Local Government Energy Audit Report

Manasquan Elementary School

January 26, 2022

Prepared for:
Manasquan Public School District
168 Broad Street
Manasquan, New Jersey 08736

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.

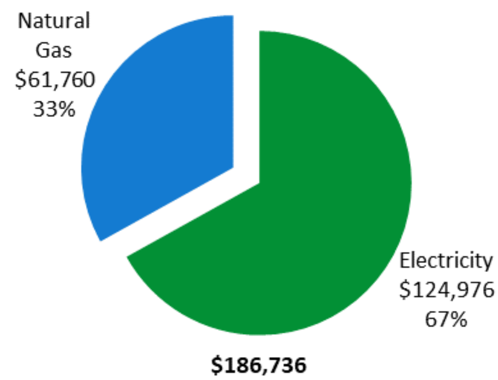
These next generation energy efficiency programs feature new ways of managing and delivering programs historically administered by New Jersey's Clean Energy Program™ (NJCEP). All of the investor-owned gas and electric utility companies will now also offer complementary energy efficiency programs and 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 under development. 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 Manasquan Elementary School. This report provides you with information about your facility's energy use, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help make changes in your facility. TRC 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: $186,736 Electricity: 974,200 kWh Natural Gas: 58,966 Therms	
ENERGY STAR® Benchmarking Score	86 *(1-100 scale)*	Congratulations, your building performs better than the national average. This report has suggestions about how to keep your building running efficiently, further improve performance, and lower your energy bills even more.

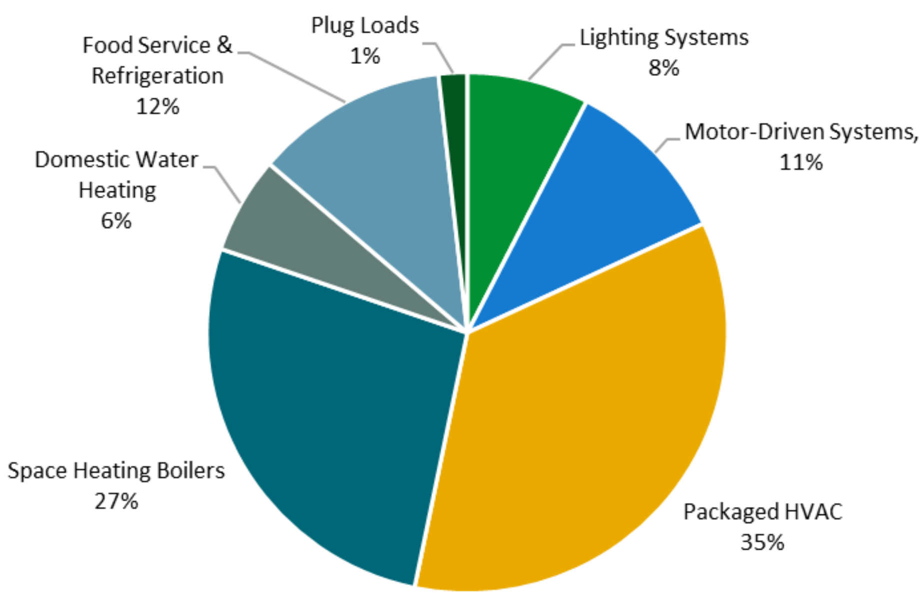


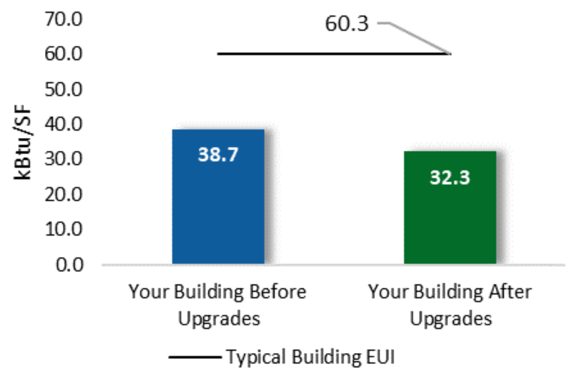
Figure 1 - Energy Use by System

POTENTIAL IMPROVEMENTS

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

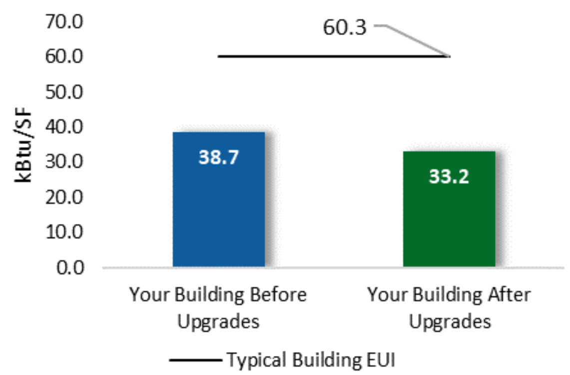
Scenario 1: Full Package (All Evaluated Measures)

Installation Cost	$837,846
Potential Rebates & Incentives[1]	$85,383
Annual Cost Savings	$45,609
Annual Energy Savings	Electricity: 319,056 kWh Natural Gas: 4,467 Therms
Greenhouse Gas Emission Savings	187 Tons
Simple Payback	16.5 Years
Site Energy Savings (All Utilities)	17%



Scenario 2: Cost Effective Package[2]

Installation Cost	$334,823
Potential Rebates & Incentives	$45,162
Annual Cost Savings	$39,400
Annual Energy Savings	Electricity: 278,141 kWh Natural Gas: 3,550 Therms
Greenhouse Gas Emission Savings	161 Tons
Simple Payback	7.4 Years
Site Energy Savings (all utilities)	14%



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			**117,383**	**22.7**	**-21**	**$14,835**	**$57,096**	**$9,936**	**$47,160**	**3.2**	**115,704**
ECM 1	Install LED Fixtures	Yes	19,121	2.0	-1	$2,439	$24,340	$2,400	$21,940	9.0	19,094
ECM 2	Retrofit Fixtures with LED Lamps	Yes	68,083	18.5	-14	$8,591	$28,555	$7,536	$21,019	2.4	66,958
ECM 3	Install LED Exit Signs	Yes	30,180	2.3	-6	$3,806	$4,200	$0	$4,200	1.1	29,652
Lighting Control Measures			**26,130**	**7.4**	**-5**	**$3,295**	**$27,177**	**$6,430**	**$20,747**	**6.3**	**25,673**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	26,130	7.4	-5	$3,295	$27,177	$6,430	$20,747	6.3	25,673
Variable Frequency Drive (VFD) Measures			**118,704**	**54.7**	**0**	**$15,228**	**$196,114**	**$20,925**	**$175,189**	**11.5**	**119,534**
ECM 5	Install VFDs on Constant Volume (CV) Fans	Yes	96,909	51.5	0	$12,432	$177,161	$16,925	$160,236	12.9	97,587
ECM 6	Install VFDs on Heating Water Pumps	Yes	21,795	3.2	0	$2,796	$18,953	$4,000	$14,953	5.3	21,947
Unitary HVAC Measures			**39,491**	**31.8**	**21**	**$5,283**	**$461,410**	**$37,696**	**$423,714**	**80.2**	**42,186**
ECM 7	Install High Efficiency Air Conditioning Units	No	39,491	31.8	21	$5,283	$461,410	$37,696	$423,714	80.2	42,186
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**27**	**$283**	**$18,195**	**$1,400**	**$16,795**	**59.4**	**3,161**
ECM 8	Install High Efficiency Hot Water Boilers	No	0	0.0	3	$28	$4,902	$400	$4,502	158.1	318
ECM 9	Install High Efficiency Furnaces	No	0	0.0	24	$254	$13,293	$1,000	$12,293	48.3	2,843
HVAC System Improvements			**615**	**0.0**	**0**	**$79**	**$173**	**$60**	**$113**	**1.4**	**620**
ECM 10	Install Pipe Insulation	Yes	615	0.0	0	$79	$173	$60	$113	1.4	620
Domestic Water Heating Upgrade			**0**	**0.0**	**89**	**$937**	**$18,402**	**$1,217**	**$17,185**	**18.3**	**10,470**
ECM 11	Install High Efficiency Gas-Fired Water Heater	No	0	0.0	44	$461	$17,542	$875	$16,667	36.1	5,156
ECM 12	Install Low-Flow DHW Devices	Yes	0	0.0	45	$475	$860	$342	$518	1.1	5,314
Food Service & Refrigeration Measures			**13,039**	**5.6**	**336**	**$5,196**	**$57,840**	**$7,719**	**$50,121**	**9.6**	**52,521**
ECM 13	Food Service Equipment Replacement	Yes	6,893	5.1	336	$4,408	$49,786	$7,199	$42,587	9.7	46,333
ECM 14	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	791	0.1	0	$101	$910	$120	$790	7.8	796
ECM 15	Refrigeration Controls	Yes	2,320	0.0	0	$298	$1,037	$100	$937	3.1	2,336
ECM 16	Replace Refrigeration Equipment	No	1,423	0.2	0	$183	$5,876	$250	$5,626	30.8	1,433
ECM 17	Vending Machine Control	Yes	1,612	0.2	0	$207	$230	$50	$180	0.9	1,623
Custom Measures			**3,693**	**0.0**	**0**	**$474**	**$1,440**	**$0**	**$1,440**	**3.0**	**3,719**
ECM 18	Install Heat Pump Water Heater	Yes	3,693	0.0	0	$474	$1,440	$0	$1,440	3.0	3,719
TOTALS (COST EFFECTIVE MEASURES)			**278,141**	**90.2**	**355**	**$39,400**	**$334,823**	**$45,162**	**$289,661**	**7.4**	**321,652**
TOTALS (ALL MEASURES)			**319,056**	**122.2**	**447**	**$45,609**	**$837,846**	**$85,383**	**$752,463**	**16.5**	**373,588**

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

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

Figure 2 – Evaluated Energy Improvements

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

1.1 Planning Your Project

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

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

Pick Your Installation Approach

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

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

Options from Around the State

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

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

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

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

Successor Solar Incentive Program (SuSI)

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

Ongoing Electric Savings with Demand Response

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

Large Energy User Program (LEUP)

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

2 Existing Conditions

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Manasquan Elementary School. This report provides information on how your facility uses energy, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help you implement the ECMs.

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 September 1, 2021, TRC performed an energy audit at Manasquan Elementary School located in Manasquan, New Jersey. TRC met with Mathew Hudson to review the facility operations and help focus our investigation on specific energy-using systems.

Manasquan Elementary School is a one-story, 238,204 square foot building built in 1967. Spaces include classrooms, gymnasium, auditorium, offices, cafeteria, corridors, a commercial kitchen, and two mechanical spaces.

2.2 Building Occupancy

The facility is occupied year-round with limited use in the weekends. Typical weekday occupancy is 125 staff and 600 students.

Building Name	Weekday/Weekend	Operating Schedule
Manasquan Elementary School	Weekday	7:00 AM - 4:00 PM
	Weekend	11:00 AM - 2:00 PM Limited use, hours assumed

Figure 3 - Building Occupancy Schedule

2.3 Building Envelope

Building walls are concrete masonry units with a brick façade.

The building has both flat and pitched roof sections and are supported by metal trusses. The flat roof is covered in black EPDM membrane while the pitched portions are covered with asphalt shingles. The roofs are in fair condition and are reported to leak during heavy rains.

The windows are double glazed and have aluminum frames. The glass-to-frame seals are in good condition. The operable window weather seals are in good condition, showing no evidence of excessive wear.

Exterior doors are old, have aluminum frames and are in fair condition. Most of the doors are equipped with weather stripping.


Façade


Flat and Pitched Roof


Window


Façade

Main Entry


Exterior Door


Roof


Façade, Windows and Roof

2.4 Lighting Systems

The primary interior lighting system is comprised of a mix of 32-Watt linear fluorescent T8 lamps and 35-Watt LED fixtures. Additionally, there are a considerable number of 60-Watt compact fluorescent lamps (CFL) and a few incandescent and LED general purpose lamps. Some of the gymnasium fixtures have manually controlled high bay 100-Watt metal halide lamps. All exit signs are 2-Watt LED units.

Fixture types include 2-lamp, 3-lamp, or 4-lamp, 2-foot or 4-foot-long troffers and surface mounted fixtures and 2-foot fixtures with U-bend tube lamps. Most fixtures are in good condition.

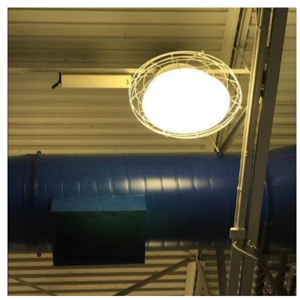
Interior lighting levels were generally sufficient.

Exterior fixtures include pole mounted metal halide fixtures, LED wall packs, and several surface mounted and recessed fixtures. LED fixtures range from 35-Watt to 75-Watt. Other fixtures have CFL or metal halide lamps.

Most of the exterior light fixtures are controlled by a time clock or photocell depending on the fixtures. A few are controlled by wall switches.

Surface Mounted T8

LED Troffer Fixture



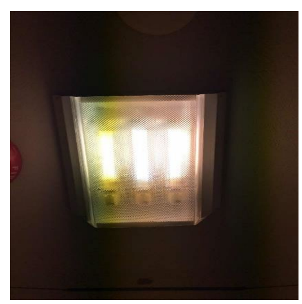
100-Watt Metal Halide Fixtures - Gymnasium

Exterior Wall Pack

T8 troffer

Pole mounted metal halide fixture

T8 troffer



CFL fixture

2.5 Air Handling Systems

Unitary Heating Equipment

Some classrooms, hallways, and restrooms are heated with electric resistance heaters. These vary in capacity and are operating beyond their useful life. Equipment is controlled by a manual dial thermostat.

Electric resistance heater

Electric resistance heater

Several classrooms are heated with natural gas-fired forced air heaters, each with a heating capacity rating of 64 MBh. These units are operating beyond their useful life.

Packaged Units

Several building areas including the main office, nurse's office, classrooms, corridors, and multipurpose room are conditioned by large Trane packaged units with direct expansion cooling coils and gas-fired furnaces. The cooling capacities of these units range from 7.5 tons to 40 tons while heating capacities range from 145 MBh to 648 MBh. The units have an average EER of 11. The units are controlled by the EMS. Most of the units are beyond their useful life and have been evaluated for replacement. All the units are equipped with economizers.

Additionally, there are two packaged forced air furnaces, one of which, HV-1, serves the kitchen.

Refer to Appendix A for detailed information about each unit.

Building Exhaust

Building exhaust systems include numerous fractional horsepower roof mounted toilet exhaust fans and two kitchen hood exhaust fans. Some of the air handling units are equipped with exhaust fans.

Packaged Units

Packaged Units

Air Handling Units (AHUs)

Many larger building spaces, including the library, cafeteria, music room, and guidance offices; are conditioned by several split system air handling units with 11.2 EER average outdoor condensing units and heating hot water coils. Cooling capacities of the condensing units ranging from 15 tons to 30 tons. Heating coils are supplied by the hot water boiler, described in the following section.

Units are all equipped with economizers. Supply and return fan motors range from 1 hp to 15 hp. They operate at constant speed using standard efficiency motors.


AHU - MZ 1

AHU - MZ 3

2.6 Heating Hot Water Systems

There are two condensing Aerco hot water boilers and one non-condensing Slant Finn hot water boiler that serve the building heating load. The condensing hot water boilers each have an output capacity of 2874 MBh and the non-condensing boiler has an output capacity rating of 134 MBh.

The condensing boiler burners are fully modulating, with a nominal efficiency of 95%. The condensing boilers are configured in a lead-lag control scheme. The efficiency rating of the smaller boiler is 80%.

Hot water is circulated to the air handlers and unit ventilators around the school using six, 7.5 hp heating hot water pumps. Two of these pumps have variable frequency drives on them while the other four are constant speed. The motors are of standard efficiency.

The Aerco boilers were installed in 2012 and in good condition. The Slant-Finn boiler was installed in 2002 and has been evaluated for replacement.


Condensing Boiler


Heating Hot Water Pumps

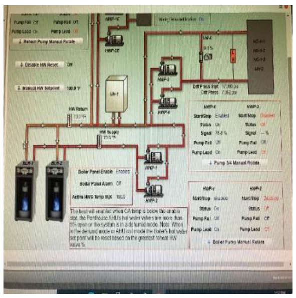

VFD


Non-condensing Boiler

2.7 Building Energy Management Systems (EMS)

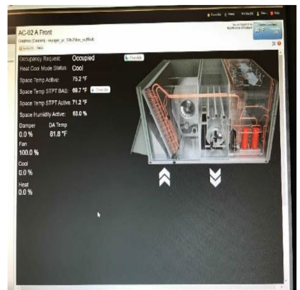
A Trane EMS controls the HVAC equipment, boilers, air handlers, and the package units. The EMS provides equipment scheduling control and monitors and controls space temperatures, supply air temperatures, humidity and heating water loop temperatures.

The site staff expressed an interest in expanding the level of control provided by the EMS, replacing the EMS, and receiving additional training on operating the EMS.

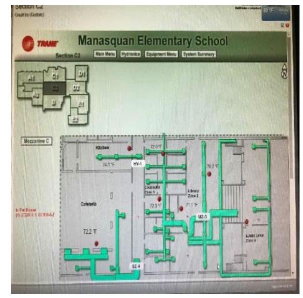


BMS Screenshot - Boiler

BMS Screenshot – Heating and Ventilating Unit



BMS Screenshot – Packaged Unit



BMS Screenshot – Layout

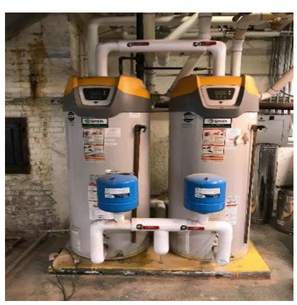
2.8 Domestic Hot Water

Hot water is produced using four storage water heaters: three gas-fired and one electric water heater.

Two of the AO Smith gas-fired water heaters, installed in 2012, have input capacities of 199 MBh, a tank capacity of 96 gallons, and an efficiency rating of 95%. The Rheem gas-fired water heater, installed in 2007, has an input capacity of 250 MBh, a tank capacity of 72 gallons, and an efficiency rating of 80%.

The Rheem electric water heater, installed in 2006, has an input capacity of 3 kW and a tank capacity of 20 gallons.

The domestic hot water pipes are partially insulated, and the insulation is in good condition. The uninsulated portions have been evaluated for insulation.



DHW - AO Smith – Gas

DHW Rheem - Electric

2.9 Food Service Equipment

The kitchen has a mix of gas and electric equipment that is used to prepare meals for students and staff. Most cooking is done using a convection gas-fired oven and gas burner stoves. Bulk prepared foods are held in several electric holding cabinets. Equipment is not high efficiency and some of them have been evaluated for replacement.

The two dishwashers are non-ENERGY STAR® high temperature, door type unit.

Our analysis determined that this building's food service equipment accounts for a relatively high proportion of overall energy use. While cost-effective opportunities to replace equipment are limited at this time, we recommend that you work with your food service equipment suppliers to maintain equipment in a way that minimizes energy use. This may include cleaning air intakes and exhausts or other methods of keeping your existing equipment operating in top shape. When food service equipment is eventually replaced, consider installing high efficiency or ENERGY STAR® labeled equipment.

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

Convection Oven

Dishwasher

Gas Burner Stoves

Food Holding Cabinet

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

2.10 Refrigeration

The kitchen has several stand-up refrigerators with either solid or glass doors. There is a freezer chest as well as refrigerator chests. All equipment is standard efficiency and in good condition.

The walk-in refrigerator has an estimated 0.92-ton compressor located in the kitchen and a one-fan evaporator. The walk-in medium temperature freezer has a 0.75-ton compressor located in the kitchen and a two-fan evaporator.

Stand-up Refrigerator

Freezer Chest

Walk-in Cooler

Stand-up Refrigerator

2.11 Plug Load and 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 71 computer workstations throughout the facility. Plug loads throughout the building include general cafe 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.

There is one refrigerated beverage vending machines that is not equipped with occupancy-based controls.

Copier

Mini Refrigerator

2.12 Water-Using Systems

There are several restrooms with toilets, urinals, and sinks. Faucet flow rates are at 2.5 gallons per minute (gpm) or higher. Toilets are rated at 1.6 gallons per flush (gpf) and urinals are rated at 1.0 gpf.

There are restrooms with showers and showerheads rated at 2.5 gpm.

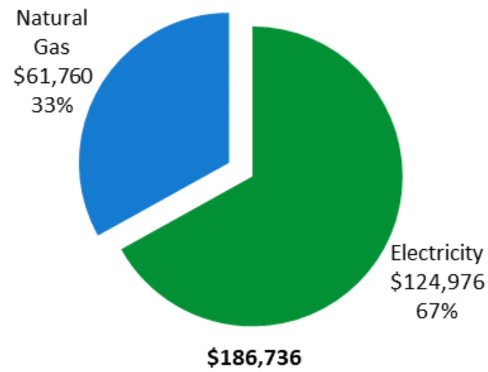
Sink

Sink

3 Energy Use and Costs

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

Utility Summary		
Fuel	**Usage**	**Cost**
Electricity	974,200 kWh	$124,976
Natural Gas	58,966 Therms	$61,760
Total		**$186,736**



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.

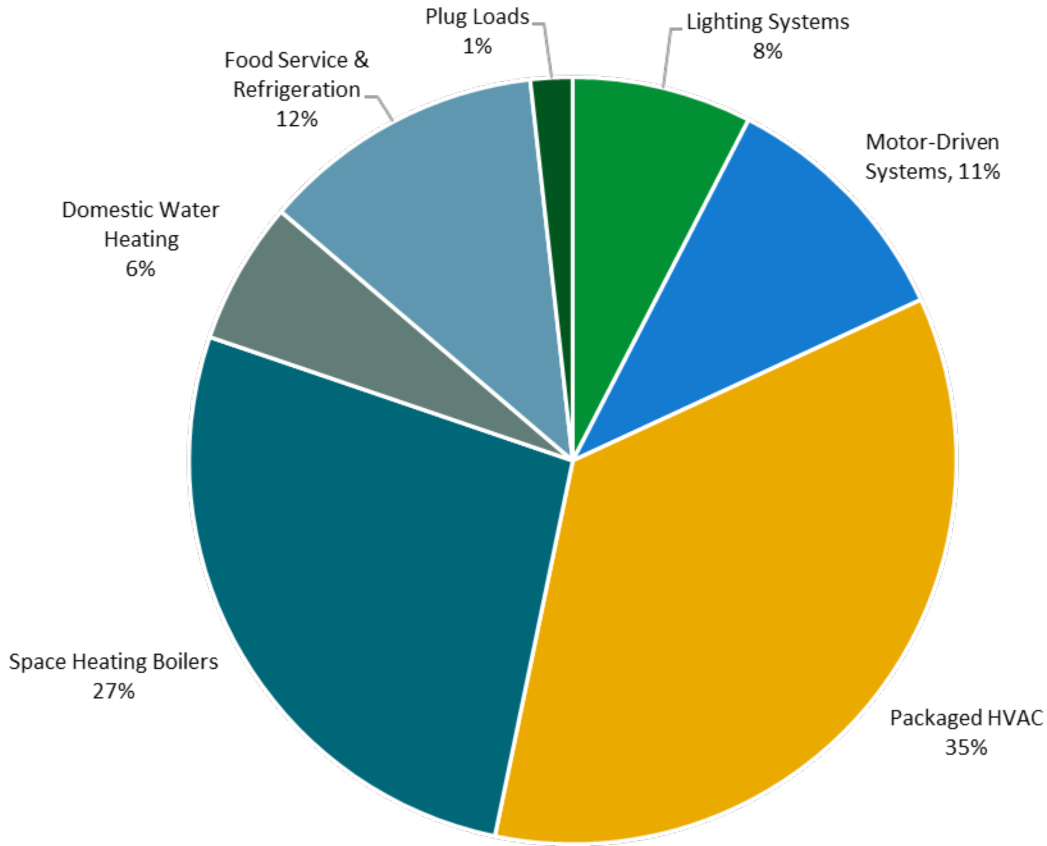
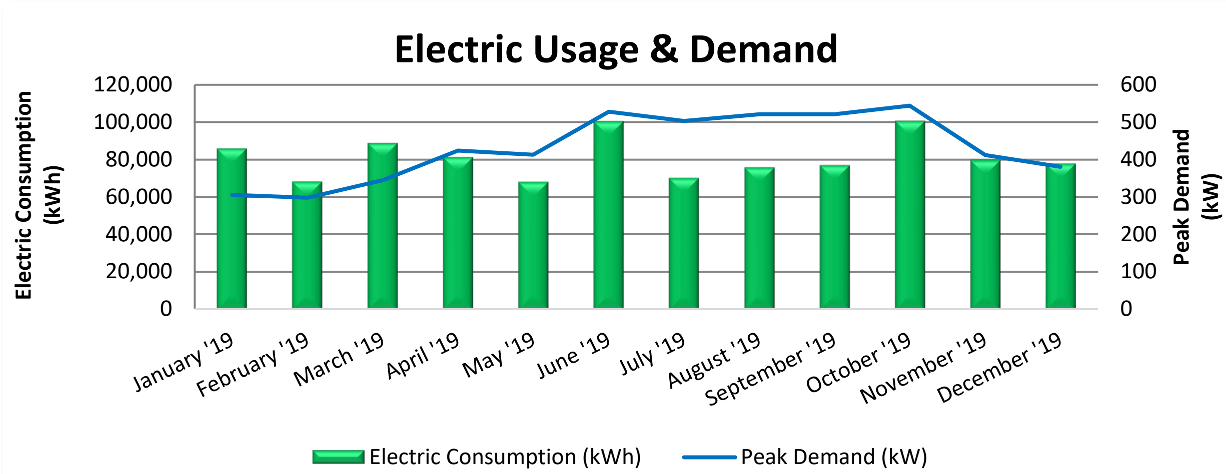


Figure 4 - Energy Balance

3.1 Electricity

JCP&L delivers electricity under rate class GSS - 3 phase.



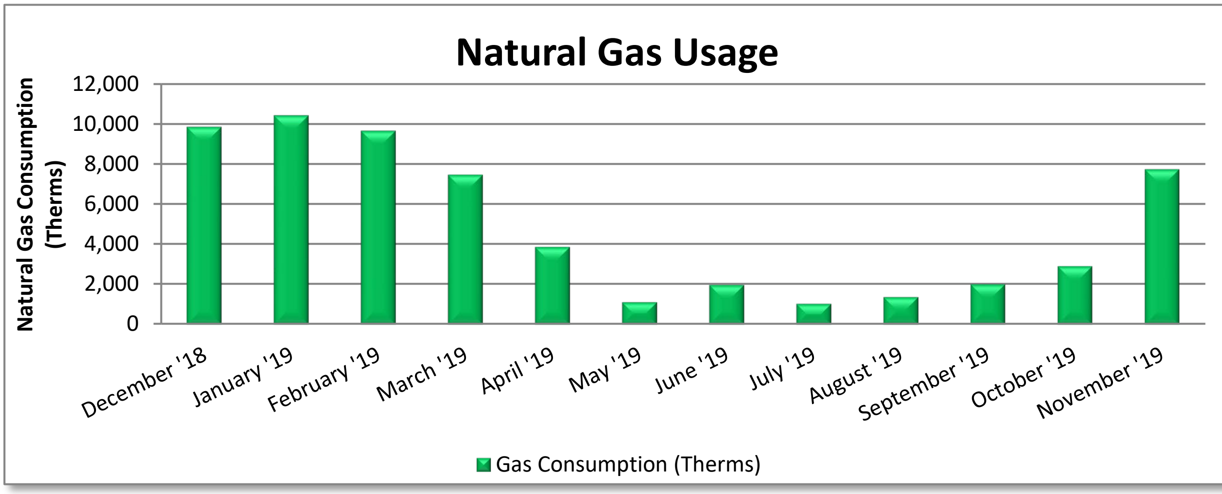
Electric Billing Data					
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**
1/18/19	31	85,840	306	$1,793	$9,839
2/18/19	31	68,360	298	$1,743	$8,327
3/19/19	29	88,720	345	$2,038	$10,323
4/17/19	29	81,360	424	$2,532	$10,146
5/16/19	29	68,200	413	$2,264	$9,121
6/18/19	33	100,360	528	$3,370	$12,704
7/17/19	29	70,160	503	$3,204	$10,063
8/19/19	33	75,920	521	$3,322	$10,734
9/17/19	29	77,000	521	$3,320	$10,835
10/18/19	31	100,520	544	$3,236	$12,998
11/18/19	31	79,800	412	$2,417	$10,202
12/18/19	30	77,960	381	$2,225	$9,683
Totals	**365**	**974,200**	**544**	**$31,463**	**$124,976**
Annual	**365**	**974,200**	**544**	**$31,463**	**$124,976**

Notes:

- Peak demand of 544 kW occurred in October 2019.
- Average demand over the past 12 months was 433 kW.
- The average electric cost over the past 12 months was $0.128/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges. This report uses this blended rate to estimate energy cost savings.

3.2 Natural Gas

NJ Natural Gas delivers natural gas under rate class 057M, with natural gas supply provided by UGI Energy, a third-party supplier.



Gas Billing Data			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
1/9/19	34	9,851	$10,943
2/6/19	28	10,425	$10,514
3/8/19	30	9,668	$9,249
4/9/19	32	7,462	$6,894
5/8/19	29	3,864	$3,880
6/10/19	33	1,127	$2,307
7/11/19	31	1,976	$2,329
8/8/19	28	1,038	$1,537
9/9/19	32	1,373	$1,771
10/7/19	28	2,012	$2,278
11/6/19	30	2,913	$3,114
12/9/19	33	7,743	$7,450
Totals	**368**	**59,451**	**$62,268**
Annual	**365**	**58,966**	**$61,760**

Notes:

- The average gas cost for the past 12 months is $1.047/therm, which is the blended rate used throughout the analysis.

3.3 Benchmarking

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

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

Benchmarking Score	**86**

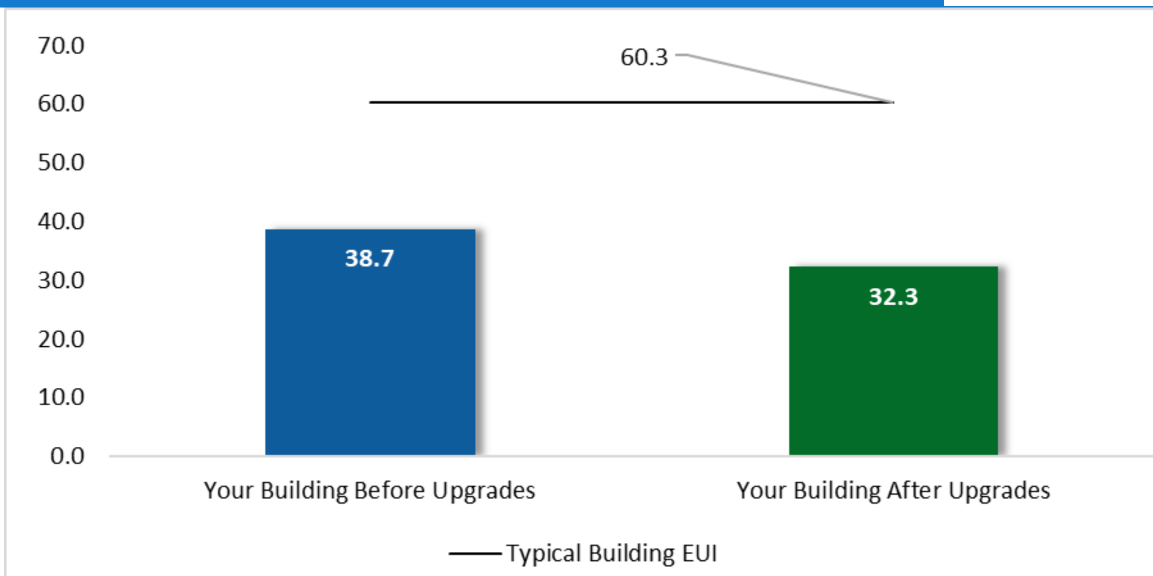


Figure 5 - Energy Use Intensity Comparison[3]

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

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

[3] Based on all evaluated ECMs

Tracking Your Energy Performance

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

We have created a Portfolio Manager® account for your facility, and 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 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			**117,383**	**22.7**	**-21**	**$14,835**	**$57,096**	**$9,936**	**$47,160**	**3.2**	**115,704**
ECM 1	Install LED Fixtures	Yes	19,121	2.0	-1	$2,439	$24,340	$2,400	$21,940	9.0	19,094
ECM 2	Retrofit Fixtures with LED Lamps	Yes	68,083	18.5	-14	$8,591	$28,555	$7,536	$21,019	2.4	66,958
ECM 3	Install LED Exit Signs	Yes	30,180	2.3	-6	$3,806	$4,200	$0	$4,200	1.1	29,652
Lighting Control Measures			**26,130**	**7.4**	**-5**	**$3,295**	**$27,177**	**$6,430**	**$20,747**	**6.3**	**25,673**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	26,130	7.4	-5	$3,295	$27,177	$6,430	$20,747	6.3	25,673
Variable Frequency Drive (VFD) Measures			**118,704**	**54.7**	**0**	**$15,228**	**$196,114**	**$20,925**	**$175,189**	**11.5**	**119,534**
ECM 5	Install VFDs on Constant Volume (CV) Fans	Yes	96,909	51.5	0	$12,432	$177,161	$16,925	$160,236	12.9	97,587
ECM 6	Install VFDs on Heating Water Pumps	Yes	21,795	3.2	0	$2,796	$18,953	$4,000	$14,953	5.3	21,947
Unitary HVAC Measures			**39,491**	**31.8**	**21**	**$5,283**	**$461,410**	**$37,696**	**$423,714**	**80.2**	**42,186**
ECM 7	Install High Efficiency Air Conditioning Units	No	39,491	31.8	21	$5,283	$461,410	$37,696	$423,714	80.2	42,186
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**27**	**$283**	**$18,195**	**$1,400**	**$16,795**	**59.4**	**3,161**
ECM 8	Install High Efficiency Hot Water Boilers	No	0	0.0	3	$28	$4,902	$400	$4,502	158.1	318
ECM 9	Install High Efficiency Furnaces	No	0	0.0	24	$254	$13,293	$1,000	$12,293	48.3	2,843
HVAC System Improvements			**615**	**0.0**	**0**	**$79**	**$173**	**$60**	**$113**	**1.4**	**620**
ECM 10	Install Pipe Insulation	Yes	615	0.0	0	$79	$173	$60	$113	1.4	620
Domestic Water Heating Upgrade			**0**	**0.0**	**89**	**$937**	**$18,402**	**$1,217**	**$17,185**	**18.3**	**10,470**
ECM 11	Install High Efficiency Gas-Fired Water Heater	No	0	0.0	44	$461	$17,542	$875	$16,667	36.1	5,156
ECM 12	Install Low-Flow DHW Devices	Yes	0	0.0	45	$475	$860	$342	$518	1.1	5,314
Food Service & Refrigeration Measures			**13,039**	**5.6**	**336**	**$5,196**	**$57,840**	**$7,719**	**$50,121**	**9.6**	**52,521**
ECM 13	Food Service Equipment Replacement	Yes	6,893	5.1	336	$4,408	$49,786	$7,199	$42,587	9.7	46,333
ECM 14	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	791	0.1	0	$101	$910	$120	$790	7.8	796
ECM 15	Refrigeration Controls	Yes	2,320	0.0	0	$298	$1,037	$100	$937	3.1	2,336
ECM 16	Replace Refrigeration Equipment	No	1,423	0.2	0	$183	$5,876	$250	$5,626	30.8	1,433
ECM 17	Vending Machine Control	Yes	1,612	0.2	0	$207	$230	$50	$180	0.9	1,623
Custom Measures			**3,693**	**0.0**	**0**	**$474**	**$1,440**	**$0**	**$1,440**	**3.0**	**3,719**
ECM 18	Install Heat Pump Water Heater	Yes	3,693	0.0	0	$474	$1,440	$0	$1,440	3.0	3,719
TOTALS			**319,056**	**122.2**	**447**	**$45,609**	**$837,846**	**$85,383**	**$752,463**	**16.5**	**373,588**

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		**117,383**	**22.7**	**-21**	**$14,835**	**$57,096**	**$9,936**	**$47,160**	**3.2**	**115,704**
ECM 1	Install LED Fixtures	19,121	2.0	-1	$2,439	$24,340	$2,400	$21,940	9.0	19,094
ECM 2	Retrofit Fixtures with LED Lamps	68,083	18.5	-14	$8,591	$28,555	$7,536	$21,019	2.4	66,958
ECM 3	Install LED Exit Signs	30,180	2.3	-6	$3,806	$4,200	$0	$4,200	1.1	29,652
Lighting Control Measures		**26,130**	**7.4**	**-5**	**$3,295**	**$27,177**	**$6,430**	**$20,747**	**6.3**	**25,673**
ECM 4	Install Occupancy Sensor Lighting Controls	26,130	7.4	-5	$3,295	$27,177	$6,430	$20,747	6.3	25,673
Variable Frequency Drive (VFD) Measures		**118,704**	**54.7**	**0**	**$15,228**	**$196,114**	**$20,925**	**$175,189**	**11.5**	**119,534**
ECM 5	Install VFDs on Constant Volume (CV) Fans	96,909	51.5	0	$12,432	$177,161	$16,925	$160,236	12.9	97,587
ECM 6	Install VFDs on Heating Water Pumps	21,795	3.2	0	$2,796	$18,953	$4,000	$14,953	5.3	21,947
HVAC System Improvements		**615**	**0.0**	**0**	**$79**	**$173**	**$60**	**$113**	**1.4**	**620**
ECM 10	Install Pipe Insulation	615	0.0	0	$79	$173	$60	$113	1.4	620
Domestic Water Heating Upgrade		**0**	**0.0**	**45**	**$475**	**$860**	**$342**	**$518**	**1.1**	**5,314**
ECM 12	Install Low-Flow DHW Devices	0	0.0	45	$475	$860	$342	$518	1.1	5,314
Food Service & Refrigeration Measures		**11,615**	**5.4**	**336**	**$5,014**	**$51,963**	**$7,469**	**$44,494**	**8.9**	**51,088**
ECM 13	Food Service Equipment Replacement	6,893	5.1	336	$4,408	$49,786	$7,199	$42,587	9.7	46,333
ECM 14	Refrigerator/Freezer Case Electrically Commutated Motors	791	0.1	0	$101	$910	$120	$790	7.8	796
ECM 15	Refrigeration Controls	2,320	0.0	0	$298	$1,037	$100	$937	3.1	2,336
ECM 17	Vending Machine Control	1,612	0.2	0	$207	$230	$50	$180	0.9	1,623
Custom Measures		**3,693**	**0.0**	**0**	**$474**	**$1,440**	**$0**	**$1,440**	**3.0**	**3,719**
ECM 18	Install Heat Pump Water Heater	3,693	0.0	0	$474	$1,440	$0	$1,440	3.0	3,719
TOTALS		**278,141**	**90.2**	**355**	**$39,400**	**$334,823**	**$45,162**	**$289,661**	**7.4**	**321,652**

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

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

Figure 7 – Cost Effective ECMs

4.1 Lighting

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**117,383**	**22.7**	**-21**	**$14,835**	**$57,096**	**$9,936**	**$47,160**	**3.2**	**115,704**
ECM 1	Install LED Fixtures	19,121	2.0	-1	$2,439	$24,340	$2,400	$21,940	9.0	19,094
ECM 2	Retrofit Fixtures with LED Lamps	68,083	18.5	-14	$8,591	$28,555	$7,536	$21,019	2.4	66,958
ECM 3	Install LED Exit Signs	30,180	2.3	-6	$3,806	$4,200	$0	$4,200	1.1	29,652

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

ECM 1: Install LED Fixtures

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

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

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

Affected building areas: gymnasium 2 and exterior metal halide fixtures.

ECM 2: Retrofit Fixtures with LED Lamps

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

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

Affected building areas: all areas with fluorescent fixtures with T8 tubes, CFLs or incandescent lamps

ECM 3: Install LED Exit Signs

Replace incandescent exit signs with LED exit signs. LED exit signs require virtually no maintenance and have a life expectancy of at least 20 years. This measure saves energy by installing LED fixtures, which use less power than other technologies with an equivalent lighting output. Maintenance savings and improved reliability may also be achieved, as the longer-lasting LED lamps will not need to be replaced as often as the existing 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		**26,130**	**7.4**	**-5**	**$3,295**	**$27,177**	**$6,430**	**$20,747**	**6.3**	**25,673**
ECM 4	Install Occupancy Sensor Lighting Controls	26,130	7.4	-5	$3,295	$27,177	$6,430	$20,747	6.3	25,673

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

ECM 4: Install Occupancy Sensor Lighting Controls

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

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

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

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

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

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		**118,704**	**54.7**	**0**	**$15,228**	**$196,114**	**$20,925**	**$175,189**	**11.5**	**119,534**
ECM 5	Install VFDs on Constant Volume (CV) Fans	96,909	51.5	0	$12,432	$177,161	$16,925	$160,236	12.9	97,587
ECM 6	Install VFDs on Heating Water Pumps	21,795	3.2	0	$2,796	$18,953	$4,000	$14,953	5.3	21,947

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

ECM 5: Install VFDs on Constant Volume (CV) Fans

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

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

VAV system controls should not raise the supply air temperature at the expense of the fan power. A common mistake is to reset the supply air temperature to achieve chiller energy savings, which can lead to additional air flow requirements. Supply air temperature should be kept low (e.g., 55°F) until the minimum fan speed (typically about 50%) is met. At this point, it is efficient to raise the supply air temperature as the load decreases, but not such that additional air flow and thus fan energy is required.

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

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

Affected air handlers: MZ1, MZ3, all AC units.

ECM 6: Install VFDs on Heating Water Pumps

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

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

Affected pumps: Pump 1, 2, 5 and 6

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		**39,491**	**31.8**	**21**	**$5,283**	**$461,410**	**$37,696**	**$423,714**	**80.2**	**42,186**
ECM 7	Install High Efficiency Air Conditioning Units	39,491	31.8	21	$5,283	$461,410	$37,696	$423,714	80.2	42,186

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

ECM 7: Install High Efficiency Air Conditioning Units

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

Affected units: AC 1, 2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, AHU SZ4, MZ 1, MZ 3.

4.5 Gas-Fired Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**27**	**$283**	**$18,195**	**$1,400**	**$16,795**	**59.4**	**3,161**
ECM 8	Install High Efficiency Hot Water Boilers	0	0.0	3	$28	$4,902	$400	$4,502	158.1	318
ECM 9	Install High Efficiency Furnaces	0	0.0	24	$254	$13,293	$1,000	$12,293	48.3	2,843

ECM 8: Install High Efficiency Hot Water Boilers

We evaluated replace the older inefficient Slant Fin hot water boiler with a high efficiency hot water boiler. Energy savings results from improved combustion efficiency and reduced standby losses at low loads.

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

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

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

ECM 9: Install High Efficiency Furnaces

We evaluated replacing standard efficiency furnaces with condensing furnaces. Improved combustion technology and heat exchanger design optimize heat recovery from the combustion gases, which can significantly improve furnace efficiency. Savings result from improved system efficiency.

Note: these units produce acidic condensate that require proper drainage.

Affected Units: two kitchen furnaces.

4.6 HVAC Improvements

#	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)
HVAC System Improvements		**615**	**0.0**	**0**	**$79**	**$173**	**$60**	**$113**	**1.4**	**620**
ECM 10	Install Pipe Insulation	615	0.0	0	$79	$173	$60	$113	1.4	620

ECM 10: Install Pipe Insulation

Install insulation on domestic hot water system piping. Distribution system losses are dependent on system fluid temperature, the size of the distribution system, and the level of insulation of the piping. Significant energy savings can be achieved when insulation has not been well maintained. When the insulation is exposed to water, when the insulation has been removed from some areas of the pipe, or when valves have not been properly insulated system efficiency can be significantly reduced. This measure saves energy by reducing heat transfer in the distribution system.

Affected Systems: domestic hot water piping

4.7 Domestic Water Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**89**	**$937**	**$18,402**	**$1,217**	**$17,185**	**18.3**	**10,470**
ECM 11	Install High Efficiency Gas-Fired Water Heater	0	0.0	44	$461	$17,542	$875	$16,667	36.1	5,156
ECM 12	Install Low-Flow DHW Devices	0	0.0	45	$475	$860	$342	$518	1.1	5,314

ECM 11: Install High Efficiency Gas-Fired Water Heater

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

ECM 12: Install Low-Flow DHW Devices

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

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

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

Additional cost savings may result from reduced water usage.

4.8 Food Service & Refrigeration Measures

#	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)
Food Service & Refrigeration Measures		**13,039**	**5.6**	**336**	**$5,196**	**$57,840**	**$7,719**	**$50,121**	**9.6**	**52,521**
ECM 13	Food Service Equipment Replacement	6,893	5.1	336	$4,408	$49,786	$7,199	$42,587	9.7	46,333
ECM 14	Refrigerator/Freezer Case Electrically Commutated Motors	791	0.1	0	$101	$910	$120	$790	7.8	796
ECM 15	Refrigeration Controls	2,320	0.0	0	$298	$1,037	$100	$937	3.1	2,336
ECM 16	Replace Refrigeration Equipment	1,423	0.2	0	$183	$5,876	$250	$5,626	30.8	1,433
ECM 17	Vending Machine Control	1,612	0.2	0	$207	$230	$50	$180	0.9	1,623

ECM 13: Food Service Equipment Replacement

Buildings that use a lot of food service equipment are often among the most energy-intensive commercial buildings. Replace existing food service equipment with new, high-efficiency equipment. Consider replacing the following equipment with high efficiency or ENERGY STAR® labeled versions:

Location	Quantity	Equipment Type	Manufacturer	Model
Kitchen 3	1	Electric Combination Oven/Steam Cooker (<15 Pans)	U.S Range	
Kitchen 3	1	Gas Fryer	PitCO	
Lower Kitchen	1	Insulated Food Holding Cabinet (1/2 Size)	Wittco	
Kitchen 3	1	Gas Rack Oven (Double)	Southbend	
Lower Kitchen	1	Gas Rack Oven (Double)	Southbend	
Lower Kitchen	1	Electric Steamer	GE	

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

ECM 14: Refrigerator/Freezer Case Electrically Commutated Motors

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

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

ECM 15: Refrigeration Controls

Install additional controls to optimize the operation of walk-in coolers and freezers.

Many walk-in coolers and freezers have evaporator fans that run continuously. The measure adds a control system feature to automatically shut off evaporator fans when not needed.

Energy savings for each of the control measures account for reduction in compressor and fan operating hours as well as reduction in the refrigeration heat load as appropriate.

ECM 16: Replace Refrigeration Equipment

We evaluated replacing existing commercial refrigerators, freezers, and ice makers with new ENERGY STAR® rated equipment. The energy savings associated with this measure come from reduced energy usage, due to more efficient technology, and reduced run times.

Affected Systems: Ice-O-Matic ice machine, True stand-up solid door refrigerator.

ECM 17: Vending Machine Control

Vending machines operate continuously, even during unoccupied hours. Install occupancy sensor controls to reduce energy use. These controls power down vending machines when the vending machine area has been vacant for some time, and they power up the machines at necessary regular intervals or when the surrounding area is occupied. Energy savings are dependent on the vending machine and activity level in the area surrounding the machines.

4.9 Custom Measures

#	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)
Custom Measures		**3,693**	**0.0**	**0**	**$474**	**$1,440**	**$0**	**$1,440**	**3.0**	**3,719**
ECM 18	Install Heat Pump Water Heater	3,693	0.0	0	$474	$1,440	$0	$1,440	3.0	3,719

ECM 18: Install Heat Pump Water Heater

A typical electric water heater uses electric resistance coils to heat water at a coefficient of performance (COP) of 1. Heat pump water heaters (HPWH) use a refrigeration cycle to transfer heat from the air to the domestic water. The typical average COP for a HPWH is about 2.5, so they require significantly less electricity to produce the same amount of hot water as a traditional electric water heater. HPWH also reject cold air. As such, they need to be in an unconditioned space with good ventilation. Ideal locations are garages or large enclosed, unconditioned storage areas.

Most HPHW operate effectively down to an air temperature of 40 °F. Below that temperature, an electric resistance booster heater is typically required to achieve full heating capacity. It is critical that the HPWH controls are set up so that the electric resistance heat only engages when the air temperature is too cold for the HPWH to extract heat from it. HPWHs have a slow recovery. During periods of high demand, the recommended electric resistance heating element, if enabled, may be energized to maintain set point, thus reducing the overall efficiency of the unit. It is recommended that a careful analysis of the hot water demand be conducted to determine if the application makes economic sense, and the HPWH heating capacity and storage are properly sized.

HPWH operate most effectively when the temperature difference between the incoming and outgoing water is high. Generally, this means that cold make-up water should be piped to the bottom of the tank and return water should be piped to the top of the tank in order to maintain stratification within the storage tank. Water should be drawn from the bottom of the tank to be heated. If there is a DHW recirculation pump, it should only be operated during high hot water demand periods.

Affected Systems: 3.0 kW electric hot water heater.

5 Energy Efficient Best Practices

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

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

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

Energy Tracking with ENERGY STAR® Portfolio Manager®

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

Lighting Controls

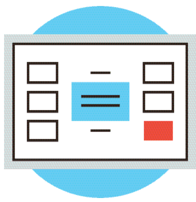
As part of a lighting maintenance schedule, test lighting controls to ensure proper functioning. For occupancy sensors, this requires triggering the sensor and verifying that the sensor's timer settings are correct. For daylight and photocell sensors, maintenance involves cleaning sensor lenses and confirming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

Motor 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.

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

Thermostat Schedules and Temperature Resets



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

Economizer Maintenance

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

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

AC System Evaporator/Condenser Coil Cleaning

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

HVAC Filter Cleaning and Replacement

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

Ductwork Maintenance

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

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

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

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

Boiler Maintenance

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

Optimize HVAC Equipment Schedules

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

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

Water Heater Maintenance

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

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

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

Refrigeration Equipment Maintenance

Preventative maintenance keeps commercial refrigeration equipment running reliably and efficiently. Commercial refrigerators and freezers are mission-critical equipment that can cost a fortune when they go down. Even when they appear to be working properly, refrigeration units can be consuming too much energy. Have walk-in refrigeration and freezer and other commercial systems serviced at least annually. This practice will allow systems to perform to their highest capabilities and will help identify system issues if they exist.

Maintaining your commercial refrigeration equipment can save between 5% and 10% on energy costs. When condenser coils are dirty, your commercial refrigerators and freezers work harder to maintain the temperature inside. Worn gaskets, hinges, door handles or faulty seals cause cold air to leak from the unit, forcing the unit to run longer and use more electricity.

Regular cleaning and maintenance also help your commercial refrigeration equipment to last longer.

Water Conservation

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

For more information regarding water conservation go to the EPA's WaterSense® website[5] or download a copy of EPA's "WaterSense® at Work: Best Management Practices for Commercial and Institutional Facilities"[6] to get ideas for creating a water management plan and best practices for a wide range of water using systems.

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

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

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

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.

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

[6] 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.

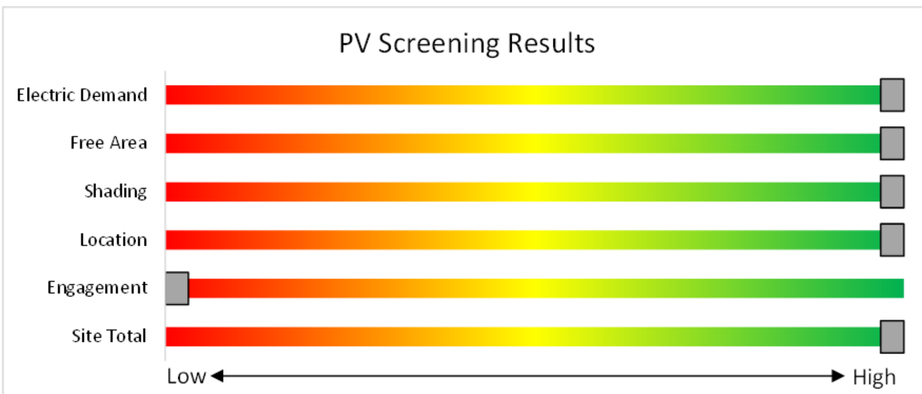
6.1 Solar Photovoltaic

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	419	kW DC STC
Electric Generation	499,184	kWh/yr
Displaced Cost	$64,040	/yr
Installed Cost	$1,089,400	

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.

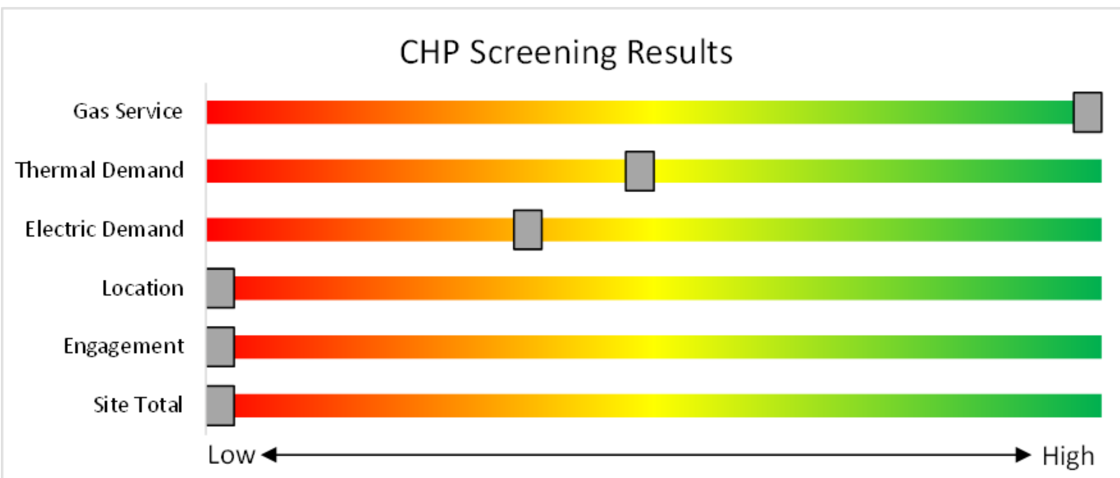


Figure 9 - Combined Heat and Power Screening

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

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

These new utility programs are rolling out in the spring and summer of 2021. Keep up to date with developments by visiting:

https://www.njcleanenergy.com/transition

8 New Jersey's Clean Energy Programs

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

8.1 Large Energy Users

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

Incentives

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

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

How to Participate

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

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

8.2 Combined Heat and Power

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

Incentives

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

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

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

How to Participate

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

8.3 Energy Savings Improvement Program

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

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

How to Participate

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

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

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

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

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

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Carefully consider all alternatives to develop an approach that best meets your needs. A detailed program 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.

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

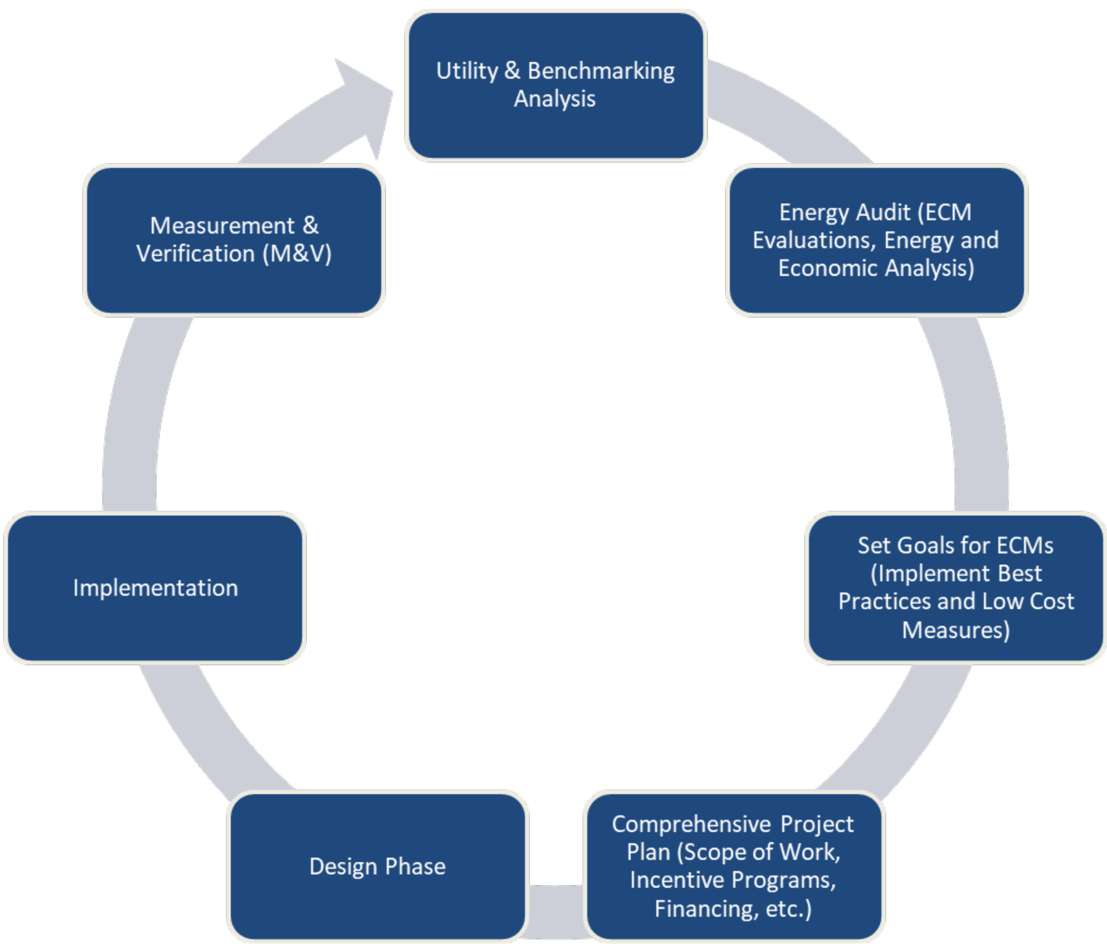


Figure 10 – Project Development Cycle

10 Energy Purchasing and Procurement Strategies

10.1 Retail Electric Supply Options

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

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

A list of licensed third-party electric suppliers is available at the NJBPU website[7].

10.2 Retail Natural Gas Supply Options

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

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

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

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

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

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

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
113-112	1	Exit Signs: Incandescent	None		60	8,760	3	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.0	520	0	$66	$72	$0	1.1
113-112	1	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	2,168	2	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	9	2,168	0.0	122	0	$15	$17	$1	1.1
113-112	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	2,168	2	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,168	0.0	42	0	$5	$18	$5	2.5
208	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,168	2, 4	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,496	0.2	751	0	$95	$544	$110	4.6
A1	16	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	35	2,168	4	None	Yes	16	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	1,496	0.1	414	0	$52	$540	$70	9.0
A2	16	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	35	2,168	4	None	Yes	16	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	1,496	0.1	414	0	$52	$540	$70	9.0
A3	16	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	35	2,168	4	None	Yes	16	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	1,496	0.1	414	0	$52	$540	$70	9.0
A4	16	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	35	2,168	4	None	Yes	16	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	1,496	0.1	414	0	$52	$540	$70	9.0
A5	16	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	35	2,168	4	None	Yes	16	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	1,496	0.1	414	0	$52	$540	$70	9.0
A6	16	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	35	2,168	4	None	Yes	16	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	1,496	0.1	414	0	$52	$540	$70	9.0
A7	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	35	2,168		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	35	2,168	0.0	0	0	$0	$0	$0	0.0
A8	6	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	35	2,168	4	None	Yes	6	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	1,496	0.0	155	0	$20	$270	$35	12.0
B1	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	35	2,168		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	35	2,168	0.0	0	0	$0	$0	$0	0.0
B2	15	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	35	2,168	4	None	Yes	15	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	1,496	0.1	388	0	$49	$270	$35	4.8
B3	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	35	2,168		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	35	2,168	0.0	0	0	$0	$0	$0	0.0
B4	14	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	35	2,168	4	None	Yes	14	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	1,496	0.1	362	0	$46	$270	$35	5.1
B5	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	35	2,168		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	35	2,168	0.0	0	0	$0	$0	$0	0.0
B6	15	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	35	2,168	4	None	Yes	15	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	1,496	0.1	388	0	$49	$270	$35	4.8
Boiler Room 1	1	Compact Fluorescent: (3) 60W Plug-in Lamps	Wall Switch	S	180	1,275	2	Relamp	No	1	LED Lamps: (3) 42W plug-in	Wall Switch	126	1,275	0.0	76	0	$10	$38	$3	3.6
Boiler Room 1	2	Exit Signs: Incandescent	None		60	8,760	3	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.1	1,041	0	$131	$145	$0	1.1
Boiler Room 1	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,275	2	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,275	0.4	694	0	$88	$548	$150	4.5
Boiler Room 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,275	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,275	0.0	93	0	$12	$73	$20	4.5
Breakroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,168	0.0	79	0	$10	$37	$10	2.7
Cafeteria	2	Exit Signs: Incandescent	None		60	8,760	3	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.1	1,041	0	$131	$145	$0	1.1
Cafeteria	51	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,168	2, 4	Relamp	Yes	51	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,496	2.7	8,996	-2	$1,134	$4,805	$1,160	3.2

	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
Chorus Room	16	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	35	2,168	4	None	Yes	16	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	1,496	0.1	414	0	$52	$540	$70	9.0
Chorus Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,168	2, 4	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,496	0.1	353	0	$44	$262	$60	4.5
Classroom 101	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,168	0.0	79	0	$10	$37	$10	2.7
Classroom 102	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,496	0.4	1,201	0	$151	$708	$155	3.7
Classroom 103	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,496	0.4	1,201	0	$151	$708	$155	3.7
Classroom 104	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,496	0.4	1,201	0	$151	$708	$155	3.7
Classroom 105	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,496	0.4	1,201	0	$151	$708	$155	3.7
Classroom 106	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,496	0.4	1,201	0	$151	$708	$155	3.7
Classroom 107	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,496	0.4	1,201	0	$151	$708	$155	3.7
Classroom 108	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,496	0.4	1,201	0	$151	$708	$155	3.7
Classroom 109	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,496	0.4	1,201	0	$151	$708	$155	3.7
Classroom 110	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,496	0.4	1,201	0	$151	$708	$155	3.7
Classroom 111	1	Compact Fluorescent: (1) 60W Plug-in Lamps	Wall Switch	S	60	2,168	2	Relamp	No	1	LED Lamps: (1) 42W plug-in	Wall Switch	42	2,168	0.0	43	0	$5	$13	$1	2.1
Classroom 111	3	Compact Fluorescent: (3) 60W Plug-in Lamps	Wall Switch	S	180	2,168	2, 4	Relamp	Yes	3	LED Lamps: (3) 42W plug-in	Occupancy Sensor	126	1,496	0.2	666	0	$84	$383	$44	4.0
Classroom 111	1	Exit Signs: Incandescent	None		60	8,760	3	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.0	520	0	$66	$72	$0	1.1
Classroom 111	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,496	0.4	1,201	0	$151	$708	$155	3.7
Classroom 112	1	Compact Fluorescent: (1) 60W Plug-in Lamps	Wall Switch	S	60	2,168	2	Relamp	No	1	LED Lamps: (1) 42W plug-in	Wall Switch	42	2,168	0.0	43	0	$5	$13	$1	2.1
Classroom 112	1	Compact Fluorescent: (3) 60W Plug-in Lamps	Wall Switch	S	180	2,168	2	Relamp	No	1	LED Lamps: (3) 42W plug-in	Wall Switch	126	2,168	0.0	129	0	$16	$38	$3	2.1
Classroom 112	1	Exit Signs: Incandescent	None		60	8,760	3	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.0	520	0	$66	$72	$0	1.1
Classroom 112	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,168	0.0	79	0	$10	$37	$10	2.7
Classroom 113	1	Compact Fluorescent: (3) 60W Plug-in Lamps	Wall Switch	S	180	2,168	2	Relamp	No	1	LED Lamps: (3) 42W plug-in	Wall Switch	126	2,168	0.0	129	0	$16	$38	$3	2.1
Classroom 113	1	Exit Signs: Incandescent	None		60	8,760	3	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.0	520	0	$66	$72	$0	1.1
Classroom 113	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,496	0.4	1,201	0	$151	$708	$155	3.7
Classroom 114	1	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	2,168	2	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	9	2,168	0.0	122	0	$15	$17	$1	1.1
Classroom 114	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,496	0.4	1,201	0	$151	$708	$155	3.7

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 115	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	2,168	2	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,168	0.0	38	0	$5	$33	$6	5.5
Classroom 115	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,496	0.4	1,201	0	$151	$708	$155	3.7
Classroom 202	2	Exit Signs: Incandescent	None		60	8,760	3	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.1	1,041	0	$131	$145	$0	1.1
Classroom 202	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	25	2,168		None	No	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	25	2,168	0.0	0	0	$0	$0	$0	0.0
Classroom 202	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,168	0.0	79	0	$10	$37	$10	2.7
Classroom 203	1	Compact Fluorescent: (1) 60W Plug-in Lamps	Wall Switch	S	60	2,168	2	Relamp	No	1	LED Lamps: (1) 42W plug-in	Wall Switch	42	2,168	0.0	43	0	$5	$13	$1	2.1
Classroom 203	2	Exit Signs: Incandescent	None		60	8,760	3	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.1	1,041	0	$131	$145	$0	1.1
Classroom 203	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2, 4	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,496	0.2	501	0	$63	$453	$85	5.8
Classroom 204	1	Exit Signs: Incandescent	None		60	8,760	3	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.0	520	0	$66	$72	$0	1.1
Classroom 204	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,496	0.1	200	0	$25	$189	$40	5.9
Classroom 205	2	Exit Signs: Incandescent	None		60	8,760	3	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.1	1,041	0	$131	$145	$0	1.1
Classroom 205	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,168	0.0	79	0	$10	$37	$10	2.7
Classroom 302	5	Compact Fluorescent: (1) 60W Plug-in Lamps	Wall Switch	S	60	2,168	2, 4	Relamp	Yes	5	LED Lamps: (1) 42W plug-in	Occupancy Sensor	42	1,496	0.1	370	0	$47	$333	$40	6.3
Classroom 302	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2, 4	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,496	0.7	2,403	-1	$303	$1,416	$310	3.7
Classroom 303	5	Compact Fluorescent: (1) 60W Plug-in Lamps	Wall Switch	S	60	2,168	2, 4	Relamp	Yes	5	LED Lamps: (1) 42W plug-in	Occupancy Sensor	42	1,496	0.1	370	0	$47	$333	$40	6.3
Classroom 303	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,496	0.1	200	0	$25	$189	$40	5.9
Classroom 304	5	Compact Fluorescent: (1) 60W Plug-in Lamps	Wall Switch	S	60	2,168	2, 4	Relamp	Yes	5	LED Lamps: (1) 42W plug-in	Occupancy Sensor	42	1,496	0.1	370	0	$47	$333	$40	6.3
Classroom 304	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2, 4	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,496	0.7	2,403	-1	$303	$1,416	$310	3.7
Classroom 305	6	Compact Fluorescent: (1) 60W Plug-in Lamps	Wall Switch	S	60	2,168	2, 4	Relamp	Yes	6	LED Lamps: (1) 42W plug-in	Occupancy Sensor	42	1,496	0.1	444	0	$56	$345	$41	5.4
Classroom 305	25	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,168	2, 4	Relamp	Yes	25	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,496	1.1	3,754	-1	$473	$1,909	$445	3.1
Classroom 306	6	Compact Fluorescent: (1) 60W Plug-in Lamps	Wall Switch	S	60	2,168	2, 4	Relamp	Yes	6	LED Lamps: (1) 42W plug-in	Occupancy Sensor	42	1,496	0.1	444	0	$56	$345	$41	5.4
Classroom 306	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,168	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,168	0.0	118	0	$15	$55	$15	2.7
Classroom 307	4	Compact Fluorescent: (1) 60W Plug-in Lamps	Wall Switch	S	60	2,168	2, 4	Relamp	Yes	4	LED Lamps: (1) 42W plug-in	Occupancy Sensor	42	1,496	0.1	296	0	$37	$320	$39	7.5
Classroom 307	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,168	2, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,496	0.1	300	0	$38	$226	$50	4.6
Classroom 308	4	Compact Fluorescent: (1) 60W Plug-in Lamps	Wall Switch	S	60	2,168	2, 4	Relamp	Yes	4	LED Lamps: (1) 42W plug-in	Occupancy Sensor	42	1,496	0.1	296	0	$37	$320	$39	7.5

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 308	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,168	2, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,496	0.1	300	0	$38	$226	$50	4.6
Exterior 1	3	Compact Fluorescent: (1) 60W Plug-in Lamps	Timeclock		60	4,380	2	Relamp	No	3	LED Lamps: (1) 42W plug-in	Timeclock	42	4,380	0.0	237	0	$30	$38	$3	1.1
Exterior 1	8	Incandescent: (1) 60W A19 Screw-In Lamp	Timeclock		60	4,380	2	Relamp	No	8	LED Lamps: A19 Lamps	Timeclock	9	4,380	0.0	1,787	0	$229	$138	$8	0.6
Exterior 1	3	LED Lamps: (1) 15W BR30 Screw-In Lamp	Timeclock		15	4,380		None	No	3	LED Lamps: (1) 15W BR30 Screw-In Lamp	Timeclock	15	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 1	4	LED - Fixtures: Wall Pack	Timeclock		35	4,380		None	No	4	LED - Fixtures: Wall Pack	Timeclock	35	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 1	4	LED - Fixtures: Wall Pack	Photocell		35	4,380		None	No	4	LED - Fixtures: Wall Pack	Photocell	35	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 1	2	Metal Halide: (1) 150W Lamp	Photocell		190	4,380	1	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Photocell	45	4,380	0.0	1,270	0	$163	$692	$100	3.6
Exterior 1	2	Metal Halide: (1) 150W Lamp	Timeclock		190	4,380	1	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	45	4,380	0.0	1,270	0	$163	$692	$100	3.6
Exterior 1	4	Metal Halide: (1) 70W Lamp	Timeclock		75	4,380	1	Fixture Replacement	No	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	21	4,380	0.0	946	0	$121	$824	$200	5.1
Exterior 2	6	Compact Fluorescent: (1) 60W Plug-in Lamps	Wall Switch		60	2,550	2	Relamp	No	6	LED Lamps: (1) 42W plug-in	Wall Switch	42	2,550	0.0	275	0	$35	$75	$6	2.0
Exterior 3	5	Compact Fluorescent: (1) 60W Plug-in Lamps	Timeclock		60	4,380	2	Relamp	No	5	LED Lamps: (1) 42W plug-in	Timeclock	42	4,380	0.0	394	0	$51	$63	$5	1.1
Exterior 3	3	LED Lamps: (1) 10W A19 Screw-In Lamp	Timeclock		10	4,380		None	No	3	LED Lamps: (1) 10W A19 Screw-In Lamp	Timeclock	10	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 3	2	LED Lamps: (1) 35W Corn Bulb Screw-In Lamp	Timeclock		35	4,380		None	No	2	LED Lamps: (1) 35W Corn Bulb Screw-In Lamp	Timeclock	35	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 3	1	LED - Fixtures: Downlight Recessed	Timeclock		15	4,380		None	No	1	LED - Fixtures: Downlight Recessed	Timeclock	15	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 3	2	LED - Fixtures: Wall Pack	Timeclock		35	4,380		None	No	2	LED - Fixtures: Wall Pack	Timeclock	35	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 3	4	LED - Fixtures: Wall Pack	Timeclock		50	4,380		None	No	4	LED - Fixtures: Wall Pack	Timeclock	50	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 3	1	LED - Fixtures: Wall Pack	Timeclock		75	4,380		None	No	1	LED - Fixtures: Wall Pack	Timeclock	75	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 3	10	Metal Halide: (1) 400W Lamp	Wall Switch		458	2,550	1	Fixture Replacement	No	10	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	120	2,550	0.0	8,619	0	$1,106	$5,545	$500	4.6
Exterior 3	2	Metal Halide: (1) 70W Lamp	Timeclock		75	4,380	1	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	21	4,380	0.0	473	0	$61	$412	$100	5.1
Gymnasium 1	14	Compact Fluorescent: (1) 60W Plug-in Lamps	Wall Switch	S	60	2,168	2, 4	Relamp	Yes	14	LED Lamps: (1) 42W plug-in	Occupancy Sensor	42	1,496	0.3	1,035	0	$131	$445	$49	3.0
Gymnasium 1	5	Exit Signs: Incandescent	None		60	8,760	3	Fixture Replacement	No	5	LED Exit Signs: 2 W Lamp	None	6	8,760	0.2	2,602	-1	$328	$362	$0	1.1
Gymnasium 1	24	LED - Fixtures: High-Bay	Wall Switch	S	75	2,168	4	None	Yes	24	LED - Fixtures: High-Bay	Occupancy Sensor	75	1,496	0.4	1,330	0	$168	$540	$70	2.8
Gymnasium 1	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	2,168	2, 4	Relamp	Yes	2	LED - Linear Tubes: (1) 2' Lamp	Occupancy Sensor	9	1,496	0.0	77	0	$10	$149	$26	12.6
Gymnasium 1	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,496	0.1	300	0	$38	$380	$65	8.3
Gymnasium 2	4	Exit Signs: Incandescent	None		60	8,760	3	Fixture Replacement	No	4	LED Exit Signs: 2 W Lamp	None	6	8,760	0.2	2,081	0	$262	$290	$0	1.1

	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
Gymnasium 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,168	0.0	79	0	$10	$37	$10	2.7
Gymnasium 2	28	Metal Halide: (1) 100W Lamp	Wall Switch	S	128	2,168	1, 4	Fixture Replacement	Yes	28	LED - Fixtures: High-Bay	Occupancy Sensor	30	1,496	2.2	7,163	-1	$903	$16,715	$1,470	16.9
Janitor 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	1,152	2	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,152	0.0	22	0	$3	$18	$5	4.7
Janitorial 1	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	1,152	2	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	1,152	0.0	20	0	$3	$33	$6	10.4
Janitorial 3	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	1,152	2, 4	Relamp	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	795	0.0	84	0	$11	$171	$35	12.9
Janitorial 4	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,152	2, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	795	0.1	106	0	$13	$189	$40	11.1
Janitorial 5	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,152	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,152	0.0	63	0	$8	$55	$15	5.0
Kitchen 3	4	Exit Signs: Incandescent	None		60	8,760	3	Fixture Replacement	No	4	LED Exit Signs: 2 W Lamp	None	6	8,760	0.2	2,081	0	$262	$290	$0	1.1
Kitchen 3	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,168	2, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,496	0.1	300	0	$38	$226	$50	4.6
Lower Kitchen	1	Exit Signs: Incandescent	None		60	8,760	3	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.0	520	0	$66	$72	$0	1.1
Lower Kitchen	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	2,168	2, 4	Relamp	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,496	0.0	157	0	$20	$55	$15	2.0
Lower Kitchen	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2, 4	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,496	0.5	1,802	0	$227	$1,197	$250	4.2
Main Hallway 1	1	Exit Signs: Incandescent	None		60	8,760	3	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.0	520	0	$66	$72	$0	1.1
Main Hallway 1	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	3,188		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	3,188	0.0	0	0	$0	$0	$0	0.0
Main Hallway 1	56	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,188	2, 4	Relamp	Yes	56	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,199	1.7	8,245	-2	$1,040	$2,945	$1,460	1.4
Main Hallway 2	14	Exit Signs: Incandescent	None		60	8,760	3	Fixture Replacement	No	14	LED Exit Signs: 2 W Lamp	None	6	8,760	0.5	7,285	-2	$919	$1,014	$0	1.1
Main Hallway 2	100	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,188	2, 4	Relamp	Yes	100	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,199	3.0	14,723	-3	$1,856	$5,227	$2,575	1.4
Main Hallway 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
Main Hallway 3	18	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	35	3,188	4	None	Yes	18	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	2,199	0.1	685	0	$86	$450	$450	0.0
Main Hallway 4	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
Main Hallway 4	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	35	3,188		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	35	3,188	0.0	0	0	$0	$0	$0	0.0
Main Hallway 5	7	Exit Signs: Incandescent	None		60	8,760	3	Fixture Replacement	No	7	LED Exit Signs: 2 W Lamp	None	6	8,760	0.3	3,642	-1	$459	$507	$0	1.1
Main Hallway 5	27	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,188	2, 4	Relamp	Yes	27	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,199	1.2	5,963	-1	$752	$1,929	$855	1.4
Main Office 1	4	Exit Signs: Incandescent	None		60	8,760	3	Fixture Replacement	No	4	LED Exit Signs: 2 W Lamp	None	6	8,760	0.2	2,081	0	$262	$290	$0	1.1
Main Office 1	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	2,550	2, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,760	0.0	179	0	$23	$98	$18	3.5

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Main Office 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	2,550	2	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,550	0.0	49	0	$6	$18	$5	2.1
Main Office 1	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,550	2, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,760	0.1	530	0	$67	$434	$80	5.3
Media Center	3	Exit Signs: Incandescent	None		60	8,760	3	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.1	1,561	0	$197	$217	$0	1.1
Media Center	8	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	45	2,168	4	None	Yes	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	45	1,496	0.1	266	0	$34	$270	$35	7.0
Media Center	28	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2, 4	Relamp	Yes	28	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,496	0.8	2,803	-1	$353	$1,562	$350	3.4
Music Room	2	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	25	2,168	4	None	Yes	2	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	25	1,496	0.0	37	0	$5	$116	$20	20.6
Music Room	16	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	35	2,168	4	None	Yes	16	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	1,496	0.1	414	0	$52	$540	$70	9.0
Music Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,496	0.1	300	0	$38	$380	$65	8.3
Music Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,168	2	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,168	0.0	134	0	$17	$73	$20	3.1
Office - Enclosed 1	4	Compact Fluorescent: (1) 60W Plug-in Lamps	Wall Switch	S	60	2,168	2, 4	Relamp	Yes	4	LED Lamps: (1) 42W plug-in	Occupancy Sensor	42	1,496	0.1	296	0	$37	$320	$39	7.5
Office - Enclosed 1	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,168	2, 4	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,496	0.6	2,002	0	$252	$1,270	$270	4.0
Restroom - Female 1	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,152	2, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	795	0.1	160	0	$20	$380	$65	15.6
Restroom - Female 2	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	1,152	2, 4	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	795	0.1	111	0	$14	$343	$55	20.5
Restroom - Female 3	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,152	2, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	795	0.1	160	0	$20	$380	$65	15.6
Restroom - Female 4	1	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	1,152	2	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	9	1,152	0.0	65	0	$8	$17	$1	2.0
Restroom - Female 4	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,152	2, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	795	0.1	160	0	$20	$380	$65	15.6
Restroom - Female 5	1	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	1,152	2	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	9	1,152	0.0	65	0	$8	$17	$1	2.0
Restroom - Female 5	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,152	2, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	795	0.1	160	0	$20	$380	$65	15.6
Restroom - Male 1	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,152	2, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	795	0.1	213	0	$27	$416	$75	12.7
Restroom - Male 2	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	1,152	2, 4	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	795	0.1	111	0	$14	$343	$55	20.5
Restroom - Male 3	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,152	2, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	795	0.1	106	0	$13	$343	$55	21.5
Restroom - Male 4	1	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	1,152	2	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	9	1,152	0.0	65	0	$8	$17	$1	2.0
Restroom - Male 4	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,152	2, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	795	0.1	160	0	$20	$380	$65	15.6
Restroom - Male 5	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,152	2, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	795	0.1	213	0	$27	$416	$75	12.7
Restroom- Female 6	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,152	2, 4	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	795	0.2	319	0	$40	$489	$95	9.8

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Restroom- Male 6	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,152	2, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	795	0.1	239	0	$30	$434	$80	11.7
Side room 1	1	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	2,168	2	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	9	2,168	0.0	122	0	$15	$17	$1	1.1
Side room 1	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	2,168	2	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	2,168	0.0	32	0	$4	$16	$3	3.3
Side room 1	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	2,168	2, 4	Relamp	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,496	0.0	157	0	$20	$171	$35	6.8
Storage 1	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,152	2, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	795	0.4	639	0	$81	$708	$120	7.3
Storage 2	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	1,152	2, 4	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	795	0.1	111	0	$14	$189	$20	12.0
Storage 3	8	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	1,152	2, 4	Relamp	Yes	8	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	795	0.1	223	0	$28	$416	$40	13.4

Motor Inventory & Recommendations

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	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 101	Classroom 101	1	Exhaust Fan	0.3	60.0%	No			W	2,000		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	Various	3	Exhaust Fan	0.3	60.0%	No			W	2,000		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	Various	2	Exhaust Fan	0.3	60.0%	No			W	2,000		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	Various	1	Exhaust Fan	0.3	60.0%	No			W	2,000		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	Various	2	Exhaust Fan	0.3	60.0%	No			W	2,000		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	Various	1	Exhaust Fan	0.3	60.0%	No			W	2,000		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	Various	1	Exhaust Fan	0.3	60.0%	No			W	2,000		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	Various	1	Exhaust Fan	0.3	60.0%	No			W	2,000		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	Various	1	Exhaust Fan	0.3	60.0%	No			W	2,000		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	Various	1	Exhaust Fan	0.3	60.0%	No			W	2,000		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	Various	2	Exhaust Fan	0.3	60.0%	No			W	2,000		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	Various	1	Exhaust Fan	0.3	60.0%	No			W	2,000		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	Various	4	Exhaust Fan	0.3	60.0%	No			W	2,000		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	Various	1	Exhaust Fan	0.3	60.0%	No			W	2,000		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	Various	1	Exhaust Fan	0.3	60.0%	No			W	2,000		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	Various	1	Exhaust Fan	0.3	60.0%	No			W	2,000		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	Various	1	Exhaust Fan	0.3	60.0%	No			W	2,000		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	Various	1	Exhaust Fan	0.3	60.0%	No			W	2,000		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Side room 1	Side room 1	1	Exhaust Fan	0.3	60.0%	No			W	2,000		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	Kitchen	1	Kitchen Hood Exhaust Fan	0.3	60.0%	No			W	1,425		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
Exterior 2	Kitchen	1	Kitchen Hood Exhaust Fan	0.3	60.0%	No			W	1,425		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	MZ-1 Area A	1	Supply Fan	5.0	89.5%	No				1,750	5	No	89.5%	Yes	1	1.4	2,735	0	$351	$4,076	$900	9.1
Exterior 2	MZ-1 Area A	1	Return Fan	2.0	89.5%	No				1,750	5	No	89.5%	Yes	1	0.6	1,094	0	$140	$3,261	$100	22.5
Exterior 2	HV1 Kitchen	1	Supply Fan	1.0	87.5%	No			W	1,750	5	No	87.5%	Yes	1	0.3	560	0	$72	$3,010	$75	40.9
Exterior 2	Furnace	1	Supply Fan	3.0	89.5%	No	Captive Aire Systems	NRTP 3-A2-D 500-G15-NCA18Fa	B	1,750		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	Furnace	1	Supply Fan	2.0	87.5%	No	Captive Aire Systems	NRTP 3-A2-D 500-G15-NCA18Fa	B	1,750		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	MZ 3 - Library	1	Supply Fan	5.0	89.5%	No				1,750	5	No	89.5%	Yes	1	1.4	2,735	0	$351	$4,076	$900	9.1
Exterior 2	MZ 3 - Library	1	Return Fan	2.0	89.5%	No				1,750	5	No	89.5%	Yes	1	0.6	1,094	0	$140	$3,261	$100	22.5
Exterior 2	POD A - Mezzanine 1 - condensing unit	3	Supply Fan	1.0	84.5%	No	Trane	RAUCC25LBY13ABD000000	B	1,750	5	No	85.5%	Yes	3	0.9	1,775	0	$228	$9,030	$225	38.7
Exterior 2	MZ 3 - Library/Media Center - Condensing unit	3	Supply Fan	1.0	84.5%	No	Trane	RAUCC30EBY13ABD000000	B	1,750	5	No	85.5%	Yes	3	0.9	1,775	0	$228	$9,030	$225	38.7
Exterior 2	AHU SZ4 - Cafeteria	1	Supply Fan	7.5	91.7%	No	Trane	CSAA0.12UAB00	B	1,750	5	No	91.7%	Yes	1	2.1	4,004	0	$514	$4,738	$1,000	7.3
Exterior 2	AHU SZ4 - Cafeteria	1	Return Fan	3.0	89.5%	No	Trane	CSAA0.12UAB00	B	1,750	5	No	89.5%	Yes	1	0.9	1,641	0	$211	$3,884	$200	17.5
Exterior 2	AC13 - Section D1 - Classrooms	1	Supply Fan	15.0	92.4%	No	Trane	YCD420AEHU2B7GE10B0D000000K000R	B	1,750	5	No	93.0%	Yes	1	4.3	8,040	0	$1,031	$7,041	$1,200	5.7
Exterior 2	AC13 - Section D1 - Classrooms	2	Exhaust Fan	1.0	84.5%	No	Trane	YCD420AEHU2B7GE10B0D000000K000R	B	1,750	5	No	85.5%	Yes	2	0.6	1,183	0	$152	$6,020	$150	38.7
Exterior 2	AC14 - Music 14	1	Supply Fan	0.5	70.0%	No	Trane	YCD181C3HCCA	B	1,750		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	AC12 - Gym	2	Supply Fan	10.0	91.7%	No	Trane	YCH360AEHU2B6DE10B0D000000K000R	B	1,750	5	No	91.7%	Yes	2	5.7	10,677	0	$1,370	$10,303	$2,200	5.9
Exterior 2	AC12 - Gym	4	Exhaust Fan	1.0	85.5%	No	Trane	YCH360AEHU2B6DE10B0D000000K000R	B	1,750	5	No	85.5%	Yes	4	1.2	2,290	0	$294	$12,041	$300	40.0
Exterior 2	AC 1 - Section A2 Classrooms and corridors	2	Supply Fan	1.0	85.5%	No	Trane	YCH211C3HBCA	B	1,750	5	No	85.5%	Yes	2	0.6	1,145	0	$147	$6,020	$150	40.0
Exterior 2	AC10 - Main Office & Nurses room	2	Supply Fan	0.5	70.0%	No	Trane	YCD151C3HRBB	B	2,188		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	AC2 - Section A1 Classrooms and corridors	1	Supply Fan	15.0	92.4%	No	Trane	YCH480AEHU2B7LE10B0D000000K000R	B	1,750	5	No	93.0%	Yes	1	4.3	8,040	0	$1,031	$7,041	$1,200	5.7

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	**Area(s)/System(s) Served**	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Exterior 2	AC2 - Section A1 Classrooms and corridors	2	Exhaust Fan	1.0	85.5%	No	Trane	YCH480AEHU2B7LE10B0D00000K0000R	B	1,750	5	No	85.5%	Yes	2	0.6	1,145	0	$147	$6,020	$150	40.0
Exterior 2	AC6 - Kitchen	1	Supply Fan	1.0	84.5%	No	Trane	Unknown	B	1,750	5	No	85.5%	Yes	1	0.3	592	0	$76	$3,010	$75	38.7
Exterior 2	AC9 - Section D2 - Classrooms	1	Supply Fan	15.0	92.4%	No	Trane	YCD420AEHU2B7GE10B0D00000K0000R	B	1,750	5	No	93.0%	Yes	1	4.3	8,040	0	$1,031	$7,041	$1,200	5.7
Exterior 2	AC9 - Section D2 - Classrooms	2	Exhaust Fan	1.0	84.5%	No	Trane	YCD420AEHU2B7GE10B0D00000K0000R	B	1,750	5	No	85.5%	Yes	2	0.6	1,183	0	$152	$6,020	$150	38.7
Exterior 2	AC7 - Corridor 311	2	Supply Fan	1.0	84.5%	No	Trane	YCD241C4HCCA	B	1,750	5	No	85.5%	Yes	2	0.6	1,183	0	$152	$6,020	$150	38.7
Exterior 2	AC5 - Multipurpose room	1	Supply Fan	15.0	92.4%	No	Trane	YCD420AEHU2B7GE10B0D00000K0000R	B	1,750	5	No	93.0%	Yes	1	4.3	8,040	0	$1,031	$7,041	$1,200	5.7
Exterior 2	AC5 - Multipurpose room	2	Exhaust Fan	1.0	84.5%	No	Trane	YCD420AEHU2B7GE10B0D00000K0000R	B	1,750	5	No	85.5%	Yes	2	0.6	1,183	0	$152	$6,020	$150	38.7
Exterior 2	RTU 1 - Multipurpose room	1	Supply Fan	15.0	92.4%	No	Trane	YCH420B4HF4B3GE10BD00000K000PR0	W	1,750	5	No	93.0%	Yes	1	4.3	8,040	0	$1,031	$7,041	$1,200	5.7
Exterior 2	RTU 1 - Multipurpose room	2	Exhaust Fan	1.0	84.5%	No	Trane	YCH420B4HF4B3GE10BD00000K000PR0	W	1,750	5	No	85.5%	Yes	2	0.6	1,183	0	$152	$6,020	$150	38.7
Exterior 2	AC8 - Gym storage	1	Supply Fan	7.5	92.4%	No	Trane	YCH420B4HF4B3GE10BD00000K000PR0	W	1,750	5	No	92.4%	Yes	1	2.1	3,974	0	$510	$4,738	$1,000	7.3
Exterior 2	AC8 - Gym storage	1	Exhaust Fan	1.0	84.5%	No	Trane	YCH420B4HF4B3GE10BD00000K000PR0	W	1,750	5	No	85.5%	Yes	1	0.3	592	0	$76	$3,010	$75	38.7
Boiler room 1	Boiler - Pump 3 and 4	2	Heating Hot Water Pump	7.5	88.5%	Yes	Armstrong	3x3x8 4380		2,190		No	88.5%	No		0.0	0	0	$0	$0	$0	0.0
Boiler room 1	Boiler - Pump 1, 2, 5, 6	4	Heating Hot Water Pump	7.5	88.5%	No	WEG		W	2,190	6	No	91.0%	Yes	4	3.2	21,795	0	$2,796	$18,953	$4,000	5.3
Exterior 2	Various	3	Exhaust Fan	0.5	60.0%	No				1,750		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Gymnasium 1	Gymnasium 1	1	Other	0.8	77.0%	No			W	1,750		No	77.0%	No		0.0	0	0	$0	$0	$0	0.0
Gymnasium 2	Gymnasium 2	1	Other	0.8	77.0%	No			W	1,750		No	77.0%	No		0.0	0	0	$0	$0	$0	0.0
Gymnasium 2	Gymnasium 2	1	Other	0.8	77.0%	No			W	1,750		No	77.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	AC11 - Gym	2	Supply Fan	10.0	91.7%	No	Trane	YCH360AEHU2B6DE10B0D00000K000OR	B	1,750	5	No	91.7%	Yes	2	5.7	10,677	0	$1,370	$10,303	$2,200	5.9
Exterior 2	AC11 - Gym	4	Exhaust Fan	1.0	85.5%	No	Trane	YCH360AEHU2B6DE10B0D00000K000OR	B	1,750	5	No	85.5%	Yes	4	1.2	2,290	0	$294	$12,041	$300	40.0

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 112	Classroom 112	1	Electric Resistance Heat		17.06		1 COP			B		No							0.0	0	0	$0	$0	$0	0.0
Exterior 2	Exterior 2	2	Electric Resistance Heat		17.06		1 COP			B		No							0.0	0	0	$0	$0	$0	0.0
Main Hallway 1	Main Hallway 1	3	Electric Resistance Heat		17.06		1 COP			B		No							0.0	0	0	$0	$0	$0	0.0
Main Hallway 2	Main Hallway 2	2	Electric Resistance Heat		17.06		1 COP			B		No							0.0	0	0	$0	$0	$0	0.0
Restroom - Female 1	Restroom - Female 1	1	Electric Resistance Heat		17.06		1 COP			B		No							0.0	0	0	$0	$0	$0	0.0
Restroom - Male 1	Restroom - Male 1	1	Electric Resistance Heat		17.06		1 COP			B		No							0.0	0	0	$0	$0	$0	0.0
Exterior 2	Unknown	1	Forced Air Furnace		183.00		0.74390243902439 Et	Captive Aire Systems	NRTP 3-A2-D 500-G15-NCA18Fa	B	9	Yes	1	Forced Air Furnace		183.00		0.97 AFUE	0.0	0	14	$144	$6,584	$500	42.2
Exterior 2	HV1 - Kitchen	1	Forced Air Furnace		200.00		0.8 Et	Trane		B	9	Yes	1	Forced Air Furnace		200.00		0.97 AFUE	0.0	0	11	$110	$6,709	$500	56.4
Exterior 2	MZ-1 POD Area A	1	Split-System	25.00		11.10		Trane	RAUCC25LBY13ABD000000	B	7	Yes	1	Split-System	25.00		12.50		1.5	1,877	0	$241	$29,716	$2,125	114.6
Exterior 2	MZ 3 - Library/Media Center + guidance	1	Split-System	30.00		11.10		Trane	RAUCC30EBY13ABD000000	B	7	Yes	1	Split-System	30.00		12.50		1.8	2,252	0	$289	$28,881	$2,550	91.1
Exterior 2	Unknown	1	Split-System	0.75		11.40		Sanyo	CL0971	B	7	Yes	1	Split-System	0.75		16.00		0.1	141	0	$18	$5,234	$79	285.6
Exterior 2	AHU SZ4 - Cafeteria	1	Split-System	15.00		11.20		Trane	TTA180B3O0FA	B	7	Yes	1	Split-System	15.00		14.00		1.6	1,993	0	$256	$14,464	$1,335	51.4
Exterior 2	AC14 - Music 14	1	Package Unit	15.00	284.00	11.20	0.811428571428571 Et	Trane	YCD181C3HCCA	B	7	Yes	1	Package Unit	15.00	284.00	14.00	0.82 Et	1.6	1,993	1	$265	$17,812	$1,335	62.2
Exterior 2	AC13 - Section D1 Graphics	1	Package Unit	35.00	486.00	11.00	0.81 Et	Trane	YCD420AEHU2B7GE10B0D00000K000R	B	7	Yes	1	Package Unit	35.00	486.00	12.50	0.82 Et	2.3	2,841	2	$383	$34,499	$2,975	82.3
Exterior 2	AC12 - Gym	2	Package Unit	30.00	486.00	11.00	0.81 Et	Trane	YCH360AEHU2B6DE10B0D00000K000R	B	7	Yes	2	Package Unit	30.00	486.00	12.50	0.82 Et	3.9	4,870	4	$662	$60,769	$5,100	84.2
Exterior 2	AC 1 - Section A1 Classrooms and corridors	1	Package Unit	17.58	284.00	11.00	0.811428571428571 Et	Trane	YCH211C3HBCA	B	7	Yes	1	Package Unit	17.58	284.00	14.00	0.82 Et	2.1	2,548	1	$336	$20,002	$1,565	54.9
Exterior 2	AC10 - Main Office & Nurses room	1	Package Unit	12.58	203.00	11.00	0.812 Et	Trane	YCD151C3HRBB	B	7	Yes	1	Package Unit	12.58	203.00	14.00	0.82 Et	1.5	1,824	1	$240	$15,754	$1,120	61.0
Exterior 2	AC2 - Section A1 Classrooms and corridors	1	Package Unit	40.00	648.00	11.00	0.81 Et	Trane	YCH480AEHU2B7LE10B0D00000K000R	B	7	Yes	1	Package Unit	40.00	648.00	12.50	0.82 Et	2.6	3,247	2	$441	$38,575	$3,400	79.8
Exterior 2	AC6 - Kitchen cafeterium	1	Package Unit	7.50	145.00	11.00	0.805555555555556 Et	Trane	Unknown	B	7	Yes	1	Package Unit	7.50	145.00	14.00	0.82 Et	0.9	1,087	1	$147	$11,397	$593	73.3
Exterior 2	AC13 - Section D1 - Classrooms - POD B 1-6	1	Package Unit	35.00	486.00	11.00	0.81 Et	Trane	YCD420AEHU2B7GE10B0D00000K000R	B	7	Yes	1	Package Unit	35.00	486.00	12.50	0.82 Et	2.3	2,841	2	$383	$34,499	$2,975	82.3

		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
Exterior 2	AC9 - Section D2 - Classrooms - 202,203,204,205	1	Package Unit	35.00	486.00	11.00	0.81 Et	Trane	YCD420AEHU2B7GE10B0D00000K0000R	B	7	Yes	1	Package Unit	35.00	486.00	12.50	0.82 Et	2.3	2,841	2	$383	$34,499	$2,975	82.3
Exterior 2	AC7 - 303,304,305,306,307,308	1	Package Unit	20.08	324.00	11.00	0.81 Et	Trane	YCD241C4HCCA	B	7	Yes	1	Package Unit	20.08	324.00	12.50	0.82 Et	1.3	1,630	1	$221	$22,111	$1,707	92.2
Exterior 2	AC5 - Multipurpose room	1	Package Unit	35.00	486.00	11.00	0.81 Et	Trane	YCD420AEHU2B7GE10B0D00000K0000R	B	7	Yes	1	Package Unit	35.00	486.00	12.50	0.82 Et	2.3	2,841	2	$383	$34,499	$2,975	82.3
Exterior 2	RTU 1 - Multipurpose room	1	Package Unit	35.00	486.00	11.00	0.81 Et	Trane	YCH420B4HF4B3GE10BD00000K000PR0	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 2	AC8 - Gym storage - 300,301,302	1	Package Unit	27.50	486.00	11.00	0.81 Et	Trane	YCD330A4HU2B5BE10B0D00000K0000R	B	7	Yes	1	Package Unit	27.50	486.00	12.50	0.82 Et	1.8	2,232	2	$305	$28,313	$2,338	85.2
Boiler Room 1	Boiler Room 1	1	Unit Heater		64.00		0.8 Et	Sterling		B		No							0.0	0	0	$0	$0	$0	0.0
Classroom 202	Classroom 202	1	Unit Heater		64.00		0.8 Et			B		No							0.0	0	0	$0	$0	$0	0.0
Classroom 204	Classroom 204	1	Unit Heater		64.00		0.8 Et			B		No							0.0	0	0	$0	$0	$0	0.0
Classroom 205	Classroom 205	1	Unit Heater		64.00		0.8 Et			B		No							0.0	0	0	$0	$0	$0	0.0
Exterior 2	AC11 - Gym	1	Package Unit	30.00	486.00	11.00	0.81 Et	Trane	YCH360AEHU2B6DE10B0D00000K000OR	B	7	Yes	1	Package Unit	30.00	486.00	12.50	0.82 Et	2.0	2,435	2	$331	$30,385	$2,550	84.2

Space Heating Boiler Inventory & Recommendations

		Existing Conditions						Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Boiler room 1	All school	2	Condensing Hot Water Boiler	2,874	Aerco	BMK 3.0 Nox	W		No						0.0	0	0	$0	$0	$0	0.0
Boiler room 2	Boiler room 2	1	Non-Condensing Hot Water Boiler	134	Slant Fin	VSPH-180	B	8	Yes	1	Non-Condensing Hot Water Boiler	134	85.00%	AFUE	0.0	0	3	$28	$4,902	$400	158.1

Pipe Insulation Recommendations

		Recommendation Inputs			Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	ECM #	Length of Uninsulated Pipe (ft)	Pipe Diameter (in)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Boiler room 2	Kitchen and restrooms	10	30	1.00	0.0	2,462	0	$316	$173	$60	0.4

DHW Inventory & Recommendations

		Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Manufacturer	Model	Remaining Useful Life	ECM #	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room 1	Kitchen and restroom	2	Storage Tank Water Heater (> 50 Gal)	AO Smith	BTH 199 100	W		No						0.0	0	0	$0	$0	$0	0.0
Boiler Room 2	Kitchen and restroom	1	Storage Tank Water Heater (≤ 50 Gal)	Rheem	EGSP20	B		No						0.0	0	0	$0	$0	$0	0.0
Janitorial 5	Kitchen and restroom	1	Storage Tank Water Heater (> 50 Gal)	Rheem	G72-250A	B	11	Yes	1	Storage Tank Water Heater (> 50 Gal)	Natural Gas	93.00%	UEF	0.0	0	44	$461	$17,542	$875	36.1

Low-Flow Device Recommendations

	Recommendation Inputs					Energy Impact & Financial Analysis						
Location	ECM #	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	12	17	Faucet Aerator (Kitchen)	2.50	1.50	0.0	0	5	$50	$122	$34	1.8
Lavatory	12	28	Faucet Aerator (Lavatory)	2.50	0.50	0.0	0	16	$164	$201	$100	0.6
Lavatory	12	49	Faucet Aerator (Lavatory)	2.20	0.50	0.0	0	23	$244	$351	$176	0.7
Gymnasium	12	2	Showerhead	2.50	1.50	0.0	0	2	$16	$179	$30	9.1
Utility Faucet	12	1	Faucet Aerator (Kitchen)	2.20	1.50	0.0	0	0	$2	$7	$2	2.5

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions				Proposed Conditions				Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	Manufacturer	Model	ECM #	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Evaporator Fan Control?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Exterior	1	Cooler (35F to 55F)	Master Bilt	MHHX0111C	14, 15	Yes	Yes	No	0.0	1,423	0	$183	$822	$90	4.0
Exterior	1	Medium Temp Freezer (0F to 30F)	Master Bilt	MHLZ0091C	14, 15	Yes	Yes	No	0.1	1,687	0	$216	$1,125	$130	4.6

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	Manufacturer	Model	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Lower kitchen	1	Freezer Chest	Artic Aire		Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen 3	1	Stand-Up Refrigerator, Solid Door (>50 cu. ft.)	TRUE	TR2R-4HS	No	16	Yes	0.1	1,045	0	$134	$2,432	$200	16.6
Lower Kitchen	1	Stand-Up Refrigerator, Glass Door (31 - 50 cu. ft.)	Traulsen	G20010	Yes		No	0.0	0	0	$0	$0	$0	0.0

Commercial Ice Maker Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Ice Maker 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 3	1	Self-Contained Unit (≥175 lbs/day), Batch	Ice-O-Matic		No	16	Yes	0.0	378	0	$49	$3,444	$50	70.0

Cooking Equipment Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	Manufacturer	Model	High Efficiency Equipement?	ECM #	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen 3	1	Electric Combination Oven/Steam Cooker (<15 Pans)	U.S Range		No	13	Yes	2.4	4,951	0	$635	$15,789	$1,000	23.3
Kitchen 3	1	Gas Fryer	PitCO		No	13	Yes	0.0	0	37	$388	$5,621	$749	12.6
Lower Kitchen	1	Insulated Food Holding Cabinet (1/2 Size)	Wittco		No	13	Yes	0.1	53	0	$7	$2,374	$200	318.5
Kitchen 3	1	Insulated Food Holding Cabinet (Full Size)	Alto Shaam		Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen 3	1	Gas Rack Oven (Double)	Southbend		No	13	Yes	0.0	0	150	$1,568	$9,290	$2,000	4.6
Lower Kitchen	1	Gas Rack Oven (Double)	Southbend		No	13	Yes	0.0	0	150	$1,568	$9,290	$2,000	4.6
Lower Kitchen	1	Electric Steamer	GE		No	13	Yes	2.7	1,889	0	$242	$7,423	$1,250	25.5

Dishwasher Inventory & Recommendations

	Existing Conditions							Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Dishwasher Type	Manufacturer	Model	Water Heater Fuel Type	Booster Heater Fuel Type	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Payback w/ Incentives in Years
Kitchen 3	1	Single Tank Conveyor (High Temp)	Insinger		Natural Gas	N/A	No		No	0.0	0	0	$0	$0	$0	0.0
Lower Kitchen	1	Multi-Tank Conveyor (High Temp)	Hobart	CRS66A	Natural Gas	N/A	No		No	0.0	0	0	$0	$0	$0	0.0

Plug Load Inventory

	Existing Conditions					
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?	Manufacturer	Model
Manasquan ES	3	Coffee Machine	400	Yes		
Manasquan ES	1	Dehumidifier	800	Yes		
Manasquan ES	71	Desktop	145	Yes		
Manasquan ES	27	Ceiling Fan	70	Yes		
Manasquan ES	8	Microwave	900	Yes		
Manasquan ES	9	Air filter	120	Yes		
Manasquan ES	2	Paper Shredder	200	Yes		
Manasquan ES	64	Printer (Small/Medium)	100	Yes		
Manasquan ES	5	Printer (Copier)	200	Yes		
Manasquan ES	49	Projector	250	Yes		
Manasquan ES	4	Refrigerator - mini	60	Yes		
Manasquan ES	3	Refrigerator - residential	200	Yes		
Manasquan ES	8	Television	100	Yes		
Manasquan ES	1	Toaster Oven	1,200	Yes		
Manasquan ES	1	Soup Kettle	24,000	Yes	Market Forge	

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	ECM #	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Breakroom	1	Refrigerated	17	Yes	0.2	1,612	0	$207	$230	$50	0.9

Custom (High Level) Measure Analysis

Heat Pump Water Heater

Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis										
Description	Area(s)/System(s) Served	SF of Area Served	Fuel Type	Input Capacity per Unit (kW)	Tank Capacity per Unit (Gal)	Description	COP	Tank Capacity per Unit (Gal)	Estimated Unit Cost	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Base Incentives	Enhanced Incentives	Total Incentives	Total Net Cost	Payback w/o Incentives in Years	Payback w/ Incentives in Years
Storage Tank Water Heater (≤50 Gal)	Kitchen and restroom	12,000	Electric	3.0	20	Heat Pump Water Heater	2.5	20	$1,440.22	0.00	14,771	0	$1,895	$1,440	$0	$0	$0	$1,440	0.76	0.76

APPENDIX B: ENERGY STAR® STATEMENT OF ENERGY PERFORMANCE

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

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ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Manasquan Elementary School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 238,204
Built: 1967

For Year Ending: December 31, 2019
Date Generated: November 02, 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
Manasquan Elementary School 168 Broad Street Manasquan, New Jersey 08736	Manasquan Public School District 169 Broad Street Manasquan, NJ 08736 732-528-8800 x1923	Peter Crawley 169 Broad Street Manasquan, NJ 08736 732-528-8800 x1923 pcrawley@manasquan.k12.nj.us

Property ID: 16087454

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
38.1 kBtu/ft²

Source EUI
64.4 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	3,318,467 (36%)
Natural Gas (kBtu)	5,763,039 (64%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	60.3
National Median Source EUI (kBtu/ft²)	101.9
% Diff from National Median Source EUI	-37%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	614

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.