Local Government Energy Audit Report

West Amwell School - Main Building

September 22, 2021

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 of 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.

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Energy Efficiency Incentive & Rebate Transition

For the purposes of your LGEA, estimated incentives and rebates are included as placeholders for planning purposes. New Jersey utilities are rolling out their own energy efficiency programs, which your project may be eligible for depending on individual measures, quantities, and size of the building.

In 2018, Governor Murphy signed into law the landmark legislation known as the Clean Energy Act. The law called for a significant overhaul of New Jersey's clean energy systems by building sustainable infrastructure in order to fight climate change and reduce carbon emissions, which will in turn create well-paying local jobs, grow the state's economy, and improve public health while ensuring a cleaner environment for current and future residents.

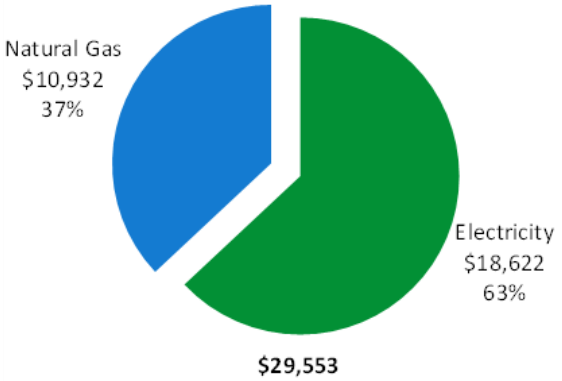
These "next generation" energy efficiency programs feature new ways of managing and delivering programs historically administered by New Jersey's Clean Energy Program™ (NJCEP). All of the investor-owned gas and electric utility companies will now also offer complementary energy efficiency programs and incentives directly to customers like you. NJCEP will still offer programs for new construction, renewable energy, the Energy Savings Improvement Program (ESIP), and large energy users.

New utility programs are expected to start rolling out in the spring and summer of 2021. Keep up to date with developments by visiting the NJCEP website.

1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for West Amwell School Main Building. 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: $29,553 Electricity: 143,840 kWh Natural Gas: 12,012 Therms	
ENERGY STAR® Benchmarking Score	75 *(1-100 scale)*	Congratulations, your building performs better than the national average. This report has suggestions about how to keep your building running efficiently, further improve performance, and lower your energy bills even more.

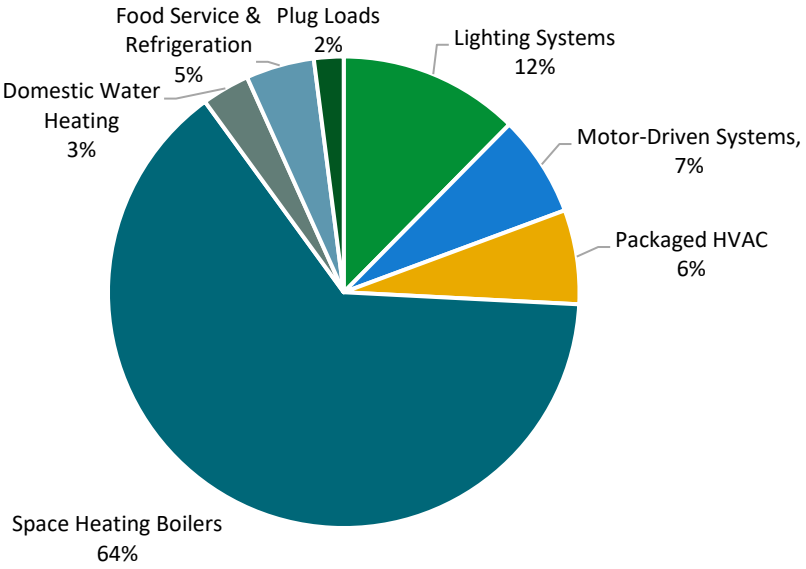


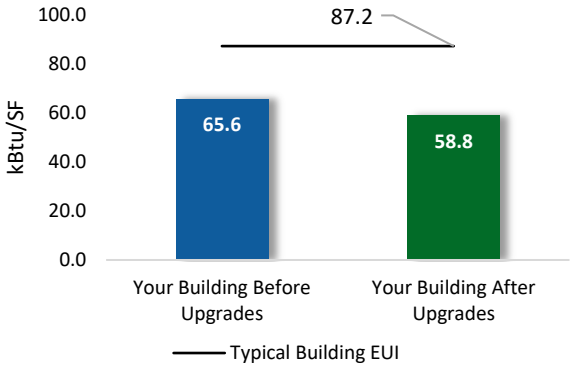
Figure 1 - Energy Use by System

POTENTIAL IMPROVEMENTS

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

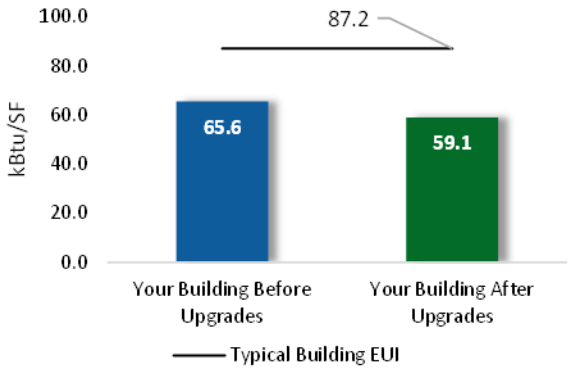
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$90,083
Potential Rebates & Incentives[1]	$14.016
Annual Cost Savings	$6,992
Annual Energy Savings	Electricity: 54,011 kWh Natural Gas: 0 Therms
Greenhouse Gas Emission Savings	27 Tons
Simple Payback	10.9 Years
Site Energy Savings (all utilities)	11%



Scenario 2: Cost Effective Package[2]

Installation Cost	$35.585
Potential Rebates & Incentives	$9,921
Annual Cost Savings	$6,396
Annual Energy Savings	Electricity: 49,402 kWh Natural Gas: 0 Therms
Greenhouse Gas Emission Savings	25 Tons
Simple Payback	4.0 Years
Site Energy Savings (all utilities)	10%



On-site Generation Potential

Photovoltaic	Medium
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			**34,933**	**9.5**	**-6**	**$4,463**	**$16,735**	**$4,004**	**$12,731**	**2.9**	**34,417**
ECM 1	Install LED Fixtures	Yes	900	0.0	0	$116	$766	$150	$616	5.3	906
ECM 2	Retrofit Fixtures with LED Lamps	Yes	34,033	9.5	-6	$4,347	$15,969	$3,854	$12,115	2.8	33,511
Lighting Control Measures			**8,619**	**2.6**	**-2**	**$1,099**	**$9,568**	**$2,205**	**$7,363**	**6.7**	**8,469**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	7,418	2.3	-2	$946	$8,218	$1,050	$7,168	7.6	7,288
ECM 4	Install High/Low Lighting Controls	Yes	1,202	0.2	0	$153	$1,350	$1,155	$195	1.3	1,181
Variable Frequency Drive (VFD) Measures			**5,389**	**1.3**	**0**	**$698**	**$8,394**	**$3,600**	**$4,794**	**6.9**	**5,426**
ECM 5	Install VFDs on Heating Water Pumps	Yes	5,389	1.3	0	$698	$8,394	$3,600	$4,794	6.9	5,426
Unitary HVAC Measures			**5,070**	**4.4**	**0**	**$656**	**$55,264**	**$4,095**	**$51,169**	**78.0**	**5,105**
ECM 6	Install High Efficiency Air Conditioning Units	No	4,609	4.2	0	$597	$54,498	$4,095	$50,403	84.5	4,642
ECM 7	Install High Efficiency Heat Pumps	Yes	460	0.2	0	$60	$766	$0	$766	12.9	464
Domestic Water Heating Upgrade			**0**	**0.0**	**8**	**$76**	**$122**	**$112**	**$10**	**0.1**	**974**
ECM 8	Install Low-Flow DHW Devices	Yes	0	0.0	8	$76	$122	$112	$10	0.1	974
TOTALS (COST EFFECTIVE MEASURES)			**49,402**	**13.6**	**0**	**$6,396**	**$35,585**	**$9,921**	**$25,664**	**4.0**	**49,749**
TOTALS (ALL MEASURES)			**54,011**	**17.8**	**0**	**$6,992**	**$90,083**	**$14,016**	**$76,067**	**10.9**	**54,391**

* - All incentives presented in this table are included as placeholders 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.

For details on these programs please visit New Jersey's Clean Energy Program website or contact your utility provider.

Options from Around the State

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

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

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

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

Ongoing Electric Savings with Demand Response

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

2 EXISTING CONDITIONS

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for West Amwell School Main Building. 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 April 30, 2021, TRC performed an energy audit at West Amwell School Main Building located in Lambertville, New Jersey. TRC met with George Hutton to review the facility operations and help focus our investigation on specific energy-using systems.

West Amwell School Main Building is a 1-story, 25,782 square foot building built in 1963. Spaces include classrooms, gymnasium, multipurpose room, library, offices, kitchen, corridors, boiler room, storage, and restrooms.

Facility lighting consists primarily of 32-Watt T8 fluorescent fixtures. The building is 100% heated by two non- condensing hot water boilers. It is cooled by split system and window air conditioning units.

Figure 3 - Facility Aerial View

2.2 Building Occupancy

The school operates on a 10-month schedule, from September to June. The entire facility is shut down around 10:00 PM after the cleaning process.

During a typical day, the facility is occupied by approximately 295 people. It should be noted that the energy and economic analysis for this building 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
West Amwell School Main Building	Weekday	6:00 AM - 10:00 PM
	Weekend	Closed

Figure 3 - Building Occupancy Schedule

2.3 Building Envelope

Building walls are concrete masonry units (CMUs) over structural steel with a concrete facade. The roof sections are supported with steel trusses and reinforced concrete deck and finished with a grey membrane that is in fair condition.

Windows are double paned and have either wood or aluminum frames. The glass to frame seals are in good and fair condition. Some windows are operable and have window weather seals in fair condition showing little signs of wear. Degraded window seals increase drafts and outside air infiltration. Exterior doors have aluminum frames and are in good condition with undamaged door seals.

Building Walls

Roof Sections

Windows

Exterior Doors

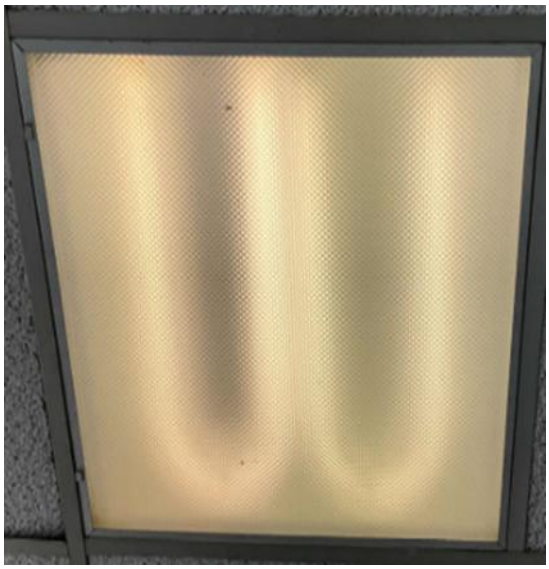
2.4 Lighting Systems

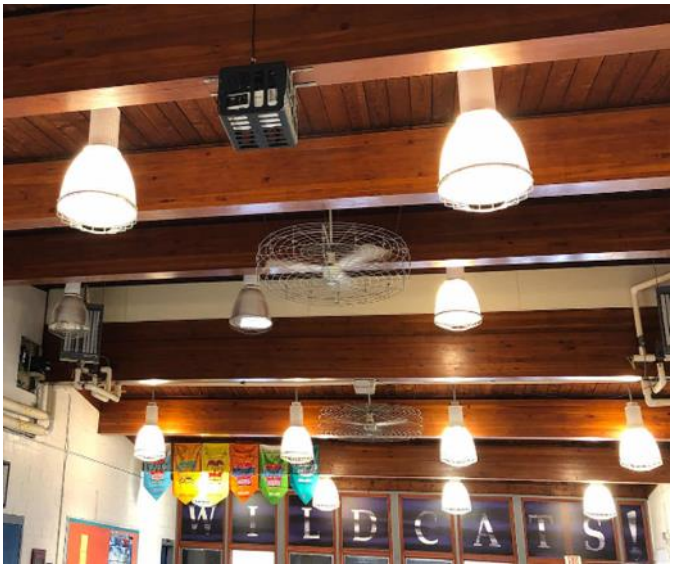
The primary interior lighting system uses 32-Watt linear fluorescent T8 lamps. There are also several 60-Watt incandescent and 23-Watt compact fluorescent lamps (CFL). Fixture types include 2- or 4-lamp, 4-foot troffer, recessed, surface mounted fixtures and 2-foot fixtures with U-bend linear tube lamps. The classrooms, corridors, kitchen, boiler room, offices, and storage rooms are lit with linear fluorescent fixtures. U-bend linear tube fixtures are also found in the corridors. Interior spaces such as restrooms, pump room, and classrooms have some CFL and incandescent lamps.

There is a 2' x 4' LED fixture in the library, and the multipurpose room is illuminated by high bay compact fluorescent fixtures. Most fixtures are in fair condition. All exit signs are LED units. Interior lighting levels were generally sufficient. Lighting fixtures in spaces are controlled by manual wall switches.

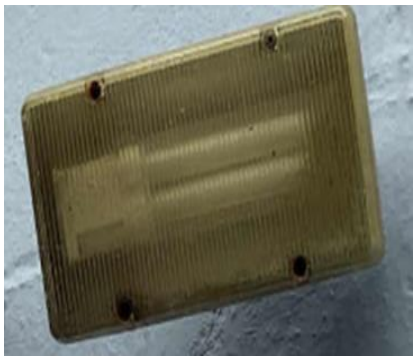
Exterior fixtures are comprised of a mixture of CFL, incandescent, and two LED and metal halide lamps that are mostly controlled by timers.

Linear T8 & 2x4 LED Fixtures





U-Bend & CFL Lamps

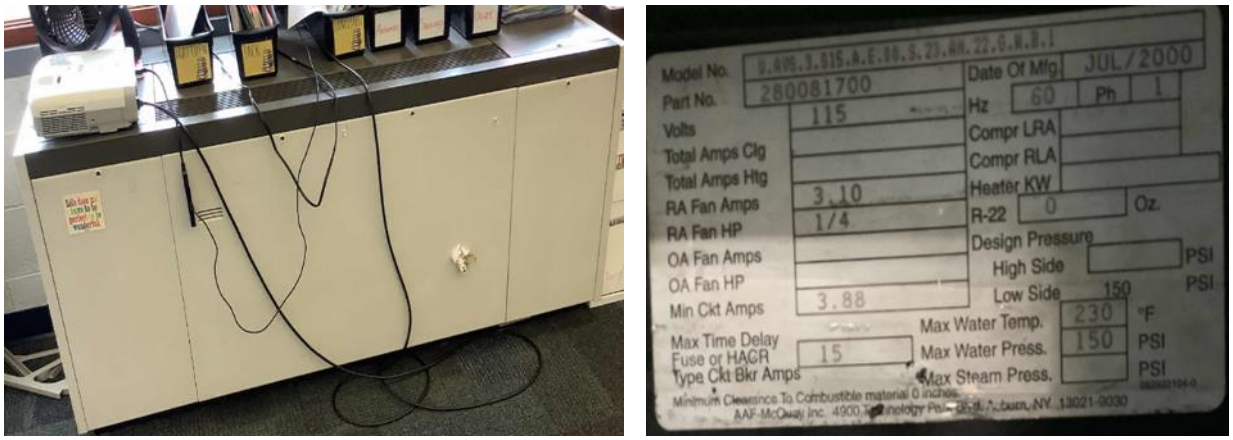


CFL, Metal Halide & LED Corn bulbs Fixtures

2.5 Air Handling Systems

Unit Ventilators

Unit ventilators (UV) provide heating and ventilation to classrooms. They have supply fan motors with pneumatically controlled outside air dampers and are equipped with hot water coils fed directly from the two non-condensing hot water boilers. They are in good condition.



Typical Classroom Unit Ventilator

Unitary Electric HVAC Equipment

The library, art room, school building office, three classrooms, and copy and speech rooms are cooled by split system air conditioning (AC) units. There are 11 units that vary in capacity between 1.5 and 3 tons and range in efficiency between 10 to 12 EER. The unit serving the library is in good condition while the remaining units are in poor condition and have been evaluated for replacement. They are controlled via programmable and local thermostats.

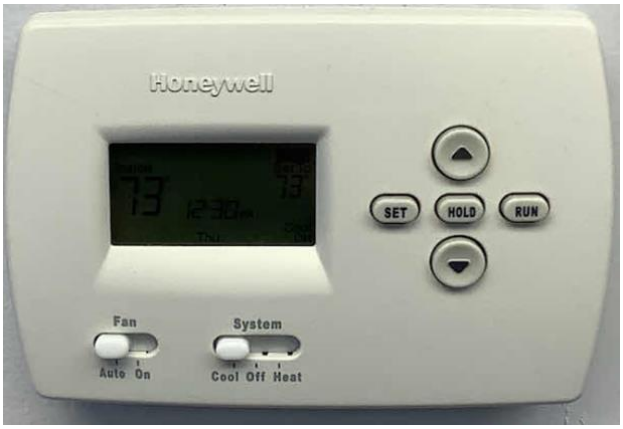
The main office is served by a fan coil with a 2-ton direct expansion coil and a 54 MBh gas fired heating coils. The unit is located above, in the ceiling, and is in good condition.

There are 17 window AC units that provide cooling to classrooms, kitchen, and the kitchen storage room. They vary in capacity between 0.52 to 1.5 tons and range in efficiency between 10 and 11 EER. The unit serving the kitchen is in poor condition and has been evaluated for replacement.

The nurse's office is conditioned with a through-the-wall heat pump with respective cooling and heating capacities of 1.18 ton and 13.3 MBh. It is an older unit that has been evaluated for replacement.

Exterior Condensing Units

Window AC & Indoor Split AC Evaporator



Programmable Thermostat

2.6 Heating Hot Water Systems

Two Paterson Kelly 1,020 MBh non-condensing hot water boilers serve the building heating load. The burners are non-modulating with a nominal efficiency of 85%. The boilers are configured in an automated control scheme. Both boilers may be required under high load conditions. Installed in 2018, they are in good condition.

The hydronic distribution system is a two-pipe heating only system. Two 5 hp constant speed pumps distribute heating hot water to unit ventilators, hydronic baseboards, cabinets, and unit heaters. The boilers run based on outside air temperature. Space heating temperature is controlled via local thermostats.

5 hp Hot Water Pumps, Hydronic Unit Heater, and Baseboard Heating.

Boilers & Hot Water Pipes

2.7 Domestic Hot Water

Domestic hot water is produced by an A O. Smith 100 gallon 199.9 MBh gas-fired condensing storage tank water heater rated at 95% efficiency. The hot water heater is in the boiler room and in good condition. Domestic hot water pipes are properly insulated.

Condensing Water Heater

2.8 Food Service Equipment

The kitchen has a mix of gas and electric equipment that is used to prepare breakfasts and lunches for students. Most cooking is done using two convection gas-fired ovens. Bulk prepared foods are held in two electric holding cabinets. Equipment is high efficiency and is in good condition.

The dishwasher is a non- ENERGY STAR® high temperature, rack type unit. It is equipped with a 12-kW electric booster heater.

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

Gas-Fired Kitchen Equipment

2.9 Refrigeration

The kitchen has two stand-up refrigerators with solid doors, and one refrigerator chest. All 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 Solid Doors Refrigerator

2.10 Plug Load & Vending Machines

There are approximately 7 computer workstations throughout the facility and 27 laptops. Plug loads throughout the building include general café and office equipment. There are classrooms with smart boards and projectors. There are two residential style refrigerators that are in good condition.

Copier, Mini-Refrigerator & Microwave

2.11 Water-Using Systems

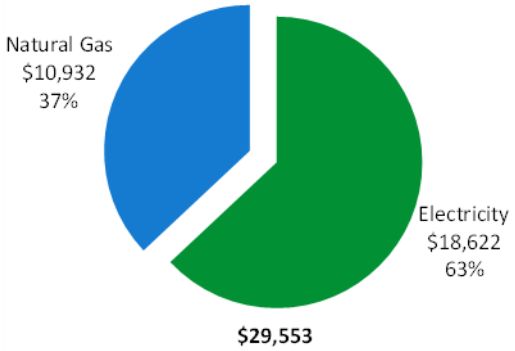
There are several restrooms with toilets, urinals, and sinks. Faucet flow rates are at 2.2 gallons per minute (gpm) or higher. Toilets are rated at 2.5 gallons per flush (gpf) and urinals are rated at 2.5 gpf. The kitchen has three sinks with faucet flow rate of 2.5 gallons per minute (gpm) or higher.

Typical Restroom 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	143,840 kWh	$18,622
Natural Gas	12,012 Therms	$10,932
Total		**$29,553**



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.

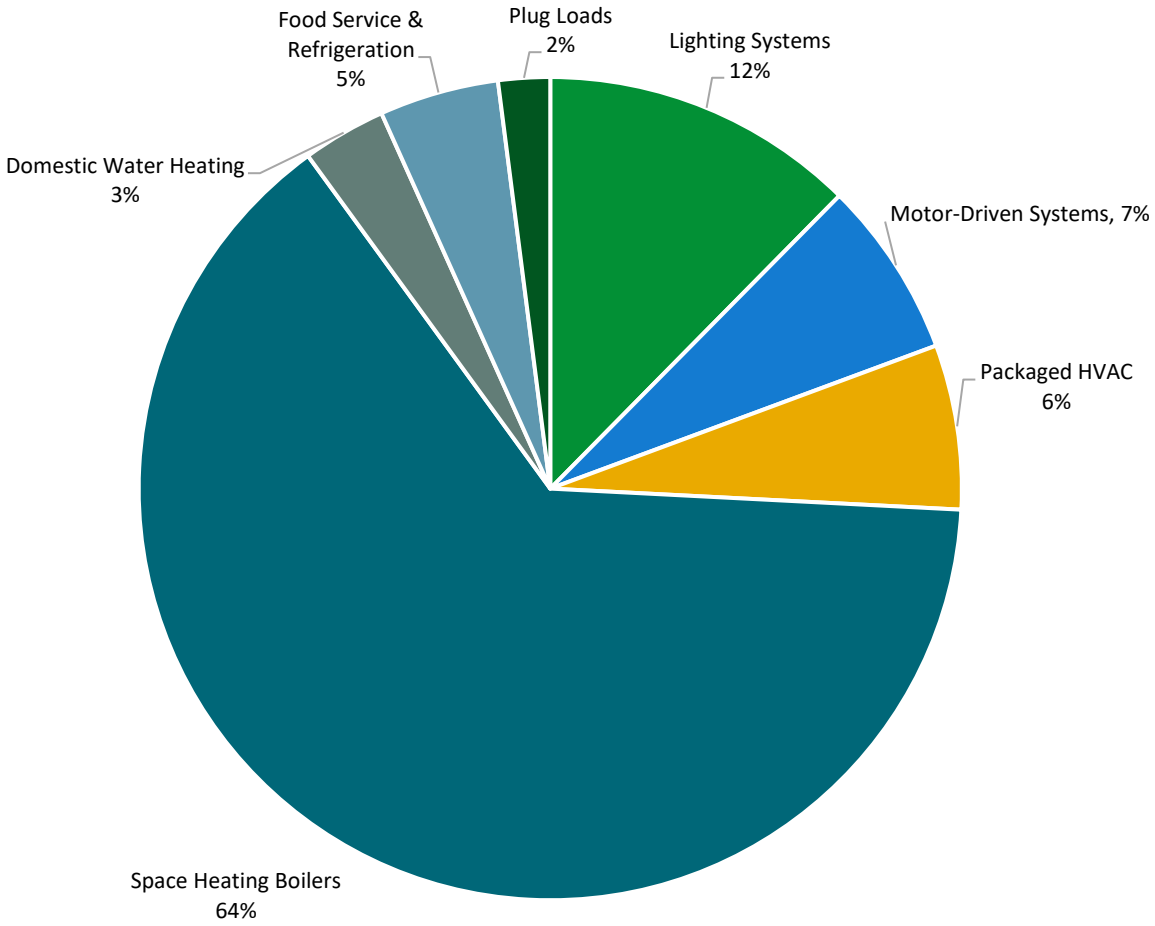
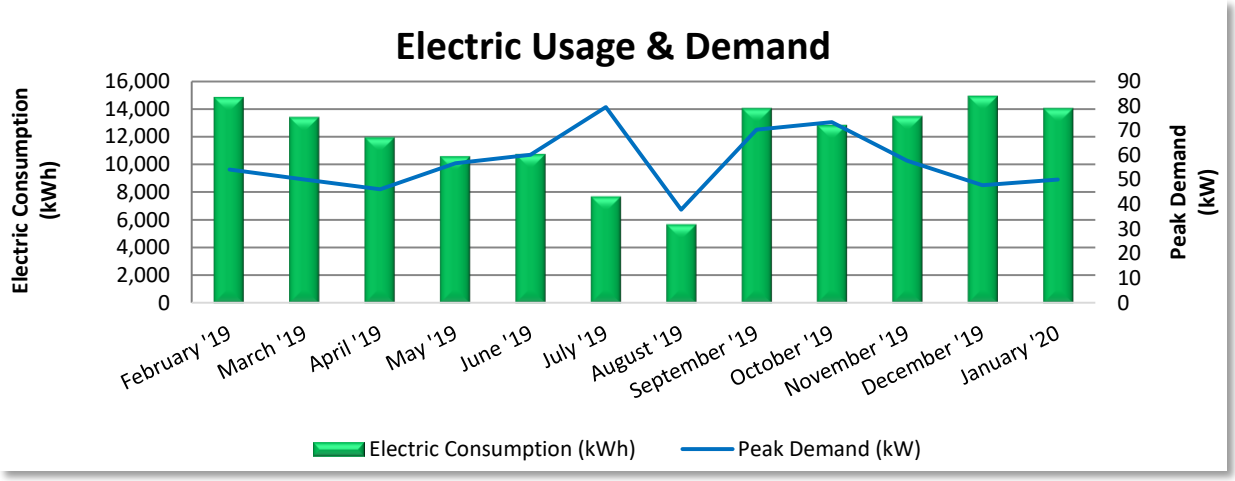


Figure 4 - Energy Balance

3.1 Electricity

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



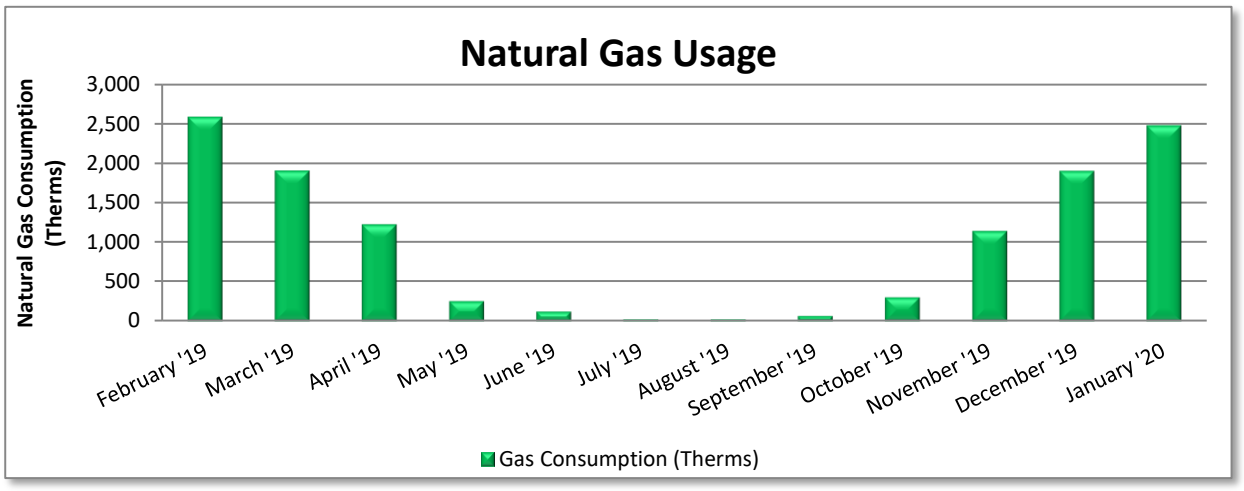
Electric Billing Data					
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**
2/22/19	30	14,800	54	$340	$1,808
3/22/19	28	13,360	50	$314	$1,643
4/23/19	32	11,920	46	$289	$1,479
5/24/19	31	10,560	57	$241	$1,433
6/21/19	28	10,720	60	$399	$1,473
7/24/19	33	7,680	80	$240	$1,055
8/22/19	29	5,680	38	$251	$871
9/23/19	32	14,000	70	$467	$1,900
10/24/19	31	12,800	73	$453	$1,764
11/22/19	29	13,440	58	$357	$1,732
12/23/19	31	14,880	48	$295	$1,776
1/23/20	31	14,000	50	$309	$1,688
Totals	**365**	**143,840**	**80**	**$3,954**	**$18,622**
Annual	**365**	**143,840**	**80**	**$3,954**	**$18,622**

Notes:

- Peak demand of 80 kW occurred in July '19.
- Average demand over the past 12 months was 57 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 Service Delivery (GDS).



Gas Billing Data			
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**
2/22/19	30	2,581	$2,078
3/22/19	28	1,902	$1,551
4/23/19	32	1,224	$1,025
5/24/19	31	253	$346
6/21/19	28	124	$247
7/24/19	33	22	$188
8/22/19	29	23	$188
9/23/19	32	67	$216
10/24/19	31	303	$385
11/22/19	29	1,142	$1,017
12/23/19	31	1,899	$1,657
1/23/20	31	2,472	$2,035
Totals	**365**	**12,012**	**$10,932**
Annual	**365**	**12,012**	**$10,932**

Notes:

- The average gas cost for the past 12 months is $0.910/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	**75**

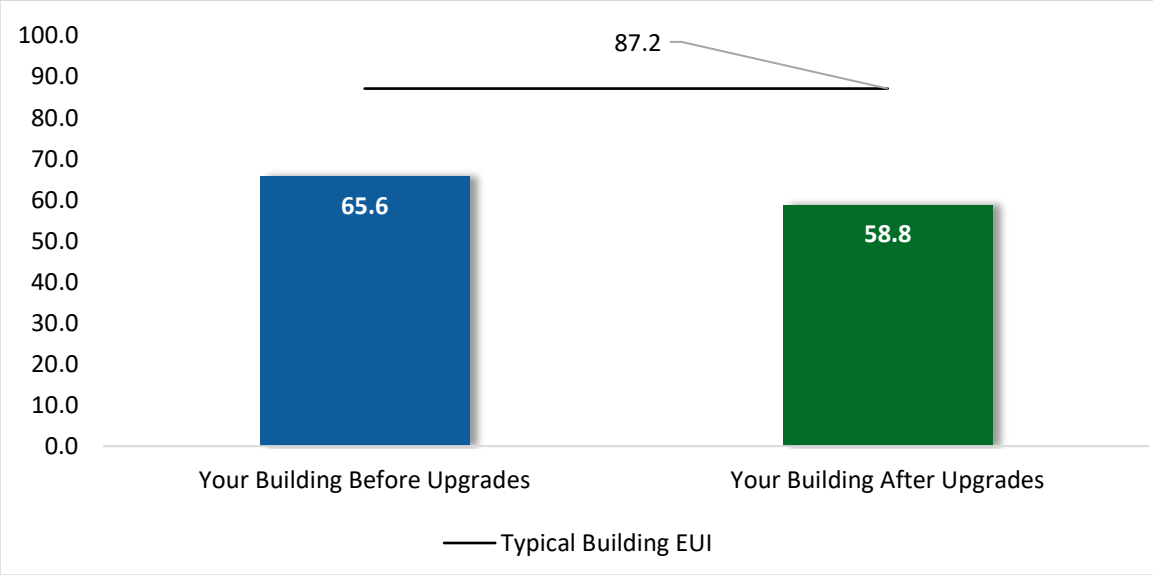


Figure 5 - Energy Use Intensity Comparison[3]

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

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

[3] Based on all evaluated ECMs

Tracking Your Energy Performance

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

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

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

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

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

4 Energy Conservation Measures

The goal of this audit report is to identify and evaluate potential energy efficiency improvements 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 are based on previously run state rebate programs. New utility programs are expected to start rolling out in the spring and summer of 2021. Keep up to date with developments by visiting the NJCEP website. Some measures and proposed upgrades may be eligible for higher incentives than those shown below.

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			**34,933**	**9.5**	**-6**	**$4,463**	**$16,735**	**$4,004**	**$12,731**	**2.9**	**34,417**
ECM 1	Install LED Fixtures	Yes	900	0.0	0	$116	$766	$150	$616	5.3	906
ECM 2	Retrofit Fixtures with LED Lamps	Yes	34,033	9.5	-6	$4,347	$15,969	$3,854	$12,115	2.8	33,511
Lighting Control Measures			**8,619**	**2.6**	**-2**	**$1,099**	**$9,568**	**$2,205**	**$7,363**	**6.7**	**8,469**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	7,418	2.3	-2	$946	$8,218	$1,050	$7,168	7.6	7,288
ECM 4	Install High/Low Lighting Controls	Yes	1,202	0.2	0	$153	$1,350	$1,155	$195	1.3	1,181
Variable Frequency Drive (VFD) Measures			**5,389**	**1.3**	**0**	**$698**	**$8,394**	**$3,600**	**$4,794**	**6.9**	**5,426**
ECM 5	Install VFDs on Heating Water Pumps	Yes	5,389	1.3	0	$698	$8,394	$3,600	$4,794	6.9	5,426
Unitary HVAC Measures			**5,070**	**4.4**	**0**	**$656**	**$55,264**	**$4,095**	**$51,169**	**78.0**	**5,105**
ECM 6	Install High Efficiency Air Conditioning Units	No	4,609	4.2	0	$597	$54,498	$4,095	$50,403	84.5	4,642
ECM 7	Install High Efficiency Heat Pumps	Yes	460	0.2	0	$60	$766	$0	$766	12.9	464
Domestic Water Heating Upgrade			**0**	**0.0**	**8**	**$76**	**$122**	**$112**	**$10**	**0.1**	**974**
ECM 8	Install Low-Flow DHW Devices	Yes	0	0.0	8	$76	$122	$112	$10	0.1	974
TOTALS			**54,011**	**17.8**	**0**	**$6,992**	**$90,083**	**$14,016**	**$76,067**	**10.9**	**54,391**

* - All incentives presented in this table are included as placeholders 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		**34,933**	**9.5**	**-6**	**$4,463**	**$16,735**	**$4,004**	**$12,731**	**2.9**	**34,417**
ECM 1	Install LED Fixtures	900	0.0	0	$116	$766	$150	$616	5.3	906
ECM 2	Retrofit Fixtures with LED Lamps	34,033	9.5	-6	$4,347	$15,969	$3,854	$12,115	2.8	33,511
Lighting Control Measures		**8,619**	**2.6**	**-2**	**$1,099**	**$9,568**	**$2,205**	**$7,363**	**6.7**	**8,469**
ECM 3	Install Occupancy Sensor Lighting Controls	7,418	2.3	-2	$946	$8,218	$1,050	$7,168	7.6	7,288
ECM 4	Install High/Low Lighting Controls	1,202	0.2	0	$153	$1,350	$1,155	$195	1.3	1,181
Variable Frequency Drive (VFD) Measures		**5,389**	**1.3**	**0**	**$698**	**$8,394**	**$3,600**	**$4,794**	**6.9**	**5,426**
ECM 5	Install VFDs on Heating Water Pumps	5,389	1.3	0	$698	$8,394	$3,600	$4,794	6.9	5,426
Unitary HVAC Measures		**460**	**0.2**	**0**	**$60**	**$766**	**$0**	**$766**	**12.9**	**464**
ECM 7	Install High Efficiency Heat Pumps	460	0.2	0	$60	$766	$0	$766	12.9	464
Domestic Water Heating Upgrade		**0**	**0.0**	**8**	**$76**	**$122**	**$112**	**$10**	**0.1**	**974**
ECM 8	Install Low-Flow DHW Devices	0	0.0	8	$76	$122	$112	$10	0.1	974
TOTALS		**49,402**	**13.6**	**0**	**$6,396**	**$35,585**	**$9,921**	**$25,664**	**4.0**	**49,749**

* - All incentives presented in this table are included as placeholders 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		**34,933**	**9.5**	**-6**	**$4,463**	**$16,735**	**$4,004**	**$12,731**	**2.9**	**34,417**
ECM 1	Install LED Fixtures	900	0.0	0	$116	$766	$150	$616	5.3	906
ECM 2	Retrofit Fixtures with LED Lamps	34,033	9.5	-6	$4,347	$15,969	$3,854	$12,115	2.8	33,511

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

ECM 1: Install LED Fixtures

Replace existing exterior fixtures containing 70 and 400-Watt lamps with new LED light fixtures. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

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

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

Affected building areas: exterior fixtures.

ECM 2: Retrofit Fixtures with LED Lamps

Replace fluorescent T8, CFL and incandescent lamps with LED lamps. Many LED tubes are direct replacements for existing fluorescent tubes and can be installed while leaving the fluorescent fixture ballast in place. LED lamps can be used in existing fixtures as a direct replacement for most other lighting technologies.

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

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

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**8,619**	**2.6**	**-2**	**$1,099**	**$9,568**	**$2,205**	**$7,363**	**6.7**	**8,469**
ECM 3	Install Occupancy Sensor Lighting Controls	7,418	2.3	-2	$946	$8,218	$1,050	$7,168	7.6	7,288
ECM 4	Install High/Low Lighting Controls	1,202	0.2	0	$153	$1,350	$1,155	$195	1.3	1,181

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 3: Install Occupancy Sensor Lighting Controls

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

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

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

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

Affected building areas: offices, classrooms, restrooms, library, and multipurpose room.

ECM 4: 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.

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

Affected building areas: corridors.

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

4.3 Variable Frequency Drives (VFD)

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**5,389**	**1.3**	**0**	**$698**	**$8,394**	**$3,600**	**$4,794**	**6.9**	**5,426**
ECM 5	Install VFDs on Heating Water Pumps	5,389	1.3	0	$698	$8,394	$3,600	$4,794	6.9	5,426

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 5: 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: two 5 hp hot water pumps.

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		**5,070**	**4.4**	**0**	**$656**	**$55,264**	**$4,095**	**$51,169**	**78.0**	**5,105**
ECM 6	Install High Efficiency Air Conditioning Units	4,609	4.2	0	$597	$54,498	$4,095	$50,403	84.5	4,642
ECM 7	Install High Efficiency Heat Pumps	460	0.2	0	$60	$766	$0	$766	12.9	464

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

ECM 6: Install High Efficiency Air Conditioning Units

We evaluated replacing standard efficiency split system and window air conditioning units with high efficiency split system and 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: nine split system and one window AC.

ECM 7: Install High Efficiency Heat Pumps

Replace standard efficiency heat pumps with high efficiency heat pumps. A higher EER or SEER rating indicates a more efficient cooling system and a higher HSPF rating indicates more efficient heating mode. 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 heating and cooling loads, and the estimated annual operating hours.

Affected units: nurse's office through-the-wall heat pump.

4.5 Domestic Water Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**8**	**$76**	**$122**	**$112**	**$10**	**0.1**	**974**
ECM 8	Install Low-Flow DHW Devices	0	0.0	8	$76	$122	$112	$10	0.1	974

ECM 8: Install Low-Flow DHW Devices

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

Device	Flow Rate
Faucet aerators (lavatory)	0.5 gpm
Faucet aerator (kitchen)	1.5 gpm

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 between 5 to 20 percent of the energy usage in your building without substantial capital investment. A successful plan includes your records of energy usage trends and costs, building equipment lists, current maintenance practices, planned capital upgrades, and incorporates your ideas for improved building operation. Your plan will address goals for energy-efficient operation, provide detail on how to reach the goals, and will outline procedures for measuring and reporting whether goals have been achieved.

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

Energy Tracking with ENERGY STAR® Portfolio Manager®

You've heard it before - you can't manage what you don't measure. ENERGY STAR® Portfolio Manager® is an online tool that you can use to measure and track energy and water consumption, as well as greenhouse gas emissions[5] . Your account has already been established. Now you can continue to keep tabs on your energy performance every month.

Lighting Maintenance

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

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

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.

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

Thermostat Schedules and Temperature Resets

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

AC System Evaporator/Condenser Coil Cleaning

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

HVAC Filter Cleaning and Replacement

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

Boiler Maintenance

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

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[6] or download a copy of EPA's "WaterSense® at Work: Best Management Practices for Commercial and Institutional Facilities"[7] to get ideas for creating a water management plan and best practices for a wide range of water using systems.

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

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

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

Procurement Strategies

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

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

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

6 On-site Generation

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

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

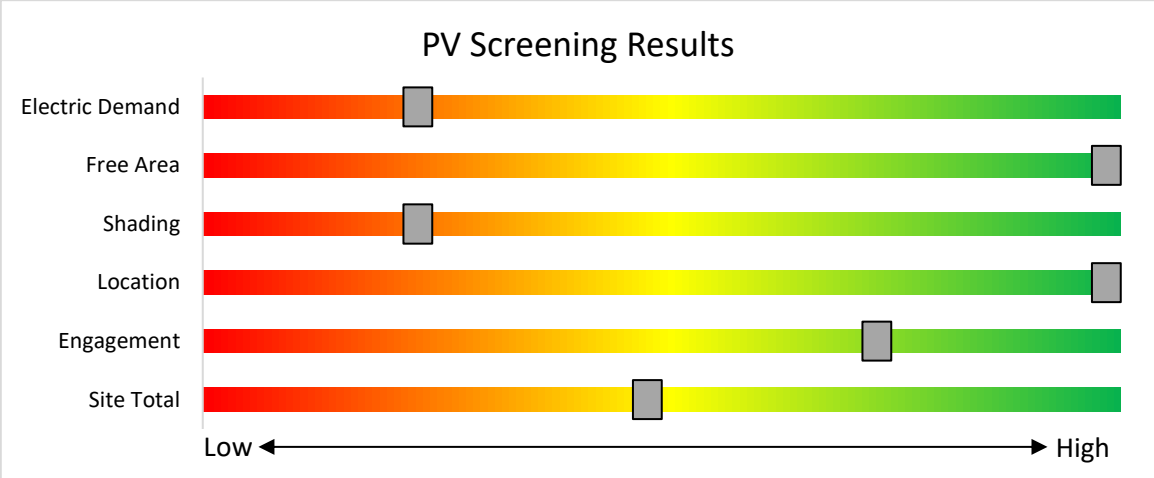
6.1 Solar Photovoltaic

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

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

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

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



Potential	Medium	
System Potential	57	kW DC STC
Electric Generation	42,889	kWh/yr
Displaced Cost	$5,550	/yr
Installed Cost	$148,200	

Figure 8 - Photovoltaic Screening

Transition Incentive (TI) Program

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

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

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

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

6.2 Combined Heat and Power

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

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

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

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

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

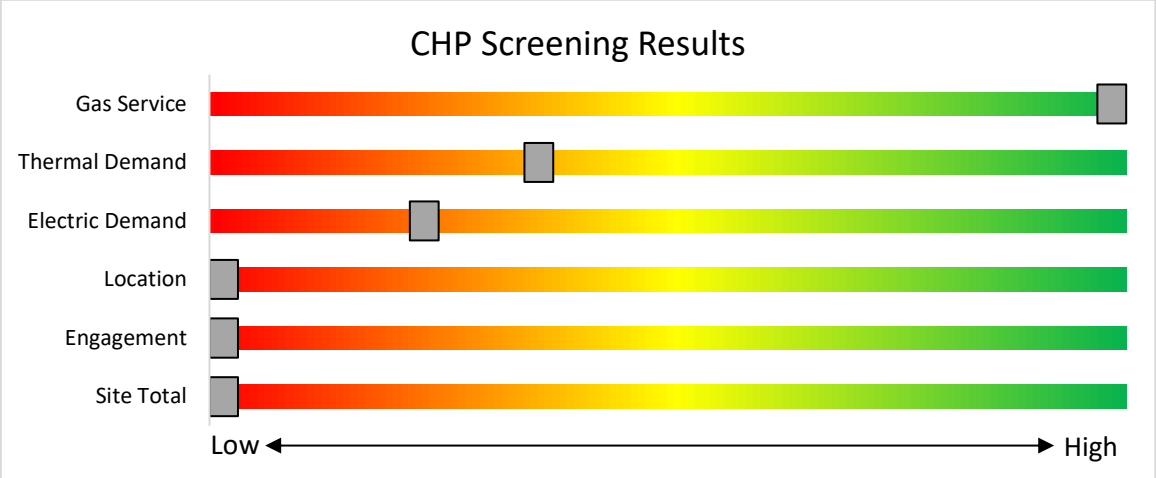


Figure 9 - Combined Heat and Power Screening

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 PROJECT FUNDING AND INCENTIVES

Ready to improve your building's performance? Your utility provider may be able to help.

7.1 Utility Energy Efficiency Programs

New utility programs are expected to start rolling out in the spring and summer of 2021. Keep up to date with developments by visiting the NJCEP website.

8 New Jersey's Clean Energy Programs

New Jersey's Clean Energy Program will continue to offer some energy efficiency programs.

8.1 Combined Heat and Power

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

Incentives

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

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

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

How to Participate

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

8.2 Energy Savings Improvement Program

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

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

How to Participate

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

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

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

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

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

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

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

8.3 Transition Incentive (TI) Program

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

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

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

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

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

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

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

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

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. 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 includes the review of multiple bids for project work, incorporate potential operational & maintenance (O&M) cost savings and maximize your incentive potential.

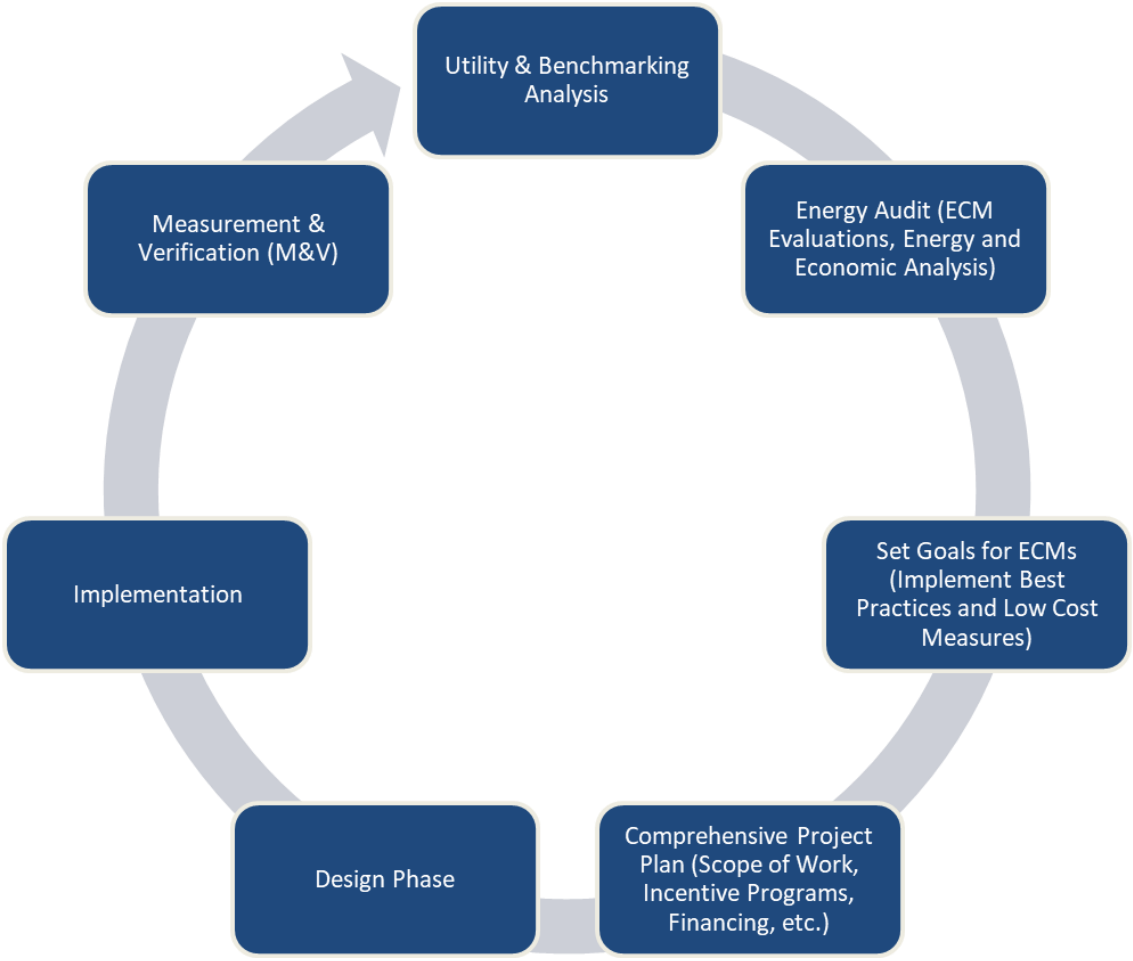


Figure 10 – Project Development Cycle

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. So, though you may choose a different company from which to buy your electric power, responsibility for your facility's interconnection to the grid and repair to local power distribution will still reside with the traditional utility company serving your region.

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

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

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 that fluctuate monthly. The utility provides basic gas supply service (BGSS) to customers who choose not to buy from a third-party supplier for natural gas commodity.

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

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

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

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

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

APPENDIX A: EQUIPMENT INVENTORY & RECOMMENDATIONS

Lighting Inventory & Recommendations

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Boys room A	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,520	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.1	488	0	$62	$380	$65	5.1
Classroom 101	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.5	1,372	0	$175	$818	$185	3.6
Classroom 102	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Classroom 102	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.1	183	0	$23	$189	$40	6.4
Classroom 103	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Classroom 103	19	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	19	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.9	2,606	-1	$332	$1,581	$355	3.7
Classroom 104	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Classroom 104	19	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,980	2, 3	Relamp	Yes	19	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,366	0.9	2,606	-1	$332	$1,581	$355	3.7
Classroom 105	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,980	0.0	72	0	$9	$37	$10	2.9
Classroom 106	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.5	1,646	0	$210	$1,197	$250	4.5
Classroom 107	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.5	1,646	0	$210	$1,197	$250	4.5
Classroom 108	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.5	1,646	0	$210	$1,197	$250	4.5
Classroom 109	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.5	1,646	0	$210	$1,197	$250	4.5
Classroom 110	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.5	1,646	0	$210	$1,197	$250	4.5
Classroom 111	1	Compact Fluorescent: (2) 23W Spiral Plug-In Lamps	Wall Switch	S	46	1,980	2	Relamp	No	1	LED Lamps: LED Plug In Lamp	Wall Switch	33	1,980	0.0	28	0	$4	$25	$2	6.4
Classroom 111	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.5	1,372	0	$175	$818	$185	3.6
Classroom 112	1	Incandescent: (1) 100W A19 Screw-In Lamp	Wall Switch	S	100	1,980	2	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	15	1,980	0.1	185	0	$24	$17	$1	0.7
Classroom 112	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.5	1,372	0	$175	$818	$185	3.6
Classroom 113	1	Incandescent: (1) 100W A19 Screw-In Lamp	Wall Switch	S	100	1,980	2	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	15	1,980	0.1	185	0	$24	$17	$1	0.7
Classroom 113	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.5	1,372	0	$175	$818	$185	3.6
Classroom 114	1	Compact Fluorescent: (2) 23W Spiral Plug-In Lamps	Wall Switch	S	46	1,980	2	Relamp	No	1	LED Lamps: LED Plug In Lamp	Wall Switch	33	1,980	0.0	28	0	$4	$25	$2	6.4
Classroom 114	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.5	1,372	0	$175	$818	$185	3.6
Classroom 115	1	Compact Fluorescent: (2) 23W Spiral Plug-In Lamps	Wall Switch	S	46	1,980	2	Relamp	No	1	LED Lamps: LED Plug In Lamp	Wall Switch	33	1,980	0.0	28	0	$4	$25	$2	6.4
Classroom 115	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.5	1,372	0	$175	$818	$185	3.6
Classroom 116	1	Compact Fluorescent: (2) 23W Spiral Plug-In Lamps	Wall Switch	S	46	1,980	2	Relamp	No	1	LED Lamps: LED Plug In Lamp	Wall Switch	33	1,980	0.0	28	0	$4	$25	$2	6.4

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 116	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,980	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,366	0.5	1,372	0	$175	$818	$185	3.6
Classroom resource room	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,980	2	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,980	0.0	122	0	$16	$73	$20	3.4
Corridor 1 kindergarten wing	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor kindergarten wing	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,520	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.0	128	0	$16	$37	$10	1.6
Corridor 1st, 2nd, 3rd wing. Built 1966	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor 1st, 2nd, 3rd wing. Built 1966	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,520	2, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,429	0.2	976	0	$124	$444	$270	1.4
Corridor 1st, 2nd, 3rd wing. Built 1966	11	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,520	2, 4	Relamp	Yes	11	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	2,429	0.3	1,671	0	$213	$1,247	$495	3.5
Corridor main hall	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor main hall	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,520	2, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,429	0.5	2,601	-1	$332	$1,259	$720	1.6
Corridor main hall	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,520	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.0	128	0	$16	$37	$10	1.6
Exterior 2 ground	2	Compact Fluorescent: (1) 26W G25 Screw-In Lamp	Timeclock		26	2,184	2	Relamp	No	2	LED Lamps: G25 Lamps	Timeclock	19	2,184	0.0	31	0	$4	$50	$4	11.7
Exterior 2 ground	1	Compact Fluorescent: (1) 42W G25 Screw-In Lamp	Timeclock		42	2,184	2	Relamp	No	1	LED Lamps: G25 Lamps	Timeclock	30	2,184	0.0	26	0	$3	$25	$2	6.8
Exterior 2 ground	6	Incandescent: (1) 100W A19 Screw-In Lamp	Timeclock		100	2,184	2	Relamp	No	6	LED Lamps: A19 Lamps	Timeclock	15	2,184	0.0	1,114	0	$144	$103	$6	0.7
Exterior 2 ground	1	Incandescent: (1) 100W A19 Screw-In Lamp	Timeclock		100	2,184	2	Relamp	No	1	LED Lamps: A19 Lamps	Timeclock	15	2,184	0.0	186	0	$24	$17	$1	0.7
Exterior 2 ground	12	Incandescent: (1) 60W A19 Screw-In Lamp	Timeclock		60	2,184	2	Relamp	No	12	LED Lamps: A19 Lamps	Timeclock	9	2,184	0.0	1,337	0	$173	$207	$12	1.1
Exterior 2 ground	1	Incandescent: (1) 90W PAR38 Screw-In Lamp	Wall Switch		90	3,520	2	Relamp	No	1	LED Lamps: PAR38 Lamps	Wall Switch	14	3,520	0.0	268	0	$35	$30	$3	0.8
Exterior 2 ground	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Timeclock		10	2,184		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Timeclock	10	2,184	0.0	0	0	$0	$0	$0	0.0
Exterior 2 ground	1	LED Lamps: (1) 100W Corn Bulb Screw-In Lamp	Timeclock		100	2,184		None	No	1	LED Lamps: (1) 100W Corn Bulb Screw-In Lamp	Timeclock	100	2,184	0.0	0	0	$0	$0	$0	0.0
Exterior 2 ground	4	LED Lamps: (1) 10W PAR30 Screw-In Lamp	Timeclock		10	2,184		None	No	4	LED Lamps: (1) 10W PAR30 Screw-In Lamp	Timeclock	10	2,184	0.0	0	0	$0	$0	$0	0.0
Exterior 2 ground	1	Metal Halide: (1) 400W Lamp	Timeclock		458	2,184	1	Fixture Replacement	No	1	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock	120	2,184	0.0	738	0	$96	$560	$100	4.8
Exterior 2 ground	1	Metal Halide: (1) 70W Lamp	Timeclock		95	2,184	1	Fixture Replacement	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	21	2,184	0.0	162	0	$21	$206	$50	7.5
Girls room A	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,520	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,429	0.1	488	0	$62	$380	$65	5.1
Janitorial	1	Compact Fluorescent: (1) 23W Spiral Plug-In Lamp	Wall Switch	S	23	1,135	2	Relamp	No	1	LED Lamps: LED Plug In Lamp	Wall Switch	17	1,135	0.0	7	0	$1	$13	$1	12.0
Kitchen	2	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	1,870	2	Relamp	No	2	LED Lamps: A19 Lamps	Wall Switch	9	1,870	0.1	210	0	$27	$34	$2	1.2
Kitchen	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,870	2, 3	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,290	0.2	518	0	$66	$489	$95	6.0

	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
Kitchen office	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,870	2	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,870	0.0	115	0	$15	$73	$20	3.6
Library	3	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	2,090	2, 3	Relamp	Yes	3	LED Lamps: A19 Lamps	Occupancy Sensor	9	1,442	0.1	371	0	$47	$322	$38	6.0
Library	1	LED - Fixtures: Ambient - 4' - Direct Fixture	Wall Switch	S	40	2,090		None	No	1	LED - Fixtures: Ambient - 4' - Direct Fixture	Wall Switch	40	2,090	0.0	0	0	$0	$0	$0	0.0
Mechanical boiler room	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,520	2	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.1	767	0	$98	$219	$60	1.6
Multipurpose	20	Compact Fluorescent: (2) 42W G25 Screw-In Lamps	Wall Switch	S	84	3,520	2, 3	Relamp	Yes	20	LED Lamps: G25 Lamps	Occupancy Sensor	59	2,429	0.6	3,352	-1	$428	$1,125	$100	2.4
Multipurpose 1	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Nurse room	1	Incandescent: (2) 60W A19 Screw-In Lamps	Wall Switch	S	120	1,870	2	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	18	1,870	0.1	210	0	$27	$34	$2	1.2
Nurse room	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,870	2, 3	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,290	0.1	304	0	$39	$262	$60	5.2
Office - Counselor	1	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	1,980	2	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	9	1,980	0.0	111	0	$14	$17	$1	1.1
Office - Counselor	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,980	2, 3	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,366	0.1	322	0	$41	$262	$60	4.9
Office - Enclosed	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,980	2, 3	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,366	0.1	322	0	$41	$262	$60	4.9
Office - Enclosed copy room	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,980	2	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,980	0.0	122	0	$16	$73	$20	3.4
Office - Enclosed Principal	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,980	2, 3	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,366	0.1	322	0	$41	$262	$60	4.9
Office - Enclosed speech room	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,980	2	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,980	0.0	122	0	$16	$73	$20	3.4
Office - Main office	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Office - Main office	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,200	2, 3	Relamp	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,518	0.3	895	0	$114	$635	$135	4.4
Pump	2	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	1,100	2, 3	Relamp	Yes	2	LED Lamps: A19 Lamps	Occupancy Sensor	9	759	0.1	130	0	$17	$150	$22	7.7
Restroom - Unisex 103	1	Compact Fluorescent: (2) 26W G25 Screw-In Lamps	Wall Switch	S	52	3,520	2	Relamp	No	1	LED Lamps: G25 Lamps	Wall Switch	37	3,520	0.0	58	0	$7	$50	$4	6.3
Restroom - Unisex 104	1	Compact Fluorescent: (2) 26W G25 Screw-In Lamps	Wall Switch	S	52	3,520	2	Relamp	No	1	LED Lamps: G25 Lamps	Wall Switch	37	3,520	0.0	58	0	$7	$50	$4	6.3
Restroom - Unisex adult 1	1	Compact Fluorescent: (2) 23W Spiral Plug-In Lamps	Wall Switch	S	46	3,520	2	Relamp	No	1	LED Lamps: LED Plug In Lamp	Wall Switch	33	3,520	0.0	50	0	$6	$25	$2	3.6
Restroom - Unisex adult 2	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	3,520		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	3,520	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex kitchen	1	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	3,520	2	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	9	3,520	0.0	197	0	$25	$17	$1	0.6
Restroom - Unisex library	1	Compact Fluorescent: (2) 13W G25 Screw-In Lamps	Wall Switch	S	26	3,520	2	Relamp	No	1	LED Lamps: G25 Lamps	Wall Switch	19	3,520	0.0	27	0	$3	$50	$4	13.4
Storage kitchen	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	880	2	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	880	0.0	54	0	$7	$73	$20	7.7
Storage maintenance	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	600	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	600	0.0	22	0	$3	$37	$10	9.5

	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
Storage maintenance	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	600	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	414	0.1	52	0	$7	$261	$20	36.5
Storage store room	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	600	2, 3	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	414	0.6	586	0	$75	$1,146	$240	12.1

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
Boiler Room	Combustion Air	2	Combustion Air Fan	0.5	70.0%	No			W	1,980		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Multipurpose Room 1	Multipurpose Room 1	1	Exhaust Fan	0.8	70.0%	No			W	1,870		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	School Building	3	Exhaust Fan	0.3	65.0%	No			W	1,870		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	School Building	4	Exhaust Fan	0.5	70.0%	No			W	1,870		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Heating System	2	Heating Hot Water Pump	5.0	82.0%	No			W	1,373	5	No	89.5%	Yes	2	1.3	5,389	0	$698	$8,394	$3,600	6.9
Boiler Room	Domestic Hot Water	1	DHW Circulation Pump	0.1	65.0%	No			W	8,760		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	HP Water Circulation Pump	1	Water Supply Pump	5.0	89.5%	No			W	1,373		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Sceptic Pump	1	Other	0.3	65.0%	No			W	915		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Above Ceiling	Kindergarten Wing	3	Fan Coil Unit	0.5	70.0%	No			W	1,870		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Copy & Speech Rooms	Copy & Speech Rooms	2	Fan Coil Unit	0.2	65.0%	No			W	1,870		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Main Office	Main Office	1	Fan Coil Unit	0.5	70.0%	No			W	1,870		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Various Spaces	Various Spaces	8	Fan Coil Unit	0.1	65.0%	No			W	1,373		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Classrooms	Classrooms	11	Fan Coil Unit	0.3	65.0%	No			W	1,870		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Classrooms	Classrooms	9	Fan Coil Unit	0.2	65.0%	No			W	1,870		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0

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
Main Office	Main Office	1	Fan Coil	2.00	54.00	12.00	80 AFUE	ICP	NXA624GKA100	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	School Building	1	Split-System	2.00		12.00		Olsen	Not Available	B	6	Yes	1	Split-System	2.00		16.00		0.3	275	0	$36	$5,922	$420	154.5
Roof	Classroom 101	1	Split-System	2.00		10.70		Sanyo	C2432A	B	6	Yes	1	Split-System	2.00		16.00		0.4	409	0	$53	$5,922	$420	104.0
Exterior Ground	Classroom 103	1	Split-System	2.50		10.00		Fujitsu	AOU30C1	B	6	Yes	1	Split-System	2.50		16.00		0.6	619	0	$80	$6,124	$525	69.9
Exterior Ground	Classroom 104	1	Split-System	3.00		10.00		Fujitsu		B	6	Yes	1	Split-System	3.00		16.00		0.7	743	0	$96	$6,286	$630	58.8
Exterior Ground	Classrooms	2	Split-System	2.50		10.00		Fujitsu	AOU30C1	B	6	Yes	2	Split-System	2.50		16.00		1.1	1,238	0	$160	$12,249	$1,050	69.9
Exterior Ground	Library	1	Split-System	2.00		12.00		Daikin	RKN24KEVJUS	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Art Room	1	Split-System	2.00		10.70		Sanyo	C2432A	B	6	Yes	1	Split-System	2.00		16.00		0.4	409	0	$53	$5,922	$420	104.0
Roof	Copy & Speech Rooms	2	Split-System	1.50		9.70		EMI	SCC180	B	6	Yes	2	Split-System	1.50		16.00		0.7	804	0	$104	$11,355	$630	103.1
Nurse Office	Nurse Office	1	Through-The-Wall HP	1.18	13.30	9.30	3 COP	Carrier	52MQBU15301	B	7	Yes	1	Through-The-Wall HP	1.18	13.30	12.00	4 COP	0.2	460	0	$60	$766	$0	12.9
Kitchen	Kitchen	1	Window AC	1.04		10.00		GE		B	6	Yes	1	Window AC	1.04		12.00		0.1	115	0	$15	$718	$0	48.4
Kitchen Storage	Kitchen Storage	1	Window AC	0.52		11.00		Friedrich		W		No							0.0	0	0	$0	$0	$0	0.0
Classrooms	Classrooms	15	Window AC	1.50		10.30				W		No							0.0	0	0	$0	$0	$0	0.0

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	Hydronic Heating System	2	Non-Condensing Hot Water Boiler	1,020	Paterson Kelly	N1500	W		No						0.0	0	0	$0	$0	$0	0.0

DHW Inventory & Recommendations

		Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	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
Boiler Room	Domestic Hot Water System	1	Storage Tank Water Heater (> 50 Gal)	A O Smith	BTH 199 100	W		No						0.0	0	0	$0	$0	$0	0.0

Low-Flow Device Recommendations

	Recommedation Inputs					Energy Impact & Financial Analysis						
Location	ECM #	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Restrooms	8	14	Faucet Aerator (Lavatory)	2.20	0.50	0.0	0	7	$60	$100	$100	0.0
Kitchen	8	3	Faucet Aerator (Kitchen)	2.50	1.50	0.0	0	2	$15	$22	$12	0.6

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
Kitchen	1	Refrigerator Chest	Powers	569	No		No	0.0	0	0	$0	$0	$0	0.0
kitchen Storage	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Turbo Air	M3F47-2	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Traulsen	G20010	No		No	0.0	0	0	$0	$0	$0	0.0

Cooking Equipment Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	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	Gas Convection Oven (Half Size)	Hobart	HGC5	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Insulated Food Holding Cabinet (Full Size)	Vulcan	VP18	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Insulated Food Holding Cabinet (1/2 Size)	Hatco	GRA48	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Gas Combination Oven/Steam Cooker (<15 Pans)	Vulcan		Yes		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)	Hobart	AM14	Electric	N/A	No		No	0.0	0	0	$0	$0	$0	0.0

Plug Load Inventory

	Existing Conditions					
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?	Manufacturer	Model
School Building	3	Coffee Machine	800	No		
School Building	7	Desktop Computer	270	No		
School Building	25	Laptop Computer	75	No		
School Building	4	Microwave	1,000	No		
School Building	1	Paper Shredder	400	No		
School Building	5	Printer (Medium/Small)	120	No		
School Building	3	Printer/Copier (Large)	600	No		
School Building	18	Projector	224	No		
School Building	4	Refrigerator (Mini)	126	No		
School Building	2	Refrigerator (Residential)	226	No		
School Building	2	Television	200	No		
School Building	6	Fan (Large)	200	No		
School Building	3	Other Plug Load	250	No		
Kitchen	1	Electric Booster Pump	12,000	No		

APPENDIX B: ENERGY STAR® STATEMENT OF ENERGY PERFORMANCE

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

LEARN MORE AT energystar.gov

ENERGY STAR® Statement of Energy Performance

75

ENERGY STAR® Score[1]

West Amwell School - Main Building

Primary Property Type: K-12 School
Gross Floor Area (ft²): 25,782
Built: 1963

For Year Ending: January 31, 2020
Date Generated: June 15, 2021

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
West Amwell School - Main Building 1417 Route 179 Lambertville, New Jersey 08530	South Hunterdon Regional School District 301 Mt. Airy Harbourton Road Lambertville, NJ 08530 609-397-9311	Andrew Harris 301 Mt. Airy Harbourton Road Lambertville, NJ 08530 609-397-9311 x4 andrew.harris@shrsd.org

Property ID: 14826881

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
65.5 kBtu/ft²

Source EUI
102.2 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	1,196,516 (71%)
Electric - Grid (kBtu)	492,028 (29%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	87.2
National Median Source EUI (kBtu/ft²)	136.1
% Diff from National Median Source EUI	-25%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	111

Signature & Stamp of Verifying Professional

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

LP Signature: _____ Date: _____

Licensed Professional

___ _____
.
(___)___-_____
_____

Professional Engineer or Registered Architect Stamp (if applicable)

APPENDIX C: GLOSSARY

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

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

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