Local Government Energy Audit Report

Lake Hiawatha School

February 18, 2022

Prepared for:

Parsippany-Troy Hills Board of Education
1 Lincoln Avenue
Lake Hiawatha, NJ 07034

Prepared by:

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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.

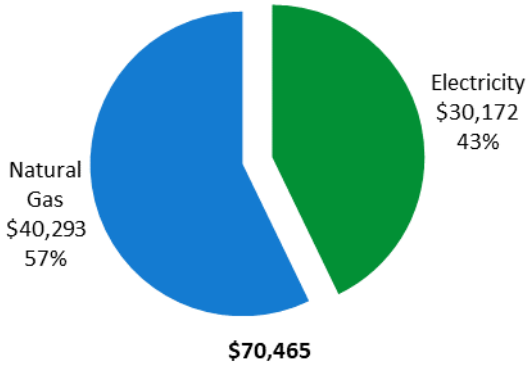
These "next generation" energy efficiency programs feature new ways of managing and delivering programs historically administered by New Jersey's Clean Energy Program™ (NJCEP). All of the investor-owned gas and electric utility companies will now also offer complementary energy efficiency programs and 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 Lake Hiawatha School. This report provides you with information about your facility's energy use, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help make changes in your facility. TRC conducted this study as part of a comprehensive effort to assist New Jersey school districts and local governments in controlling their energy costs and to help protect our environment by reducing statewide energy consumption.

BUILDING PERFORMANCE REPORT

Annual Utilities	Costs: $70,465 Electricity: 240,432 kWh Natural Gas: 38,390 Therms	
ENERGY STAR® Benchmarking Score	38 *(1-100 scale)*	This building performs at or below the national average. This report contains suggestions about how to improve building performance and reduce energy costs.

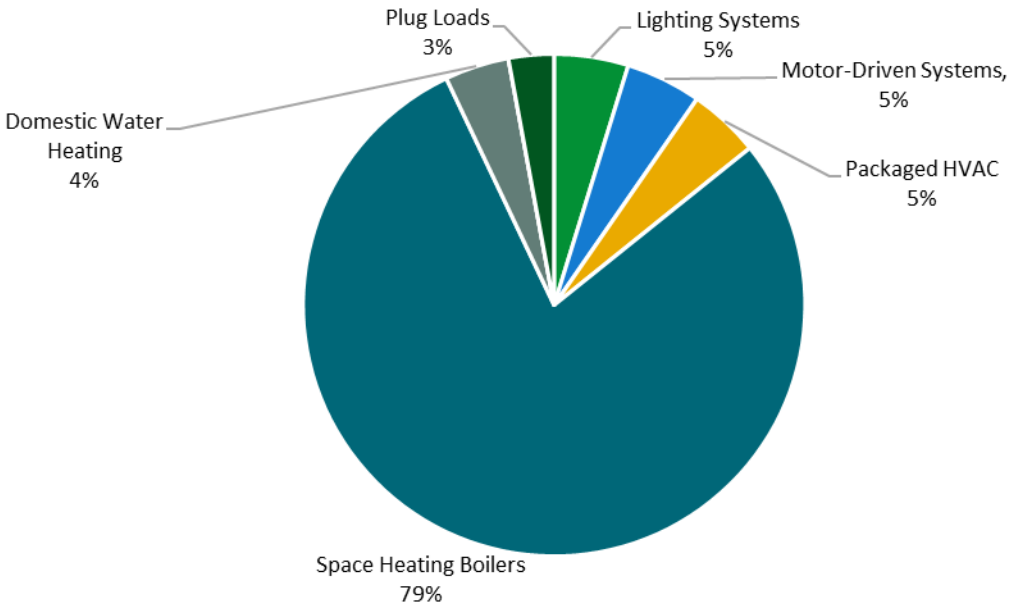


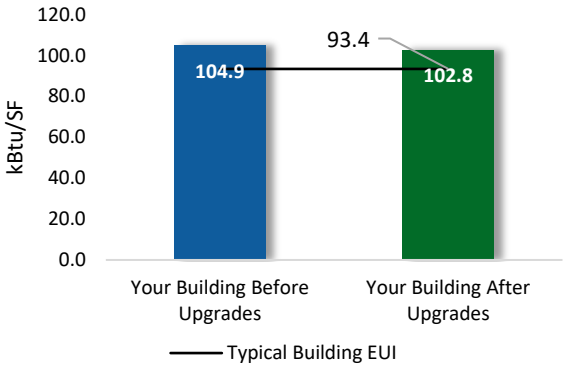
Figure 1 - Energy Use by System

POTENTIAL IMPROVEMENTS

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

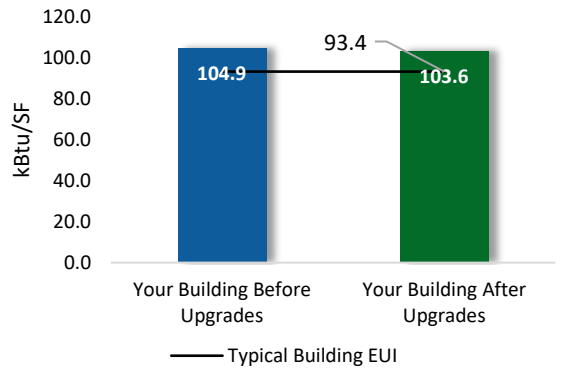
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$43,205
Potential Rebates & Incentives[1]	$8,077
Annual Cost Savings	$3,573
Annual Energy Savings	Electricity: 28,793 kWh Natural Gas: -38 Therms
Greenhouse Gas Emission Savings	14 Tons
Simple Payback	9.8 Years
Site Energy Savings (all utilities)	2%



Scenario 2: Cost Effective Package[2]

Installation Cost	$22,452
Potential Rebates & Incentives	$6,877
Annual Cost Savings	$2,261
Annual Energy Savings	Electricity: 18,341 kWh Natural Gas: -38 Therms
Greenhouse Gas Emission Savings	9 Tons
Simple Payback	6.9 Years
Site Energy Savings (all utilities)	1%



On-site Generation Potential

Photovoltaic	High
Combined Heat and Power	None

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

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**529**	**0.1**	**0**	**$65**	**$107**	**$12**	**$95**	**1.5**	**519**
ECM 1	Retrofit Fixtures with LED Lamps	Yes	529	0.1	0	$65	$107	$12	$95	1.5	519
Lighting Control Measures			**17,813**	**4.8**	**-4**	**$2,196**	**$22,345**	**$6,865**	**$15,480**	**7.0**	**17,501**
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	14,368	3.9	-3	$1,772	$17,170	$2,325	$14,845	8.4	14,117
ECM 3	Install High/Low Lighting Controls	Yes	3,445	0.9	-1	$425	$5,175	$4,540	$635	1.5	3,385
Variable Frequency Drive (VFD) Measures			**6,087**	**0.7**	**0**	**$764**	**$13,562**	**$600**	**$12,962**	**17.0**	**6,129**
ECM 4	Install VFDs on Heating Water Pumps	No	6,087	0.7	0	$764	$13,562	$600	$12,962	17.0	6,129
Unitary HVAC Measures			**4,366**	**1.3**	**0**	**$548**	**$7,191**	**$600**	**$6,591**	**12.0**	**4,396**
ECM 5	Install High Efficiency Heat Pumps	No	4,366	1.3	0	$548	$7,191	$600	$6,591	12.0	4,396
TOTALS (COST EFFECTIVE MEASURES)			**18,341**	**5.0**	**-4**	**$2,261**	**$22,452**	**$6,877**	**$15,575**	**6.9**	**18,020**
TOTALS (ALL MEASURES)			**28,793**	**7.0**	**-4**	**$3,573**	**$43,205**	**$8,077**	**$35,128**	**9.8**	**28,546**

* - 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.

Successor Solar Incentive Program (SuSI)

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

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 Lake Hiawatha School. This report provides information on how your facility uses energy, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help you implement the ECMs.

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

2.1 Site Overview

On July 13, 2021, TRC performed an energy audit at Lake Hiawatha School located in Lake Hiawatha, New Jersey. TRC met with Brian Dohm to review operations and help focus our investigation on specific energy-using systems.

The Lake Hiawatha School is a one-story, 44,424 square foot building built in 1938. Spaces include classrooms, gymnasium, auditorium, offices, cafeteria, corridors, offices, senior, kitchen, and mechanical space.

The entity was enrolled in a Pay for Performance program in 2018. The school has made several upgrades including a conversion to LED lighting.

2.2 Building Occupancy

The facility is occupied from September through June. Typical weekday occupancy is 81 staff and 425 students.

Building Name	Weekday/Weekend	Operating Schedule
Lake Hiawatha School	Weekday	9:00 AM - 5:00 PM
	Weekend	No Operation

Figure 3 - Building Occupancy Schedule

2.3 Building Envelope

Building walls are concrete block with a brick facade. The roof has both flat and inclined portions. The flat portions have a gravel layering in some areas and rubber layering in others. The inclined roof has asphalt shingles on them. The roof is in good condition.

The windows are double glazed with aluminum frames. The windows appear to be in good condition. The operable window weather seals are also in good condition. Exterior doors are made of aluminum and are in good condition with undamaged door seals.

Exterior Facade

Windows – Double Pane

Windows – Double Pane

Roof – Gravel Layer

Roof – Rubber Layer

Roof – Inclined Asphalt Shingles

2.4 Lighting Systems

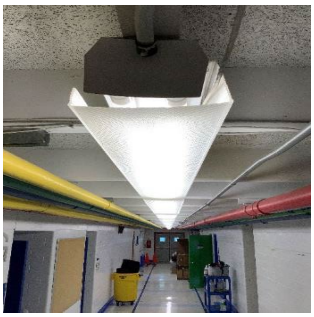
The primary interior lighting system uses 14.5-Watt linear "T8 equivalent" LED lamps. Fixture types include 2-lamp or 4-lamp, 2-foot or 4-foot-long troffers, surface mounted fixtures and pendant fixtures. Additionally, there are several 10-Watt LED screw-based lamps and incandescent lamps that provide additional lighting for some classrooms, offices, janitorial closets, and restrooms.

The multipurpose room has a mixture of 4-foot, 6-lamp linear LED tube fixtures and 10-Watt LED screw-in lamps. All exit signs are 2-Watt LED units.

Interior fixtures are controlled using wall switches. Most fixtures are new and in good condition. Interior light levels were generally sufficient.

Exterior lighting is provided by LED flood fixtures, LED wall pack fixtures, and a few screw based LED lamps.

LED Troffers



Surface Mount Fixtures

LED Flood Fixture

LED Flood Fixture

Exterior LED Lamp Fixtures

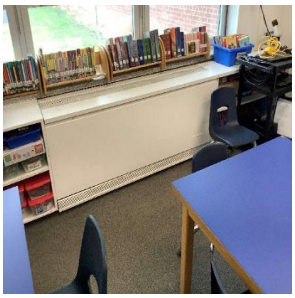
Exterior LED – Wall Pack

2.5 Air Handling Systems

Unit Ventilators

There are 41 unit ventilators that provide heating and ventilation for most of the facility, including classrooms, corridors, office, and library. They are equipped with supply fan motors, pneumatically controlled outside air dampers, and hot water valves. The systems appear to be in fair operating condition.

Unit Ventilators



Unit Ventilators

Unitary Electric HVAC Equipment

The building has several 1 ton to 2-ton window AC units serving the classrooms and a 3-ton York split AC unit with electric resistance heating which serves Room 22. Site personnel reported that this electric heater is extensively used. The York unit has a supply fan with a 0.5 hp, constant speed motor.

Temperature controls for the window AC are at the units while the split AC unit is controlled by a room thermostat. The units have an average EER of 11.2. All units are within their useful life and in good condition.

Window AC Unit

Split AC Unit

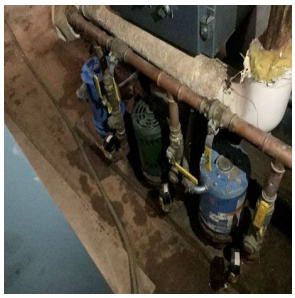
2.6 Heating Steam Systems

The facility has two forced draft HB Smith steam boilers, each with an output capacity of 3040 MBh. The burners are fully modulating with a nominal efficiency of 83%. The boilers are configured in a lead-lag control scheme. Both boilers are required under high load conditions. The boilers were installed in 2016, are in good condition, and are well maintained with a service contract in place. Steam boilers are equipped with boiler feed water pumps, combustion air fans, and fractional horsepower condensate return pumps.

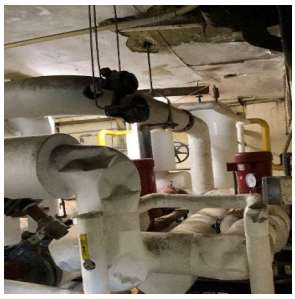
Steam from the boilers is converted to hot water using a heat exchanger and distributed to the unit ventilators. Hot water is circulated to the unit ventilators using four, 1.5 hp heating hot water pumps equipped with constant speed pumps. The hydronic distribution system is a two-pipe heating-only system. The temperatures are controlled by a BMS system along with zonal thermostats.

Steam Boiler

Air Compressor



Boiler Feed Water Pump



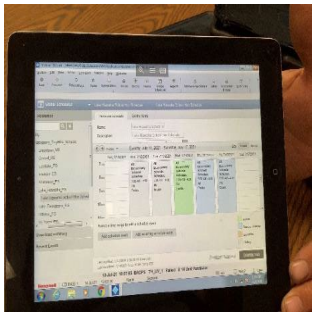
Heating Hot Water Pump

Pipe Insulation

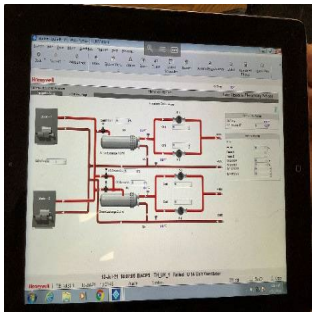
Thermostat

2.7 Building Energy Management Systems (EMS)

A district-wide Honeywell EMS controls the boilers. The EMS provides equipment scheduling control and monitors and controls space temperatures, supply air temperatures, and heating water loop temperatures.



BMS - Scheduling



BMS – Boiler Setup

2.8 Domestic Hot Water

Hot water is produced by using a storage tank water heater with an input capacity of 120 MBh and a tank capacity of 60 gallons. Hot water is distributed to the restrooms using a fractional hp circulation pump. The unit was installed in 2014 and is in good condition.

DHW

DHW Circulation Pump

2.9 Plug Load & Vending Machines

The location is doing a great job managing their electrical plug loads. This report makes additional suggestions for ECMs in this area as well as Energy Efficient Best Practices.

There are 79 computer workstations throughout the facility and on an average, one Chromebook computer per student. Plug loads include general café and office equipment. There are classroom typical loads such as smart boards, projectors, and fans.

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

Residential-style Refrigerator

Copier

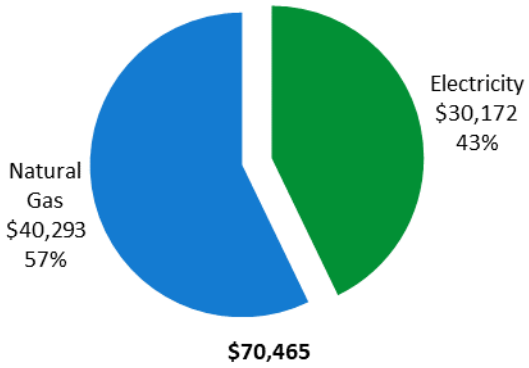
2.10 Water-Using Systems

Faucet flow rates of the restrooms are at 1.5 gallons per minute (gpm) and the kitchen is 0.5 gpm. Toilets are rated at 1.0 gallons per flush (gpf) and urinals are rated at 0.5 gpf.

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	240,432 kWh	$30,172
Natural Gas	38,390 Therms	$40,293
Total		**$70,465**



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.

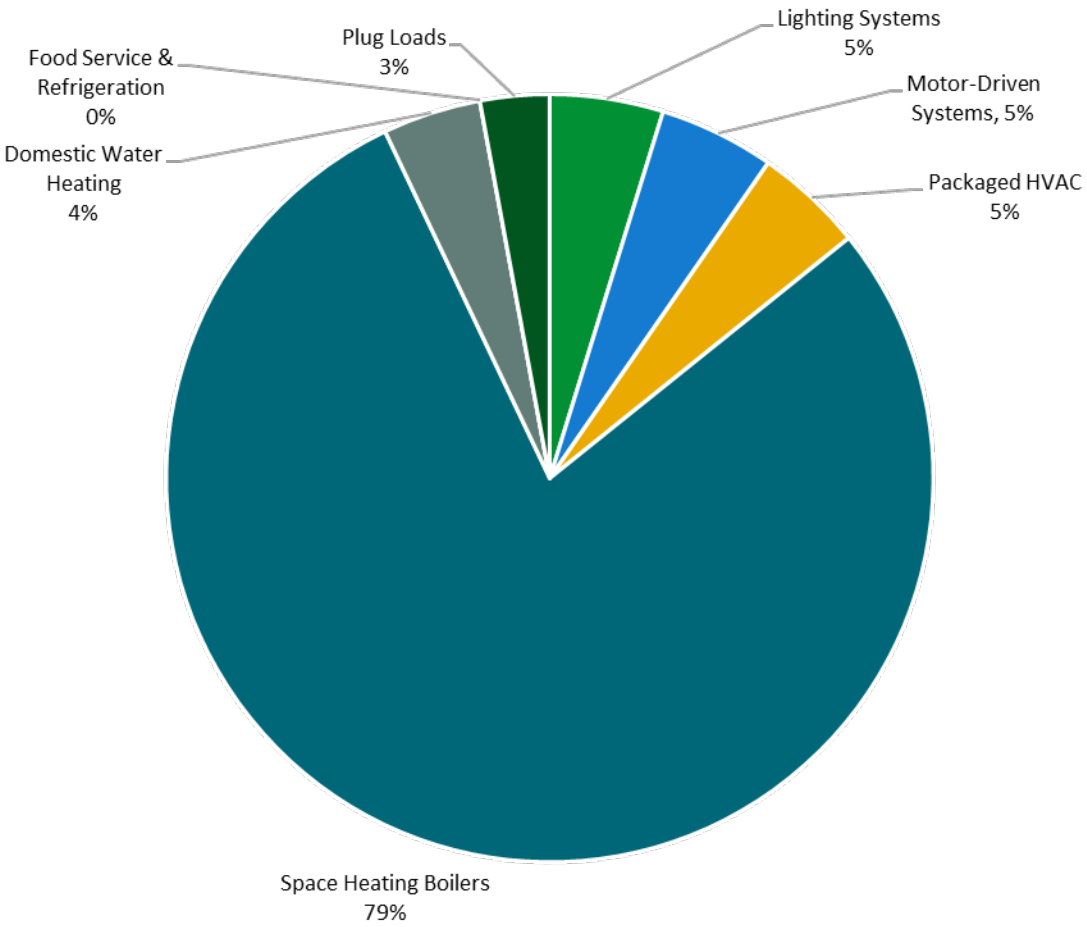
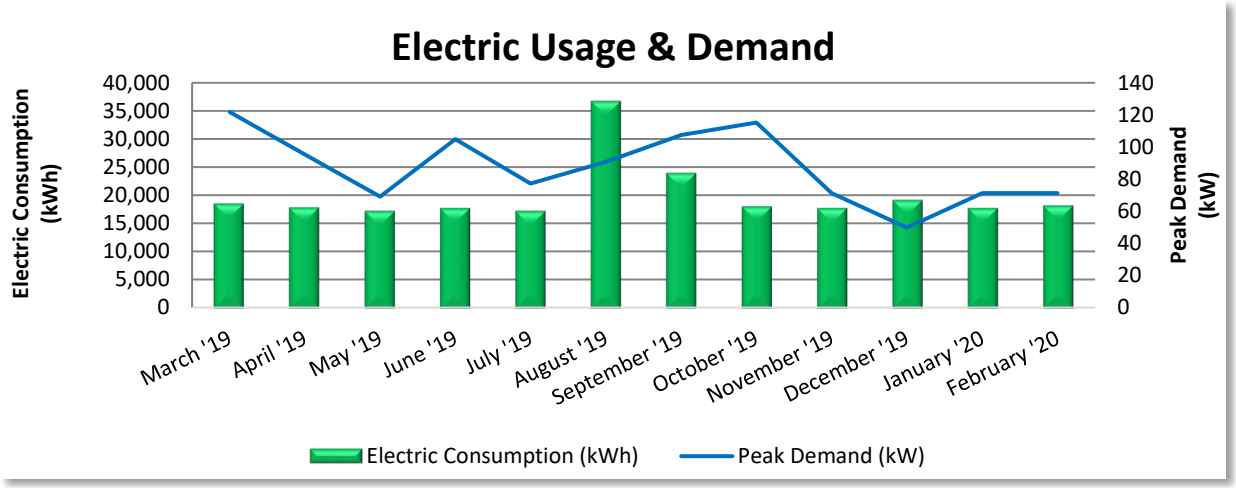


Figure 4 - Energy Balance

3.1 Electricity

JCP&L delivers electricity under rate class GSS 3-Phase, with electric production provided by Constellation, a third-party supplier.



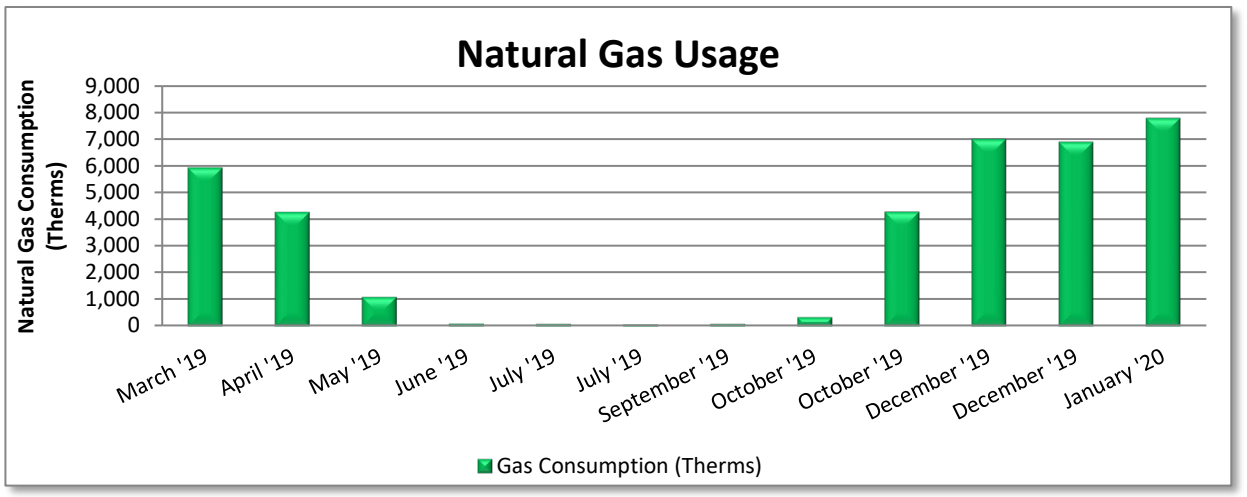
Electric Billing Data					
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**
3/20/19	30	18,556	122	$371	$2,392
4/17/19	28	17,916	95	$291	$2,339
5/17/19	30	17,276	69	$211	$2,225
6/19/19	33	17,756	105	$629	$2,511
7/19/19	30	17,276	77	$446	$2,371
8/19/19	31	36,636	91	$535	$3,783
9/18/19	30	23,996	108	$646	$2,902
10/18/19	30	18,076	115	$649	$2,481
11/18/19	31	17,756	71	$378	$2,319
12/19/19	31	19,196	50	$265	$2,310
1/20/20	32	17,756	71	$378	$2,272
2/18/20	29	18,236	71	$378	$2,265
Totals	**365**	**240,432**	**122**	**$5,176**	**$30,172**
Annual	**365**	**240,432**	**122**	**$5,176**	**$30,172**

Notes:

- Peak demand of 122 kW occurred in March 2019.
- Average demand over the past 12 months was 87 kW.
- The average electric cost over the past 12 months was $0.125/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.
- The high usage during the July-August period is likely reflective of cooling during summer peak. Consider adjusting summer thermostat settings during non-occupied periods to avoid overcooling.

3.2 Natural Gas

NJ Natural Gas delivers natural gas under rate class Monthly 057M.



Gas Billing Data			
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**
3/19/19	30	5,928	$5,793
4/17/19	29	4,274	$4,288
5/17/19	30	1,107	$1,522
6/19/19	33	108	$684
7/22/19	33	99	$675
8/15/19	24	69	$531
9/16/19	32	97	$670
10/16/19	30	352	$868
11/14/19	29	4,280	$4,089
12/17/19	33	6,990	$6,837
1/15/20	29	6,891	$6,687
2/13/20	29	7,772	$7,207
Totals	**361**	**37,969**	**$39,852**
Annual	**365**	**38,390**	**$40,293**

Notes:

- The average gas cost for the past 12 months is $1.050/therm, which is the blended rate used throughout the analysis.
- The facility follows a heating profile with year-round production of domestic hot water using gas fired equipment.

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	38

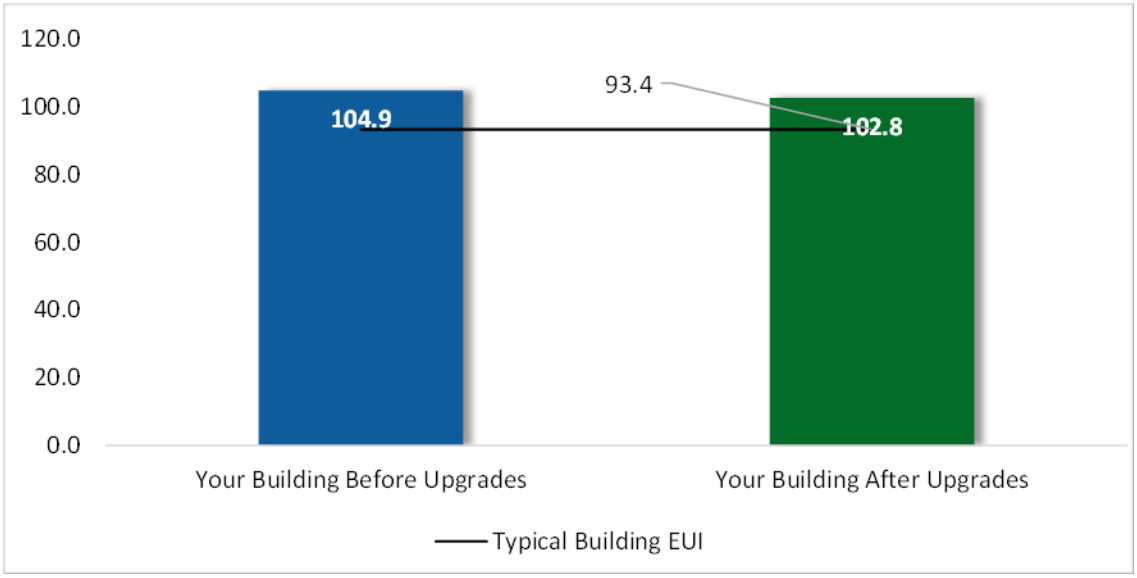


Figure 5 - Energy Use Intensity Comparison[3]

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

Energy use intensity (EUI) measures energy consumption per square foot and is the standard metric for comparing buildings' energy performance. A lower EUI means better performance and less energy consumed. 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			**529**	**0.1**	**0**	**$65**	**$107**	**$12**	**$95**	**1.5**	**519**
ECM 1	Retrofit Fixtures with LED Lamps	Yes	529	0.1	0	$65	$107	$12	$95	1.5	519
Lighting Control Measures			**17,813**	**4.8**	**-4**	**$2,196**	**$22,345**	**$6,865**	**$15,480**	**7.0**	**17,501**
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	14,368	3.9	-3	$1,772	$17,170	$2,325	$14,845	8.4	14,117
ECM 3	Install High/Low Lighting Controls	Yes	3,445	0.9	-1	$425	$5,175	$4,540	$635	1.5	3,385
Variable Frequency Drive (VFD) Measures			**6,087**	**0.7**	**0**	**$764**	**$13,562**	**$600**	**$12,962**	**17.0**	**6,129**
ECM 4	Install VFDs on Heating Water Pumps	No	6,087	0.7	0	$764	$13,562	$600	$12,962	17.0	6,129
Unitary HVAC Measures			**4,366**	**1.3**	**0**	**$548**	**$7,191**	**$600**	**$6,591**	**12.0**	**4,396**
ECM 5	Install High Efficiency Heat Pumps	No	4,366	1.3	0	$548	$7,191	$600	$6,591	12.0	4,396
TOTALS			**28,793**	**7.0**	**-4**	**$3,573**	**$43,205**	**$8,077**	**$35,128**	**9.8**	**28,546**

* - 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		**529**	**0.1**	**0**	**$65**	**$107**	**$12**	**$95**	**1.5**	**519**
ECM 1	Retrofit Fixtures with LED Lamps	529	0.1	0	$65	$107	$12	$95	1.5	519
Lighting Control Measures		**17,813**	**4.8**	**-4**	**$2,196**	**$22,345**	**$6,865**	**$15,480**	**7.0**	**17,501**
ECM 2	Install Occupancy Sensor Lighting Controls	14,368	3.9	-3	$1,772	$17,170	$2,325	$14,845	8.4	14,117
ECM 3	Install High/Low Lighting Controls	3,445	0.9	-1	$425	$5,175	$4,540	$635	1.5	3,385
TOTALS		**18,341**	**5.0**	**-4**	**$2,261**	**$22,452**	**$6,877**	**$15,575**	**6.9**	**18,020**

* - 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		**529**	**0.1**	**0**	**$65**	**$107**	**$12**	**$95**	**1.5**	**519**
ECM 1	Retrofit Fixtures with LED Lamps	529	0.1	0	$65	$107	$12	$95	1.5	519

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

ECM 1: Retrofit Fixtures with LED Lamps

Replace 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 incandescent & U-bend fluorescent T8 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		**17,813**	**4.8**	**-4**	**$2,196**	**$22,345**	**$6,865**	**$15,480**	**7.0**	**17,501**
ECM 2	Install Occupancy Sensor Lighting Controls	14,368	3.9	-3	$1,772	$17,170	$2,325	$14,845	8.4	14,117
ECM 3	Install High/Low Lighting Controls	3,445	0.9	-1	$425	$5,175	$4,540	$635	1.5	3,385

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

ECM 2: Install Occupancy Sensor Lighting Controls

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

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

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

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

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

ECM 3: Install High/Low Lighting Controls

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

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

The controller lowers the light level by dimming the fixture output. Therefore, the controlled fixtures need to have a dimmable ballast or driver. This will need to be 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: hallways.

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		**6,087**	**0.7**	**0**	**$764**	**$13,562**	**$600**	**$12,962**	**17.0**	**6,129**
ECM 4	Install VFDs on Heating Water Pumps	6,087	0.7	0	$764	$13,562	$600	$12,962	17.0	6,129

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

ECM 4: Install VFDs on Heating Water Pumps

We evaluated installing 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: four 1.5 hp heating 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		**4,366**	**1.3**	**0**	**$548**	**$7,191**	**$600**	**$6,591**	**12.0**	**4,396**
ECM 5	Install High Efficiency Heat Pumps	4,366	1.3	0	$548	$7,191	$600	$6,591	12.0	4,396

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

ECM 5: Install High Efficiency Heat Pumps

We evaluated replacing the split system air conditioner with a high efficiency heat pump. This measure would eliminate a piece of equipment that uses an inefficient resistance heating element, replacing it with equipment that includes a significantly more efficient heating source. 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: 3-ton split unit.

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

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

Energy Tracking with ENERGY STAR® Portfolio Manager®

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

Lighting Maintenance

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

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

Lighting Controls

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

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

Motor Maintenance

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

Thermostat Schedules and Temperature Resets

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

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.

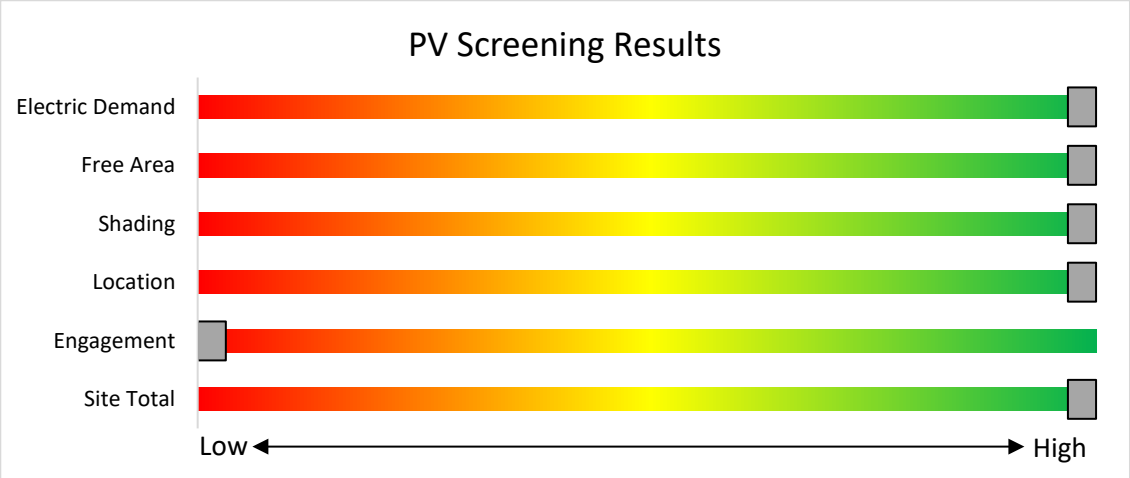
6.1 Solar Photovoltaic

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 high potential for installing a PV array.

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

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



Potential	High	
System Potential	87	kW DC STC
Electric Generation	103,649	kWh/yr
Displaced Cost	$13,010	/yr
Installed Cost	$226,200	

Figure 8 - Photovoltaic Screening

Successor Solar Incentive Program (SuSI)

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

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

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

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

6.2 Combined Heat and Power

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

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

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

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

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

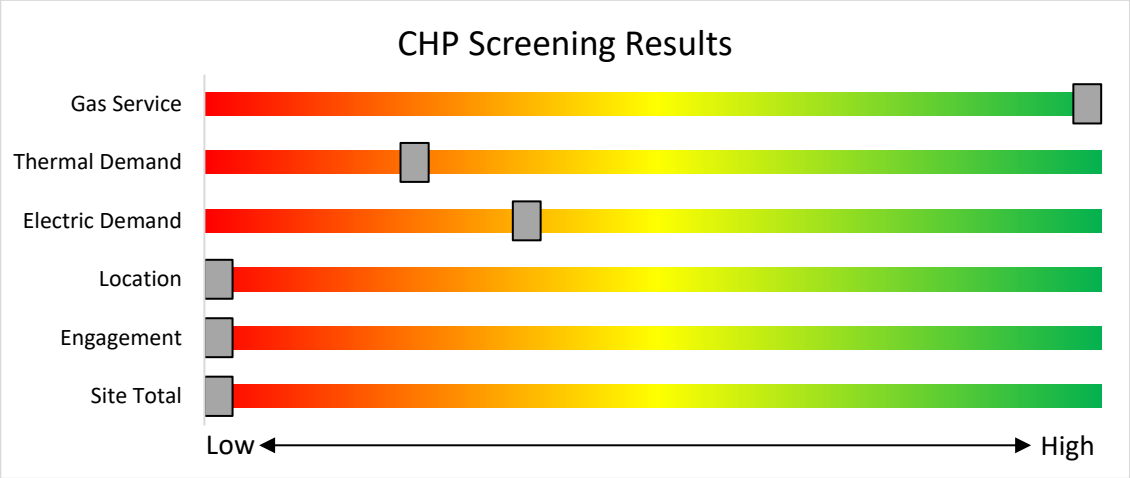


Figure 9 - Combined Heat and Power Screening

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 description and application can be found at www.njcleanenergy.com/ESIP.

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

8.3 Successor Solar Incentive Program (SuSI)

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

Administratively Determined Incentive (ADI) Program

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

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

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

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

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

The ADI Program online portal is now open to new registrations effective August 28, 2021.

Competitive Solar Incentive Program

The Competitive Solar Incentive (CSI) Program will provide competitively set incentives for grid supply projects and net metered non-residential projects greater than 5MW. The program is currently under development with the goal of holding the first solicitation by early-to-mid 2022. For updates, please continue to check the Solar Proceedings page on the New Jersey's Clean Energy Program website.

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

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

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.

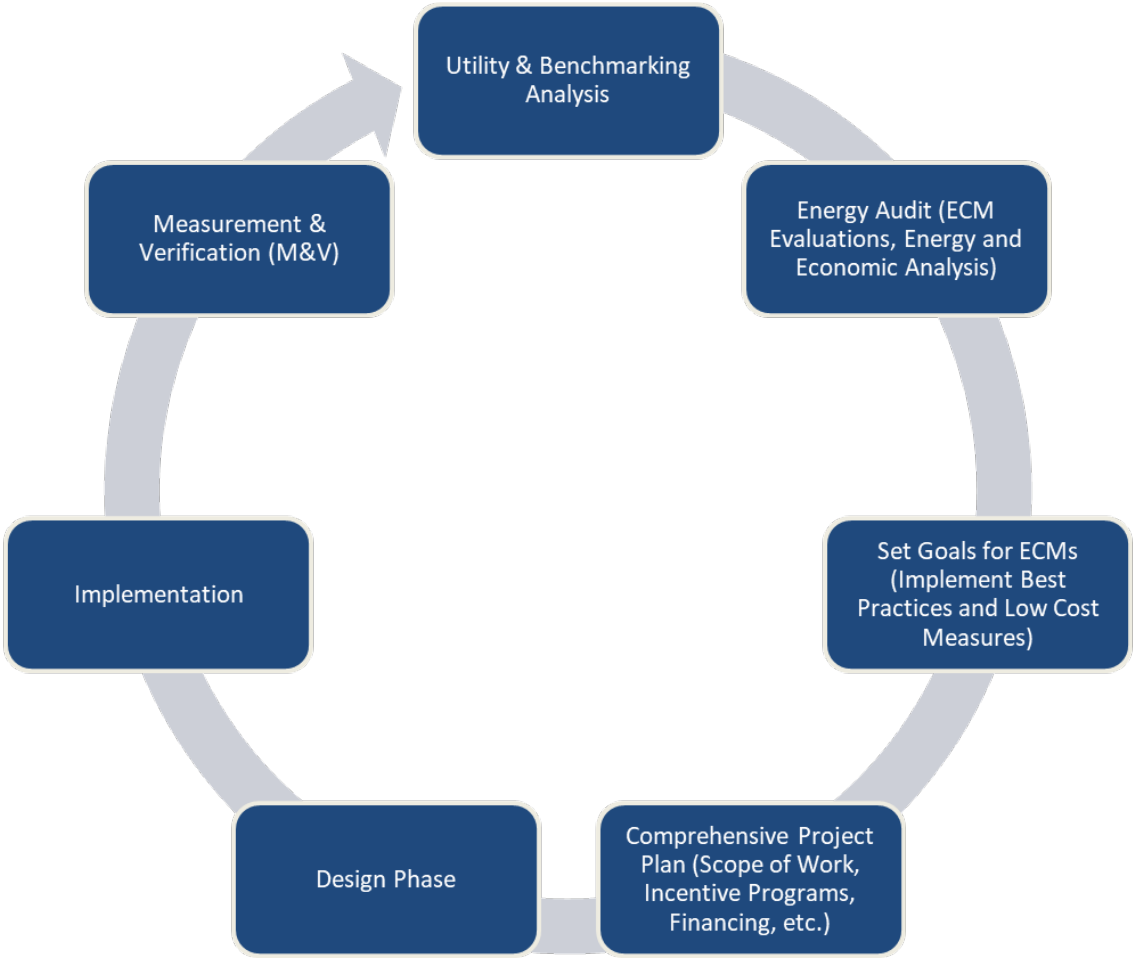


Figure 3 – Project Development Cycle

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
Classroom 1	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Classroom 1	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	2,415		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	2,415	0.0	0	0	$0	$0	$0	0.0
Classroom 1	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	287	0	$35	$270	$35	6.7
Classroom 1	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,415		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,415	0.0	0	0	$0	$0	$0	0.0
Classroom 10	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	S	10	1,666		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	1,666	0.0	0	0	$0	$0	$0	0.0
Classroom 10	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,666		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.0	0	0	$0	$0	$0	0.0
Classroom 11	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	S	10	1,666		None	No	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	1,666	0.0	0	0	$0	$0	$0	0.0
Classroom 11	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,666		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.0	0	0	$0	$0	$0	0.0
Classroom 12	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	S	10	1,666		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	1,666	0.0	0	0	$0	$0	$0	0.0
Classroom 12	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,666		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.0	0	0	$0	$0	$0	0.0
Classroom 13	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	S	10	1,666		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	1,666	0.0	0	0	$0	$0	$0	0.0
Classroom 13	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,666		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.0	0	0	$0	$0	$0	0.0
Classroom 14	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	S	10	1,666		None	No	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	1,666	0.0	0	0	$0	$0	$0	0.0
Classroom 14	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,666		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.0	0	0	$0	$0	$0	0.0
Classroom 15	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	S	10	1,666		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	1,666	0.0	0	0	$0	$0	$0	0.0
Classroom 15	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,666		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.0	0	0	$0	$0	$0	0.0
Classroom 16	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Classroom 16	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	430	0	$53	$540	$70	8.9
Classroom 17	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	430	0	$53	$540	$70	8.9
Classroom 18	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	430	0	$53	$540	$70	8.9
Classroom 19	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	2,415	2	None	Yes	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	1,666	0.0	16	0	$2	$116	$20	47.3
Classroom 19	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	430	0	$53	$540	$70	8.9
Classroom 1A	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 1A	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	2,415	2	None	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,666	0.0	96	0	$12	$116	$20	8.2
Classroom 2	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 2	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	2,415	2	None	Yes	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	1,666	0.0	16	0	$2	$116	$20	47.3
Classroom 2	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	430	0	$53	$540	$70	8.9
Classroom 20	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	2,415	2	None	Yes	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	1,666	0.0	16	0	$2	$116	$20	47.3
Classroom 20	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	430	0	$53	$540	$70	8.9
Classroom 21	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	2,415	2	None	Yes	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	1,666	0.0	16	0	$2	$116	$20	47.3
Classroom 21	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	430	0	$53	$540	$70	8.9
Classroom 22	11	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	263	0	$32	$270	$35	7.3
Classroom 23	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 23	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	2,415		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	2,415	0.0	0	0	$0	$0	$0	0.0
Classroom 23	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	430	0	$53	$540	$70	8.9
Classroom 23	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,415		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,415	0.0	0	0	$0	$0	$0	0.0
Classroom 23	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,415	1	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,415	0.0	77	0	$9	$72	$10	6.6
Classroom 24	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	287	0	$35	$270	$35	6.7
Classroom 25	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	287	0	$35	$270	$35	6.7
Classroom 26	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	430	0	$53	$540	$70	8.9
Classroom 27	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	430	0	$53	$540	$70	8.9
Classroom 28	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	430	0	$53	$540	$70	8.9
Classroom 29	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	430	0	$53	$540	$70	8.9
Classroom 3	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	2,415	2	None	Yes	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	1,666	0.0	16	0	$2	$116	$20	47.3
Classroom 3	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	430	0	$53	$540	$70	8.9
Classroom 30	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	430	0	$53	$540	$70	8.9
Classroom 31	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	430	0	$53	$540	$70	8.9
Classroom 4	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	2,415	2	None	Yes	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	1,666	0.0	16	0	$2	$116	$20	47.3
Classroom 4	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	430	0	$53	$540	$70	8.9
Classroom 5	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	430	0	$53	$540	$70	8.9

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 6	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	2,415	2	None	Yes	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	1,666	0.0	16	0	$2	$116	$20	47.3
Classroom 6	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	430	0	$53	$540	$70	8.9
Classroom 7	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	2,415	2	None	Yes	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	1,666	0.0	16	0	$2	$116	$20	47.3
Classroom 7	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	430	0	$53	$540	$70	8.9
Classroom 8	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	2,415	2	None	Yes	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	1,666	0.0	16	0	$2	$116	$20	47.3
Classroom 8	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	430	0	$53	$540	$70	8.9
Classroom 9	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.1	430	0	$53	$540	$70	8.9
Corridor 1 addition	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 1 addition	6	LED Lamps: (1) 6W G25 Screw-In Lamp	Wall Switch	S	6	2,415	3	None	Yes	6	LED Lamps: (1) 6W G25 Screw-In Lamp	High/Low Control	6	1,666	0.0	30	0	$4	$225	$210	4.1
Corridor 1 addition	18	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	2,415	3	None	Yes	18	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	1,666	0.1	215	0	$27	$675	$630	1.7
Corridor 1 addition	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	3	None	Yes	9	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,666	0.1	215	0	$27	$450	$315	5.1
Corridor 2 old	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 2 old	75	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	3	None	Yes	75	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,666	0.5	1,791	0	$221	$2,475	$2,475	0.0
Corridor 3	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor 3	16	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	2,415	3	None	Yes	16	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	1,666	0.2	764	0	$94	$675	$560	1.2
Corridor 3	8	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	2,415	3	None	Yes	8	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	1,666	0.1	382	0	$47	$450	$280	3.6
Corridor 3	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	3	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,666	0.0	48	0	$6	$225	$70	26.3
Exterior 2 ground	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Photocell		10	4,380		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Photocell	10	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 2 ground	4	LED - Fixtures: Flood Fixture	Photocell		45	4,380		None	No	4	LED - Fixtures: Flood Fixture	Photocell	45	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 2 ground	2	LED Lamps: (2) 6W G25 Screw-In Lamps	Photocell		6	4,380		None	No	2	LED Lamps: (2) 6W G25 Screw-In Lamps	Photocell	6	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 2 ground	16	LED - Fixtures: Wall Pack	Photocell		45	4,380		None	No	16	LED - Fixtures: Wall Pack	Photocell	45	4,380	0.0	0	0	$0	$0	$0	0.0
Janitorial 1	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,415	0.0	0	0	$0	$0	$0	0.0
Janitorial 2	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	2,415		None	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,415	0.0	0	0	$0	$0	$0	0.0
Janitorial 3	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	2,415		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	2,415	0.0	0	0	$0	$0	$0	0.0
Kitchen 1	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.0	48	0	$6	$116	$20	16.3

	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
Library 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
Library 1	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	2,415		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	2,415	0.0	0	0	$0	$0	$0	0.0
Library 1	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.0	48	0	$6	$116	$20	16.3
Library 1	25	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	2,415	2	None	Yes	25	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,666	0.3	1,194	0	$147	$540	$70	3.2
Mechanical 1	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	2,415	2	None	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,666	0.0	96	0	$12	$116	$20	8.2
Mechanical 2 exterior access	2	Incandescent: (1) 100W A19 Screw-In Lamp	Wall Switch	S	100	2,415	1, 2	Relamp	Yes	2	LED Lamps: A19 Lamps	Occupancy Sensor	15	1,666	0.1	476	0	$59	$150	$22	2.2
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
Multipurpose 1	16	LED - Linear Tubes: (6) 4' Lamps	Wall Switch	S	87	2,415	2	None	Yes	16	LED - Linear Tubes: (6) 4' Lamps	Occupancy Sensor	87	1,666	0.3	1,146	0	$141	$540	$70	3.3
Office - Enclosed 1 nurse	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	2,415		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	2,415	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 1 nurse	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	2,415	2	None	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,666	0.0	96	0	$12	$116	$20	8.2
Office - Enclosed 1 nurse	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	2,415	2	None	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,666	0.0	96	0	$12	$116	$20	8.2
Office - Enclosed 2 principal	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	2,415		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,415	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 2 principal	6	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	2,415	2	None	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,666	0.1	287	0	$35	$270	$35	6.7
Office - Open Plan 1	6	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	2,415	2	None	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,666	0.1	287	0	$35	$270	$35	6.7
Office - Open Plan 32	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.0	143	0	$18	$270	$35	13.3
Restroom - Female 1	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	2,415	2	None	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,666	0.0	96	0	$12	$116	$20	8.2
Restroom - Female 2	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	2,415		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	2,415	0.0	0	0	$0	$0	$0	0.0
Restroom - Female 3	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	2,415	2	None	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,666	0.0	96	0	$12	$116	$20	8.2
Restroom - Make 1	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	2,415	2	None	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,666	0.0	96	0	$12	$116	$20	8.2
Restroom - Male 2	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	2,415		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	2,415	0.0	0	0	$0	$0	$0	0.0
Restroom - Male 3	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	2,415	2	None	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,666	0.0	96	0	$12	$116	$20	8.2
Restroom - Male 3	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,415		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,415	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex 1	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	2,415		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	2,415	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex 2	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	2,415		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	2,415	0.0	0	0	$0	$0	$0	0.0
Storage 1	4	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	2,415	2	None	Yes	4	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	1,666	0.0	33	0	$4	$270	$35	57.9

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Storage 2	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,415	2	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,666	0.0	96	0	$12	$270	$35	20.0
Exterior 1	5	LED - Fixtures: Flood Fixture	Timeclock		45	4,380		None	No	5	LED - Fixtures: Flood Fixture	Timeclock	45	4,380	0.0	0	0	$0	$0	$0	0.0

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
Attic	Room 22	1	Supply Fan	0.5	70.0%	No	York	F2RP036	W	2,745		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 1	Classroom 1	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 16	Classroom 16	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 17	Classroom 17	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 18	Classroom 18	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 19	Classroom 19	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 2	Classroom 2	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 20	Classroom 20	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 21	Classroom 21	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 23	Classroom 23	1	Fan Coil Unit	0.1	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 24	Classroom 24	1	Fan Coil Unit	0.1	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 25	Classroom 25	1	Fan Coil Unit	0.1	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 26	Classroom 26	1	Fan Coil Unit	0.1	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 27	Classroom 27	1	Fan Coil Unit	0.1	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 28	Classroom 28	1	Fan Coil Unit	0.1	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 29	Classroom 29	1	Fan Coil Unit	0.1	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 3	Classroom 3	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 30	Classroom 30	1	Fan Coil Unit	0.1	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 31	Classroom 31	1	Fan Coil Unit	0.1	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 4	Classroom 4	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 5	Classroom 5	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 6	Classroom 6	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 7	Classroom 7	1	Fan Coil Unit	0.1	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 8	Classroom 8	1	Fan Coil Unit	0.1	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 9	Classroom 9	1	Fan Coil Unit	0.1	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Corridor 1 addition	Corridor 1 addition	2	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Corridor 3	Corridor 3	1	Fan Coil Unit	0.1	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Corridor 3	Corridor 3	3	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Library 1	Library 1	3	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Multipurpose 1	Multipurpose 1	2	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 10	Classroom 10	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 11	Classroom 11	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 12	Classroom 12	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 13	Classroom 13	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 14	Classroom 14	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 15	Classroom 15	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 1	Boiler	1	Air Compressor	2.0	75.5%	No	Marathon	TVL182T	W	1,920		No	75.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 1	Boiler	3	Boiler Feed Water Pump	1.5	86.5%	No	Marathon	5K46KN	W	2,745		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 1	Boiler	2	Combustion Air Fan	1.5	86.5%	No	Power flame Burner	C3-G-25	W	2,745		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 1	Boiler	2	Condensate Pump	0.8	77.0%	No	Emerson	P63FZW-4416	W	2,745		No	77.0%	No		0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 22	Various spaces	1	Exhaust Fan	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 1	Various spaces	2	Exhaust Fan	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Multipurpose 1	Various spaces	1	Exhaust Fan	0.5	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 1	Various spaces	2	Exhaust Fan	0.5	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 1	Various spaces	7	Exhaust Fan	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 1	Various spaces	3	Exhaust Fan	0.2	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 1	Boiler	2	Heating Hot Water Pump	1.5	86.5%	No	Baldor	EJMM3154T		2,745	4	No	86.5%	Yes	2	0.3	2,663	0	$334	$6,781	$300	19.4
Mechanical 1	Boiler	2	Heating Hot Water Pump	1.5	78.5%	No	Baldor	JMM3154T		2,745	4	No	86.5%	Yes	2	0.4	3,423	0	$430	$6,781	$300	15.1
Mechanical 2 exterior access	Boiler	1	Heating Hot Water Pump	0.1	60.0%	No	Bell &Gossett			2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 1	Unknown	2	Other	0.3	60.0%	No				2,745		No	60.0%	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
Classroom 1	Classroom 1	2	Window AC	1.00		12.00		Friedrich	CP12	W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 10	Classroom 10	1	Window AC	2.00		9.80				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 11	Classroom 11	1	Window AC	2.00		11.30				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 12	Classroom 12	1	Window AC	2.00		9.80				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 13	Classroom 13	2	Window AC	1.00		11.30				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 14	Classroom 14	1	Window AC	2.00		9.80				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 15	Classroom 15	1	Window AC	2.00		11.30				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 16	Classroom 16	1	Window AC	2.00		9.50				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 17	Classroom 17	1	Window AC	2.00		12.00				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 18	Classroom 18	1	Window AC	2.00		9.80				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 19	Classroom 19	1	Window AC	2.00		11.30				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 1A	Classroom 1A	1	Window AC	1.00		9.80				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 2	Classroom 2	2	Window AC	1.00		11.30				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 20	Classroom 20	1	Window AC	2.00		11.30				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 21	Classroom 21	1	Window AC	2.00		11.30				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 23	Classroom 23	2	Window AC	1.00		11.30				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 24	Classroom 24	2	Window AC	1.00		11.30				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 25	Classroom 25	1	Window AC	2.00		12.00				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 26	Classroom 26	1	Window AC	2.00		12.00				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 27	Classroom 27	1	Window AC	2.00		11.30				W		No							0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/EER)	Heating Mode Efficiency	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 28	Classroom 28	1	Window AC	2.00		11.30				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 29	Classroom 29	1	Window AC	2.00		12.00				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 3	Classroom 3	2	Window AC	1.00		12.00				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 30	Classroom 30	1	Window AC	2.00		11.30				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 31	Classroom 31	1	Window AC	2.00		11.30				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 4	Classroom 4	1	Window AC	1.00		11.30				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 4	Classroom 4	1	Window AC	2.00		11.30				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 5	Classroom 5	1	Window AC	2.00		11.30				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 6	Classroom 6	2	Window AC	1.00		12.00				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 7	Classroom 7	2	Window AC	1.00		11.30				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 8	Classroom 8	2	Window AC	1.00		11.30				W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 9	Classroom 9	2	Window AC	1.00		12.00				W		No							0.0	0	0	$0	$0	$0	0.0
Library 1	Library 1	3	Window AC	2.00		11.30				W		No							0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 1 nurse	Office - Enclosed 1 nurse	2	Window AC	1.00		11.00				W		No							0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 2 principal	Office - Enclosed 2 principal	1	Window AC	1.00		12.00				W		No							0.0	0	0	$0	$0	$0	0.0
Office - Open Plan 1	Office - Open Plan 1	1	Window AC	2.00		12.00				W		No							0.0	0	0	$0	$0	$0	0.0
Office - Open Plan 32	Office - Open Plan 32	1	Window AC	2.00		12.00				W		No							0.0	0	0	$0	$0	$0	0.0
Attic	Room 22	1	Split-System	3.00	17.06	10.30	1 COP	York	HABA-1036	W	5	Yes	1	Packaged Air-Source HP	3.00	17.06	15.50	8.5 HSPF	1.3	4,366	0	$548	$7,191	$600	12.0

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
Mechanical 1	All School	2	Forced Draft Steam Boiler	3,040	HB Smith	28HE-S/W-12	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
Mechanical 2 exterior access	Classrooms, nurses offices, restrooms	1	Storage Tank Water Heater (> 50 Gal)	AO Smith	BTH 120 200	W		No						0.0	0	0	$0	$0	$0	0.0

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	Kratos	69K-857	Yes		No	0.0	0	0	$0	$0	$0	0.0

Plug Load Inventory

	Existing Conditions					
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?	Manufacturer	Model
Lake Hiawatha School	3	Coffee Machine	400	No		
Lake Hiawatha School	79	Desktop	145	No		
Lake Hiawatha School	1	Fan - Ceiling	60	No		
Lake Hiawatha School	4	Fan - large	100	No		
Lake Hiawatha School	4	Microwave	900	No		
Lake Hiawatha School	4	Printer - Medium	70	No		
Lake Hiawatha School	2	Printer - Copier	200	No		
Lake Hiawatha School	31	Projector	200	No		
Lake Hiawatha School	2	Refrigerator residential	200	No		
Lake Hiawatha School	2	Television	100	No		
Lake Hiawatha School	1	Toaster Oven	1,200	No		
Lake Hiawatha School	1	Water Fountain	65	No		
Lake Hiawatha School	400	Chromebook	30	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.

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

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ENERGY STAR® Score[1]

Lake Hiawatha School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 44,424
Built: 1938

For Year Ending: January 31, 2020
Date Generated: July 28, 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
Lake Hiawatha School 1 Lincoln Avenue Lake Hiawatha, New Jersey 07034	Parsippany - Troy Hills Board of Education 292 Parsippany Road Parsippany, NJ 07054 (973) 263-7200	Dr. Alfred Savio 292 Parsippany Road Parsippany, NJ 07054 (973) 263-7200 x 7212 asavio@pthsd.net

Property ID: 16057045

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
105.3 kBtu/ft²

Source EUI
141.1 kBtu/ft²

Annual Energy by Fuel

Electric - Grid (kBtu)	775,135 (17%)
Natural Gas (kBtu)	3,903,036 (83%)

National Median Comparison

National Median Site EUI (kBtu/ft²)	93.4
National Median Source EUI (kBtu/ft²)	125.2
% Diff from National Median Source EUI	13%

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO2e/year)	282

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.