restroom	1	Storage Tank Water Heater (≤ 50 Gal)	A.O. SMITH		W		No						0.0	0	0	$0	$0	$0	0.0
2018 Custodial Closet	Various Sinks & Restrooms in 2018 Section	1	Storage Tank Water Heater (≤ 50 Gal)	A.O. SMITH	DEL-30 110	W		No						0.0	0	0	$0	$0	$0	0.0
Boiler Room	Main Office, Kitchen, & Various Restrooms in Hallway	1	Storage Tank Water Heater (> 50 Gal)	BRADFORD WHITE	D80T2503NA	W		No						0.0	0	0	$0	$0	$0	0.0
Boiler Room #2	99 Wing	1	Storage Tank Water Heater (> 50 Gal)	A.O. SMITH	BTP 140-199	B	13	Yes	1	Storage Tank Water Heater (> 50 Gal)	Natural Gas	93.00%	UEF	0.0	0	10	$131	$8,493	$697	59.5
Classroom 13	Classrooms 13 & 14	1	Storage Tank Water Heater (≤ 50 Gal)			W		No						0.0	0	0	$0	$0	$0	0.0
Classroom 15	Classrooms 15 & 17A	1	Storage Tank Water Heater (≤ 50 Gal)	BRADFORD WHITE		W		No						0.0	0	0	$0	$0	$0	0.0
Classroom 18	Classrooms 16 & 18	1	Storage Tank Water Heater (≤ 50 Gal)	BANTAM	BS12R	W		No						0.0	0	0	$0	$0	$0	0.0
Classroom 19	Classroom 19	1	Storage Tank Water Heater (≤ 50 Gal)	A.O. SMITH	EJCS 20 200	W		No						0.0	0	0	$0	$0	$0	0.0
Classroom 22	Classrooms 20 & 22	1	Storage Tank Water Heater (≤ 50 Gal)	A.O. SMITH		W		No						0.0	0	0	$0	$0	$0	0.0
Classroom 24	Classroom 24	1	Storage Tank Water Heater (≤ 50 Gal)	A.O. SMITH		W		No						0.0	0	0	$0	$0	$0	0.0
Classroom 8	Classroom 8	1	Storage Tank Water Heater (≤ 50 Gal)	A.O. SMITH		W		No						0.0	0	0	$0	$0	$0	0.0
Copy Room	Copy Room Restroom & Teachers Break Room	1	Storage Tank Water Heater (≤ 50 Gal)	BRADFORD WHITE	RE16U6-1NAL	W		No						0.0	0	0	$0	$0	$0	0.0
Grounds Office	Main Office, Board Office, and Student Restrooms. 38 Wing and Kitchen	1	Storage Tank Water Heater (> 50 Gal)	BRADFORD WHITE		W		No						0.0	0	0	$0	$0	$0	0.0

Low-Flow Device Recommendations

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	Manufacturer	Model	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Cafeteria	1	Refrigerator Chest	TRAULSEN		No		No	0.0	0	0	$0	$0	$0	0.0
Cafeteria	1	Refrigerator Chest	POWERS		No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Stand-Up Freezer, Solid Door (>50 cu. ft.)	TRAULSEN		No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Stand-Up Freezer, Solid Door (>50 cu. ft.)	TRAULSEN		No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Stand-Up Freezer, Solid Door (>50 cu. ft.)	TRAULSEN		No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	TRAULSEN		No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	TRAULSEN		No		No	0.0	0	0	$0	$0	$0	0.0

Commercial Ice Maker Inventory & Recommendations

Cooking Equipment Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	Manufacturer	Model	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Electric Combination Oven/Steam Cooker (<15 Pans)	VULCAN		No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	2	Electric Convection Oven (Half Size)	DUKE	E101-EV	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Insulated Food Holding Cabinet (Full Size)	METRO C5		No		No	0.0	0	0	$0	$0	$0	0.0

Dishwasher Inventory & Recommendations

	Existing Conditions							Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Dishwasher Type	Manufacturer	Model	Water Heater Fuel Type	Booster Heater Fuel Type	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Payback w/ Incentives in Years
Kitchen	1	Single Tank Conveyor (High Temp)	Champion Industries	DH6000	Electric	N/A	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?**	**Manufacturer**	**Model**
Various Spaces	6	Coffee Machine	900	No		
Various Spaces	57	Desktop	150	No		
Auditorium/Cafeteria	3	Fan (Portable)	450	No		
Various Spaces	10	Microwave	1,000	No		
Classroom 30 - Tech Lab & Media Center	3	3D Printer	100	No		
Classroom 7A - Closet	1	Kiln	5,000	No		
Kitchen	1	Steaming Table	1,500	No		
Media Center	18	Charging Station	1,200	No		
Media Center	1	Scanner	69	No		
Various Spaces	3	Paper Shredder	150	No		
Various Spaces	12	Printer (Medium/Small)	240	No		
Various Spaces	5	Printer / Copier (Large)	600	No		
Various Classrooms	34	Projector	200	No		
Various Classrooms	4	Refrigerator (Mini)	180	No		
Various Classrooms	3	Refrigerator (Residential)	172	No		
Various Spaces	3	Television	124	No		
Various Spaces	3	Toaster Oven	1,200	No		
Various Spaces	7	Water Cooler	92	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**	**Estimated M&L Cost ($)**	**Total Incentives**	**Simple Payback w/ Incentives in Years**
Corridor - Gym	1	Glass Fronted Refrigerated	N/A	No	0.0	0	0	$0	$0	$0	0.0
Corridor - Gym	1	Non-Refrigerated	N/A	No	0.0	0	0	$0	$0	$0	0.0
Teachers Lounge	1	Refrigerated	N/A	No	0.0	0	0	$0	$0	$0	0.0

Appendix B: ENERGY STAR Statement of Energy Performance

Energy use intensity (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]

East Amwell Township School (campus)

Primary Property Type: K-12 School
Gross Floor Area (ft²): 83,200
Built: 1938

For Year Ending: March 31, 2023
Date Generated: August 03, 2023

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
East Amwell Township School (campus) 43 Wertsville Road Ringoes, New Jersey 08551	East Amwell School District 43 Wertsville Road Ringoes, NJ 08551 (908) 782-6464	Jesse Fry 43 Wertsville Road Ringoes, NJ 08551 (908) 782-6464 x231 jfry@eastamwell.org

Property ID: 28748010

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
78.2 kBtu/ft²

Annual Energy by Fuel

Electric - Grid (kBtu)	1,887,790 (29%)
Natural Gas (kBtu)	4,614,335 (71%)

Source EUI
121.8 kBtu/ft²

National Median Comparison

National Median Site EUI (kBtu/ft²)	71.8
National Median Source EUI (kBtu/ft²)	111.9
% Diff from National Median Source EUI	9%

Annual Emissions

Total (Location-Based) GHG Emissions (Metric Tons CO2e/year)	410

Signature & Stamp of Verifying Professional

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

LP Signature: ____________________ Date: __________

Licensed Professional

____ _______
,
(___)____-_____
____

Professional Engineer or Registered Architect Stamp (if applicable)

APPENDIX C: GLOSSARY

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

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

SEER	*Seasonal energy efficiency ratio:* a measure of efficiency in terms of annual cooling energy provided divided by total electric input.
SEP	*Statement of energy performance:* a summary document from the ENERGY STAR Portfolio Manager.
Simple Payback	The amount of time needed to recoup the funds expended in an investment or to reach the break-even point between investment and savings.
SREC (II)	*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 $1/8^{th}$ of an inch.
Temperature Setpoint	The temperature at which a temperature regulating device (thermostat, for example) has been set.
therm	100,000 Btu. Typically used as a measure of natural gas consumption.
tons	A unit of cooling capacity equal to 12,000 Btu/hr.
Turnkey	Provision of a complete product or service that is ready for immediate use.
VAV	*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.