Local Government Energy Audit Report

West New York Public School No. 1

April 1, 2022

Prepared for:

West New York Board of Education
6129 Madison Street
West New York, New Jersey 07093

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.

Table of Contents

ENERGY EFFICIENCY INCENTIVE & REBATE TRANSITION

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

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

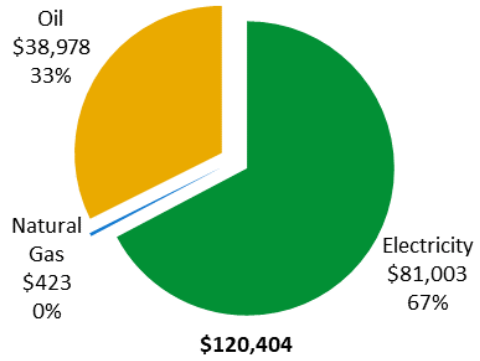
These "next generation" energy efficiency programs feature new ways of managing and delivering programs historically administered by New Jersey's Clean Energy Program™ (NJCEP). All of the investor-owned gas and electric utility companies will now also offer complementary energy efficiency programs and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

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

1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for West New York Public School No. 1. 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: $120,404 Electricity: 640,452 kWh Natural Gas: 256 Therms No. 2 Fuel Oil: 19,354 Gallons	
ENERGY STAR® Benchmarking Score	60 *(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.

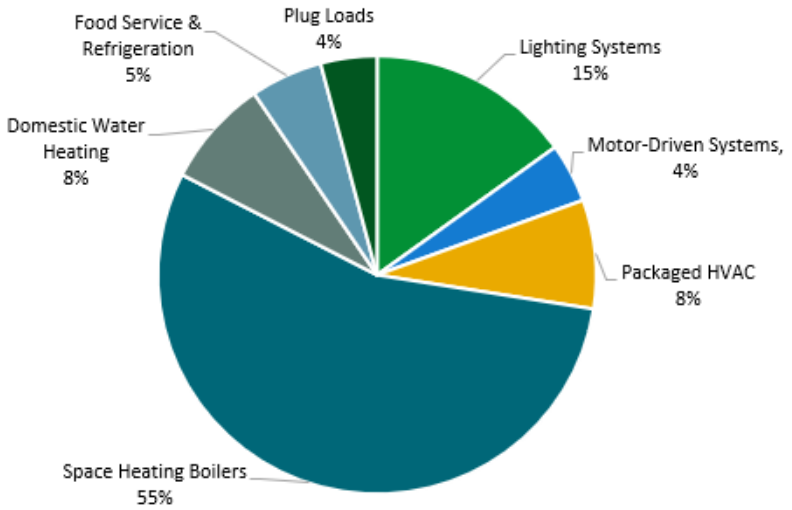


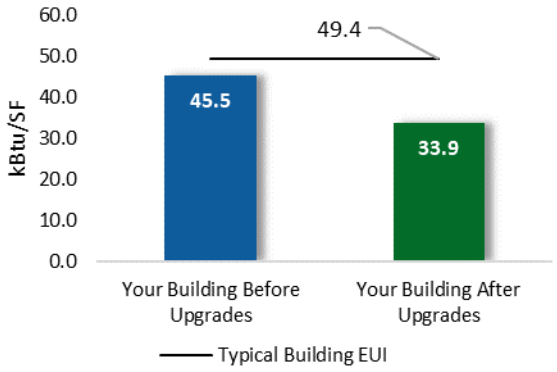
Figure 1 - Energy Use by System

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.

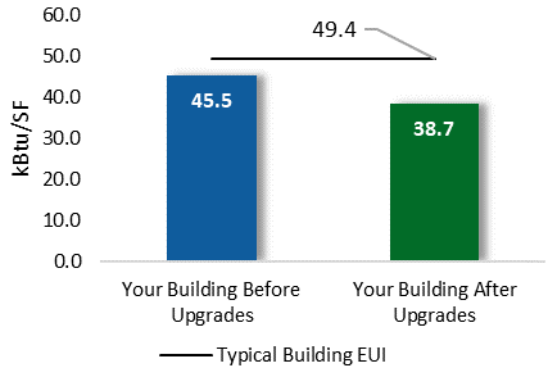
Scenario 1: Full Package (All Evaluated Measures)

Installation Cost	$464,034
Potential Rebates & Incentives[1]	$33,933
Annual Cost Savings	$37,308
Annual Energy Savings	Electricity: 245,986 kWh Natural Gas: 60 Therms No. 2 Fuel Oil: 2,927 Gallons
Greenhouse Gas Emission Savings	157 Tons
Simple Payback	11.6 Years
Site Energy Savings (All Utilities)	26%



Scenario 2: Cost Effective Package[2]

Installation Cost	$124,405
Potential Rebates & Incentives	$23,671
Annual Cost Savings	$28,511
Annual Energy Savings	Electricity: 231,799 kWh Natural Gas: 25 Therms No. 2 Fuel Oil: -421 Gallons
Greenhouse Gas Emission Savings	112 Tons
Simple Payback	3.5 Years
Site Energy Savings (all utilities)	15%



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			**117,240**	**25.5**	**-45**	**$14,176**	**$50,700**	**$11,366**	**$39,334**	**2.8**	**110,721**
ECM 1	Install LED Fixtures	Yes	19,074	2.4	-4	$2,355	$12,284	$1,250	$11,034	4.7	18,562
ECM 2	Retrofit Fixtures with LED Lamps	Yes	98,166	23.2	-41	$11,821	$38,416	$10,116	$28,300	2.4	92,159
Lighting Control Measures			**32,402**	**7.5**	**-14**	**$3,901**	**$37,252**	**$9,265**	**$27,987**	**7.2**	**30,411**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	26,465	6.7	-11	$3,186	$30,052	$3,910	$26,142	8.2	24,839
ECM 4	Install High/Low Lighting Controls	Yes	5,937	0.9	-2	$715	$7,200	$5,355	$1,845	2.6	5,572
Variable Frequency Drive (VFD) Measures			**13,634**	**4.4**	**0**	**$1,724**	**$28,913**	**$2,625**	**$26,288**	**15.2**	**13,729**
ECM 5	Install VFDs on Constant Volume (CV) Fans	Yes	9,022	2.9	0	$1,141	$19,436	$625	$18,811	16.5	9,085
ECM 6	Install VFDs on Heating Water Pumps	Yes	4,611	1.4	0	$583	$9,476	$2,000	$7,476	12.8	4,644
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**195**	**$2,838**	**$134,032**	**$10,018**	**$124,014**	**43.7**	**31,949**
ECM 7	Install High Efficiency Hot Water Boilers	No	0	0.0	195	$2,838	$134,032	$10,018	$124,014	43.7	31,949
HVAC System Improvements			**766**	**0.0**	**3**	**$139**	**$173**	**$58**	**$115**	**0.8**	**1,066**
ECM 8	Install Pipe Insulation	Yes	766	0.0	3	$139	$173	$58	$115	0.8	1,066
Domestic Water Heating Upgrade			**834**	**0.0**	**4**	**$164**	**$1,352**	**$267**	**$1,085**	**6.6**	**1,252**
ECM 9	Install High Efficiency Gas-Fired Water Heater	No	0	0.0	4	$58	$1,309	$245	$1,064	18.2	412
ECM 10	Install Low-Flow DHW Devices	Yes	834	0.0	0	$105	$43	$22	$22	0.2	840
Food Service & Refrigeration Measures			**2,915**	**0.2**	**0**	**$369**	**$3,924**	**$335**	**$3,589**	**9.7**	**2,936**
ECM 11	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	1,051	0.1	0	$133	$1,213	$160	$1,053	7.9	1,059
ECM 12	Refrigeration Controls	Yes	1,864	0.0	0	$236	$2,711	$175	$2,536	10.8	1,877
Custom Measures			**78,196**	**0.0**	**269**	**$13,797**	**$207,688**	**$0**	**$207,688**	**15.1**	**122,726**
ECM 13	Installation of an Energy Management System	No	14,187	0.0	269	$5,701	$204,288	$0	$204,288	35.8	58,270
ECM 14	Install Heat Pump Water Heater	Yes	64,009	0.0	0	$8,096	$3,400	$0	$3,400	0.4	64,457
TOTALS (COST EFFECTIVE MEASURES)			**231,799**	**37.6**	**-56**	**$28,511**	**$124,405**	**$23,671**	**$100,735**	**3.5**	**224,159**
TOTALS (ALL MEASURES)			**245,986**	**37.6**	**412**	**$37,108**	**$464,034**	**$33,933**	**$430,100**	**11.6**	**314,790**

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

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

Figure 2 – Evaluated Energy Improvements

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

1.1 Planning Your Project

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

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

Pick Your Installation Approach

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

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.

Ongoing Electric Savings with Demand Response

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

2 EXISTING CONDITIONS

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for West New York Public School No. 1. 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 August 17, 2021, TRC performed an energy audit at West New York Public School No. 1 located in West New York, New Jersey. TRC met with Rick Solares to review the facility operations and help focus our investigation on specific energy-using systems.

West New York Public School No. 1 is a four-story building with an annex, occupying 107,520 square foot and built in 1920. Spaces include classrooms and offices, as well as an auditorium, a gymnasium, a cafeteria, a kitchen, computer labs, a library, lounges, corridors, stairwells, restrooms, storage rooms, and electrical and mechanical spaces.

2.2 Building Occupancy

The facility is occupied from September to July, with the school year ending for students in July and restarting in September. Weekend occupancy varies, and the facility closes at 8:00 PM on weekdays. During a typical day, the facility is occupied by approximately 370 staff and 630 students.

Building Name	Weekday/Weekend	Operating Schedule
West New York Public School No. 1	Weekday	6:00 AM to 7:00 PM
	Weekend	Closed

Figure 3 - Building Occupancy Schedule

2.3 Building Envelope

West New York Public School No. 1 is a four-floor building connected to a three-floor annex building. Building walls are concrete block over structural steel with a brick facade. The roof is flat and covered with gravel, and it is in poor condition.

Most of the windows are single pane, double hung, and have aluminum frames. The glass-to-frame seals are in poor condition. The operable window weather seals are in poor condition, showing evidence of excessive wear. The building likely loses a lot of energy through infiltration around the windows.

The building has newer and older exterior doors that have aluminum frames. The newer doors have weather stripping that are in good condition. There are several older doors that are in poor condition. We recommend considering these for replacement as degraded window and door seals increase drafts and outside air infiltration.

Gravel roof

Facade

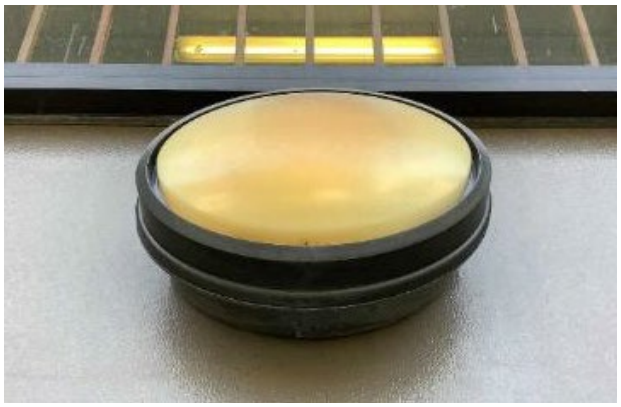
Windows

Exterior door

2.4 Lighting Systems

The primary interior lighting system uses a mix of 32W linear fluorescent T8 lamps and 20W or 40W LED fixtures. Fixture types include 2-lamp, 3-lamp, and 4-lamp, 2-foot, 4-foot, and 8-foot-long recessed, surface mounted, and pendant fixtures with linear tube lamps, and 2-foot fixtures with U-bend tube lamps. The 2 or 4-foot T8 and LED fixtures typically serve classrooms and restroom spaces. The 8-foot fixtures serve mainly some basement corridors. Typically, T8 fluorescent lamps use electronic ballasts.

Additionally, there are a few 26W and 39W compact fluorescent (CFL) general purpose lamps. Gymnasium fixtures have manually controlled high bay 250W metal halide lamps. All exit signs are 2W LED units. Interior lighting fixtures are primarily controlled by wall switches, with occupancy sensors located in the restrooms. Most fixtures are in good condition and interior lighting levels were generally sufficient. Exterior fixtures include 39W CFLs and 250W high pressure sodium wall pack fixtures and some LED fixtures controlled by a timeclock.



Wall pack CFL

T8 linear troffers

40W surface mounted interior LED fixtures

250W HPS wall pack

Gymnasium HPS

Occupancy Sensor - Restroom

2.5 Air Handling Systems

Unit Ventilators

Airdale unit ventilators, or fan coil units, are equipped with supply fan motors and pneumatically controlled outside air dampers and fan coil valves connected to the hot water distribution system. They provide heating and ventilation to classrooms. This system appears to be in fair operating condition.

Airdale UV units

Manual thermostats - Classrooms

Fan coil unit - Classroom

Unitary Electric Heating, Ventilation, and Air Conditioning (HVAC) Equipment

Most of the classrooms, the library, and a few offices are cooled by window air conditioning (AC) units. These vary in capacity between 0.8 and 2 tons. The units are in good condition and have onboard temperature controls. They have an average EER of 10.8.

Window AC - Classroom

Window AC – Computer Lab

Unitary Heating Equipment

The multipurpose room is heated by electric resistance heater with a 3kW capacity. The unit is in good condition. Equipment is controlled by a manual dial thermostat.

Electric resistance heater

Manual dial thermostat

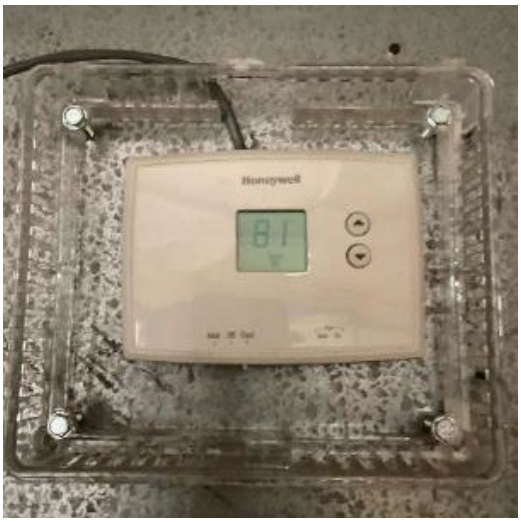
Packaged Units and Air Handlers

The cafeteria and kitchen are served by two split system heat pumps, each with a 10-ton direct expansion (DX) cooling capacity and 35 kW electric heating capacity. The units are equipped with constant speed supply and return fans. The fans were inaccessible at the time of the audit; therefore, the fan capacities have been assumed for analytical purposes.

The gymnasium air handling unit has a remote condenser with a 30-ton DX cooling capacity and is equipped with hot water coils for heating the space. The units have an average EER of 11. All the units were installed in 2012. The gym unit is on a program to be considered for replacement. The units are controlled by programmable thermostats.

Heat pump Condenser– Cafeteria/Kitchen

Heat pump – Cafeteria/Kitchen



Programmable thermostats - Gymnasium

Gymnasium condensing unit

Air handling unit - Gymnasium

2.6 Heating Hot Water Systems

Two HB Smith non-condensing, fuel-oil fired hot water boilers each with an output capacity of 3,853 MBh serve the building heating load. The burners are fully modulating with a nominal efficiency of 78%. The boilers are configured in an automated lead-lag control scheme. Both boilers are required under high load conditions. Installed in 2003, they are in fair condition and past their useful life. There is a service contract in place.

The hydronic distribution system is a two-pipe heating only system. The boilers are configured in a constant flow primary distribution with two 7.5 hp constant speed hot water pumps. The boilers provide hot water to unit ventilators, fan coil units, air handling units, and hot water radiators throughout the building.

Non-condensing boilers

7.5 hp HHWP

Fuel oil pump

2.7 Domestic Hot Water

Hot water is produced by two water heaters: one electric and one gas fired. The electric water heater has an input capacity of 54 kW and a tank capacity of 82 gallons. This unit was installed in 2017, is in good condition, and is well maintained. The gas fired water heater has an input capacity of 70 MBh, a 75-gallon tank capacity, and an 80% efficiency rating. This unit was installed in 2006 has been evaluated for replacement.

Fractional hp circulation pumps distribute hot water to its end uses. The domestic hot water pipes are partially insulated, and the insulation is in good condition. Additional pipe insulation has been evaluated.

Gas-fired Domestic Water Heater (DHW) – Boiler room

Electric water heater – Elevator room

2.8 Food Service Equipment

The kitchen has all-electric equipment that is used to prepare meals for students. Most cooking is done using a convection electric oven. Bulk prepared foods are held in several electric holding cabinets. Equipment is standard efficiency and in good condition.

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

Convection Oven

Food holding cabinets

2.9 Refrigeration

The kitchen has several solid doors stand up refrigerators and refrigerator chests. Equipment is standard efficiency and in good condition. The walk-in refrigerator has an estimated 0.67-ton compressor and a two-fan evaporator with evaporator fan control. The walk-in medium temperature freezer has a 0.75-ton compressor and a two-fan evaporator.

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

Walk-in cooler

Walk-in medium temperature freezer

Stand-up refrigerators

Refrigerator chest

2.10 Plug Load and Vending Machines

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

There are approximately 190 computer workstations and 630 Chromebooks® (one per student) throughout the facility. Plug loads include general cafe and office equipment. There are classroom typical loads such as smart boards, projectors, Chromebook carts, and fans.

There are several residential style refrigerators that are used to store food by staff. These vary in condition and efficiency.

Printer/Copier

Residential refrigerator

2.11 Water-Using Systems

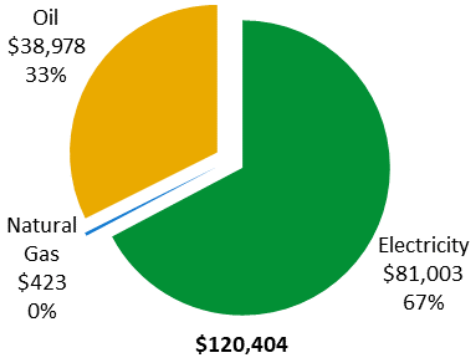
The faucet flow rates are at 2.2 gallons per minute (gpm), toilets are rated at 1.6 gallons per flush (gpf) and urinals are rated at 1.0 gpf. Low-flow fixtures for the restrooms have been evaluated.

Typical restroom sinks

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	640,452 kWh	$81,003
Natural Gas	256 Therms	$423
No. 2 Fuel Oil	19,354 Gallons	$38,978
Total		**$120,404**



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.

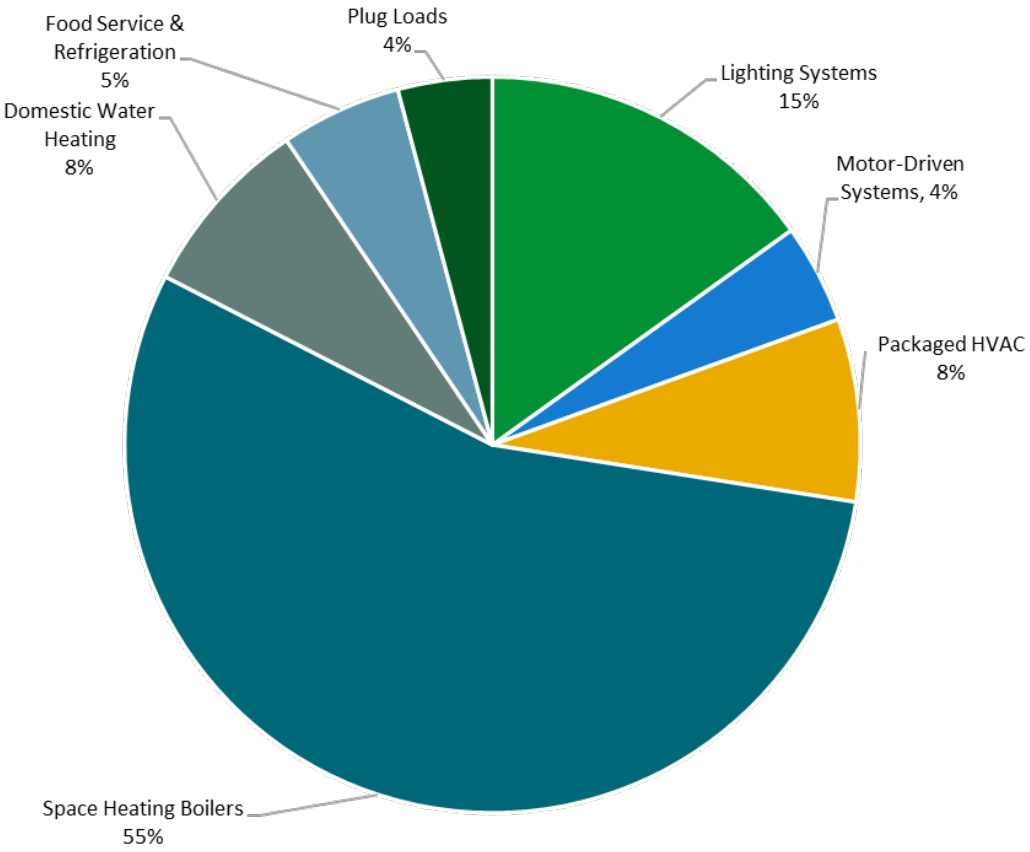
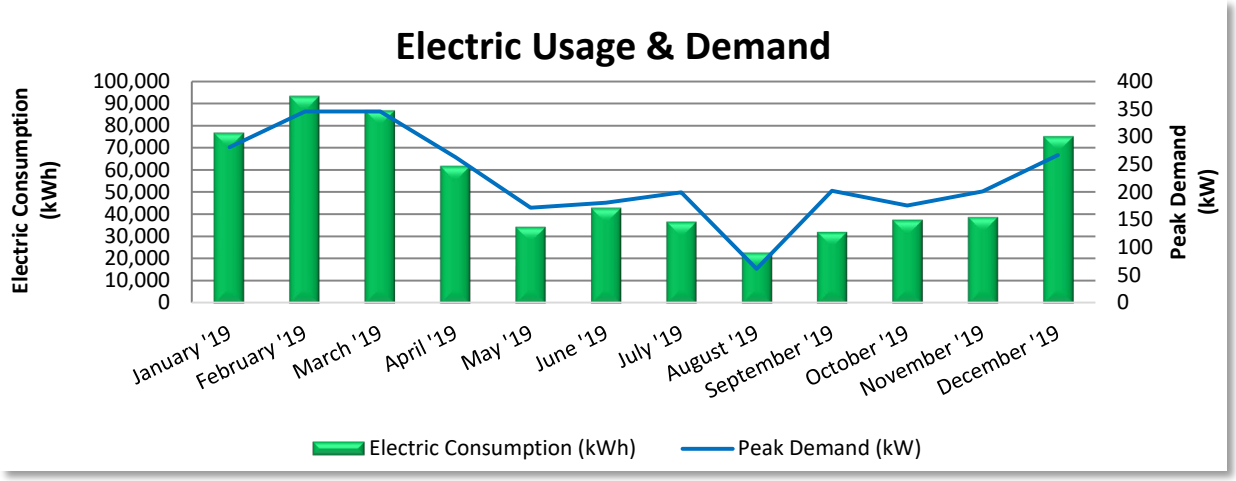


Figure 4 - Energy Balance

3.1 Electricity

PSE&G delivers electricity under rate class LPLS, with electric production provided by East Coast Power and Gas, a third-party supplier.



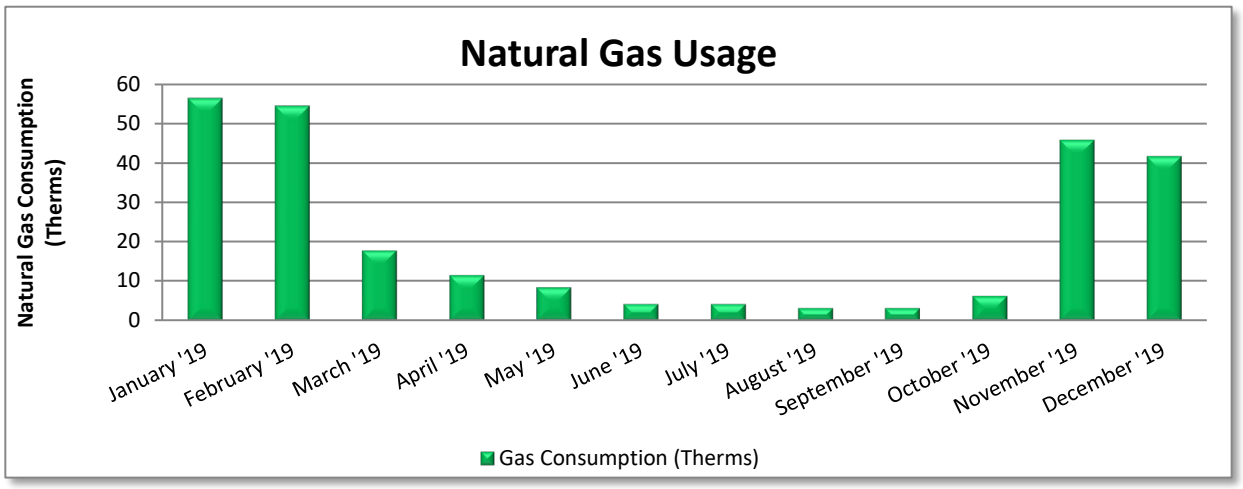
Electric Billing Data					
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**
1/15/19	32	76,641	281	$1,054	$8,487
2/14/19	30	93,044	346	$1,296	$10,360
3/15/19	29	86,658	346	$1,295	$9,665
4/16/19	32	61,720	263	$986	$7,053
5/14/19	28	34,422	171	$642	$4,324
6/14/19	31	42,932	181	$2,286	$6,804
7/16/19	32	36,791	199	$2,524	$6,452
8/14/19	29	22,872	61	$773	$3,359
9/13/19	30	32,198	203	$2,565	$6,057
10/14/19	31	37,590	176	$660	$4,676
11/12/19	29	38,828	201	$756	$4,893
12/13/19	31	75,001	267	$1,004	$8,649
Totals	**364**	**638,697**	**346**	**$15,843**	**$80,781**
Annual	**365**	**640,452**	**346**	**$15,886**	**$81,003**

Notes:

- Peak demand of 346 kW occurred in February '19.
- Average demand over the past 12 months was 225 kW.
- The average electric cost over the past 12 months was $0.126/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

PSE&G delivers natural gas under rate class GSG, with natural gas supply provided by East Coast Power and Gas, a third-party supplier.



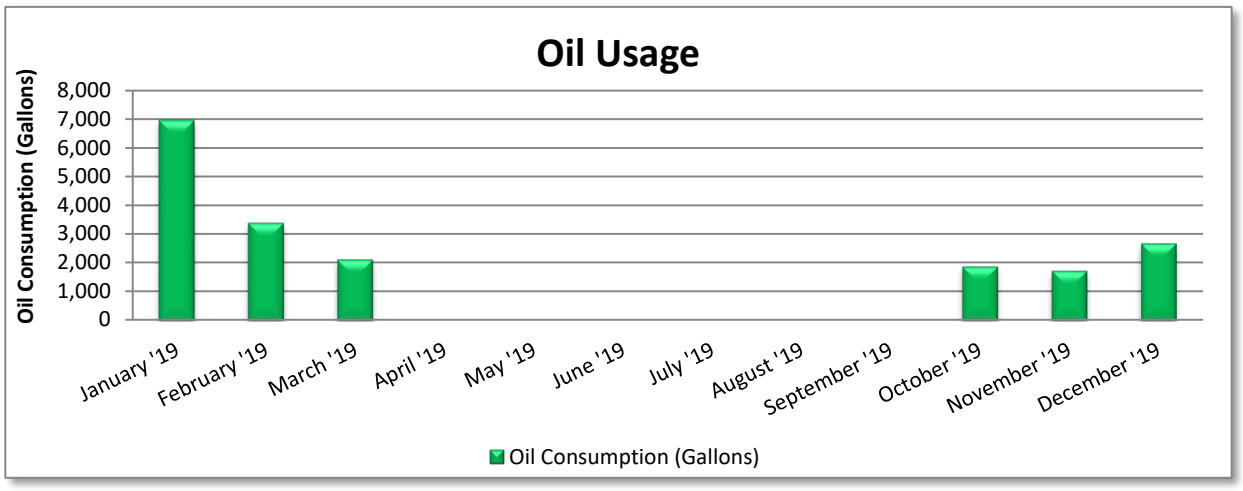
Gas Billing Data			
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**
1/17/19	34	57	$64
2/17/19	31	55	$69
3/19/19	30	18	$47
4/17/19	29	12	$24
5/17/19	30	8	$22
6/18/19	32	4	$19
7/18/19	30	4	$19
8/16/19	29	3	$18
9/17/19	32	3	$18
10/16/19	29	6	$21
11/14/19	29	46	$55
12/17/19	33	42	$51
Totals	**368**	**258**	**$427**
Annual	**365**	**256**	**$423**

Notes:

- The average gas cost for the past 12 months is $1.655/therm, which is the blended rate used throughout the analysis.
- Natural gas is used for domestic hot water heating at this site.

3.3 No. 2 Fuel Oil

Rachles-Michele's Oil Co delivers no. 2 fuel oil to the project site.



No. 2 Fuel Oil Billing Data			
Period Ending	**Days in Period**	**Oil Usage (Gallons)**	**Fuel Cost**
1/31/19	31	6,966	$13,569
2/27/19	27	3,392	$7,001
3/20/19	21	2,122	$4,377
4/30/19	41	0	$0
5/31/19	31	0	$0
6/30/19	30	0	$0
7/31/19	31	0	$0
8/31/19	31	0	$0
9/30/19	30	0	$0
10/31/19	31	1,878	$3,700
11/25/19	25	1,733	$3,453
12/20/19	25	2,680	$5,704
Totals	**354**	**18,771**	**$37,804**
Annual	**365**	**19,354**	**$38,978**

Notes:

- The average no. 2 fuel oil cost for the past 12 months is $2.014/Gallon, which is the blended rate used throughout the analysis.
- Fuel oil is used for space heating at this site.
- Fuel deliveries do not necessarily correspond to periods of use.

3.4 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	60

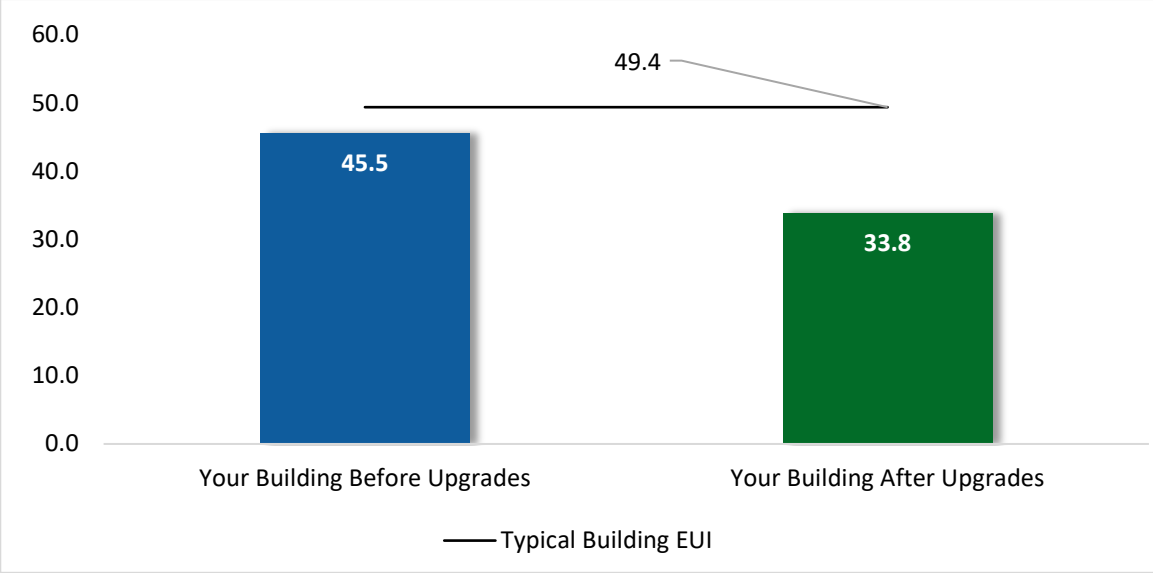


Figure 5 - Energy Use Intensity Comparison[3]

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			**117,240**	**25.5**	**-45**	**$14,176**	**$50,700**	**$11,366**	**$39,334**	**2.8**	**110,721**
ECM 1	Install LED Fixtures	Yes	19,074	2.4	-4	$2,355	$12,284	$1,250	$11,034	4.7	18,562
ECM 2	Retrofit Fixtures with LED Lamps	Yes	98,166	23.2	-41	$11,821	$38,416	$10,116	$28,300	2.4	92,159
Lighting Control Measures			**32,402**	**7.5**	**-14**	**$3,901**	**$37,252**	**$9,265**	**$27,987**	**7.2**	**30,411**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	26,465	6.7	-11	$3,186	$30,052	$3,910	$26,142	8.2	24,839
ECM 4	Install High/Low Lighting Controls	Yes	5,937	0.9	-2	$715	$7,200	$5,355	$1,845	2.6	5,572
Variable Frequency Drive (VFD) Measures			**13,634**	**4.4**	**0**	**$1,724**	**$28,913**	**$2,625**	**$26,288**	**15.2**	**13,729**
ECM 5	Install VFDs on Constant Volume (CV) Fans	Yes	9,022	2.9	0	$1,141	$19,436	$625	$18,811	16.5	9,085
ECM 6	Install VFDs on Heating Water Pumps	Yes	4,611	1.4	0	$583	$9,476	$2,000	$7,476	12.8	4,644
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**195**	**$2,838**	**$134,032**	**$10,018**	**$124,014**	**43.7**	**31,949**
ECM 7	Install High Efficiency Hot Water Boilers	No	0	0.0	195	$2,838	$134,032	$10,018	$124,014	43.7	31,949
HVAC System Improvements			**766**	**0.0**	**3**	**$139**	**$173**	**$58**	**$115**	**0.8**	**1,066**
ECM 8	Install Pipe Insulation	Yes	766	0.0	3	$139	$173	$58	$115	0.8	1,066
Domestic Water Heating Upgrade			**834**	**0.0**	**4**	**$164**	**$1,352**	**$267**	**$1,085**	**6.6**	**1,252**
ECM 9	Install High Efficiency Gas-Fired Water Heater	No	0	0.0	4	$58	$1,309	$245	$1,064	18.2	412
ECM 10	Install Low-Flow DHW Devices	Yes	834	0.0	0	$105	$43	$22	$22	0.2	840
Food Service & Refrigeration Measures			**2,915**	**0.2**	**0**	**$369**	**$3,924**	**$335**	**$3,589**	**9.7**	**2,936**
ECM 11	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	1,051	0.1	0	$133	$1,213	$160	$1,053	7.9	1,059
ECM 12	Refrigeration Controls	Yes	1,864	0.0	0	$236	$2,711	$175	$2,536	10.8	1,877
Custom Measures			**78,196**	**0.0**	**269**	**$13,797**	**$207,688**	**$0**	**$207,688**	**15.1**	**122,726**
ECM 13	Installation of an Energy Management System	No	14,187	0.0	269	$5,701	$204,288	$0	$204,288	35.8	58,270
ECM 14	Install Heat Pump Water Heater	Yes	64,009	0.0	0	$8,096	$3,400	$0	$3,400	0.4	64,457
TOTALS			**245,986**	**37.6**	**412**	**$37,108**	**$464,034**	**$33,933**	**$430,100**	**11.6**	**314,790**

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

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

Figure 6 – All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**117,240**	**25.5**	**-45**	**$14,176**	**$50,700**	**$11,366**	**$39,334**	**2.8**	**110,721**
ECM 1	Install LED Fixtures	19,074	2.4	-4	$2,355	$12,284	$1,250	$11,034	4.7	18,562
ECM 2	Retrofit Fixtures with LED Lamps	98,166	23.2	-41	$11,821	$38,416	$10,116	$28,300	2.4	92,159
Lighting Control Measures		**32,402**	**7.5**	**-14**	**$3,901**	**$37,252**	**$9,265**	**$27,987**	**7.2**	**30,411**
ECM 3	Install Occupancy Sensor Lighting Controls	26,465	6.7	-11	$3,186	$30,052	$3,910	$26,142	8.2	24,839
ECM 4	Install High/Low Lighting Controls	5,937	0.9	-2	$715	$7,200	$5,355	$1,845	2.6	5,572
Variable Frequency Drive (VFD) Measures		**13,634**	**4.4**	**0**	**$1,724**	**$28,913**	**$2,625**	**$26,288**	**15.2**	**13,729**
ECM 5	Install VFDs on Constant Volume (CV) Fans	9,022	2.9	0	$1,141	$19,436	$625	$18,811	16.5	9,085
ECM 6	Install VFDs on Heating Water Pumps	4,611	1.4	0	$583	$9,476	$2,000	$7,476	12.8	4,644
HVAC System Improvements		**766**	**0.0**	**3**	**$139**	**$173**	**$58**	**$115**	**0.8**	**1,066**
ECM 8	Install Pipe Insulation	766	0.0	3	$139	$173	$58	$115	0.8	1,066
Domestic Water Heating Upgrade		**834**	**0.0**	**0**	**$105**	**$43**	**$22**	**$22**	**0.2**	**840**
ECM 10	Install Low-Flow DHW Devices	834	0.0	0	$105	$43	$22	$22	0.2	840
Food Service & Refrigeration Measures		**2,915**	**0.2**	**0**	**$369**	**$3,924**	**$335**	**$3,589**	**9.7**	**2,936**
ECM 11	Refrigerator/Freezer Case Electrically Commutated Motors	1,051	0.1	0	$133	$1,213	$160	$1,053	7.9	1,059
ECM 12	Refrigeration Controls	1,864	0.0	0	$236	$2,711	$175	$2,536	10.8	1,877
Custom Measures		**64,009**	**0.0**	**0**	**$8,096**	**$3,400**	**$0**	**$3,400**	**0.4**	**64,457**
ECM 14	Install Heat Pump Water Heater	64,009	0.0	0	$8,096	$3,400	$0	$3,400	0.4	64,457
TOTALS		**231,799**	**37.6**	**-56**	**$28,511**	**$124,405**	**$23,671**	**$100,735**	**3.5**	**224,159**

* - 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		**117,240**	**25.5**	**-45**	**$14,176**	**$50,700**	**$11,366**	**$39,334**	**2.8**	**110,721**
ECM 1	Install LED Fixtures	19,074	2.4	-4	$2,355	$12,284	$1,250	$11,034	4.7	18,562
ECM 2	Retrofit Fixtures with LED Lamps	98,166	23.2	-41	$11,821	$38,416	$10,116	$28,300	2.4	92,159

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 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 and exterior fixtures.

ECM 2: Retrofit Fixtures with LED Lamps

Replace fluorescent, HID, or CFL 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 and CFL.

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		**32,402**	**7.5**	**-14**	**$3,901**	**$37,252**	**$9,265**	**$27,987**	**7.2**	**30,411**
ECM 3	Install Occupancy Sensor Lighting Controls	26,465	6.7	-11	$3,186	$30,052	$3,910	$26,142	8.2	24,839
ECM 4	Install High/Low Lighting Controls	5,937	0.9	-2	$715	$7,200	$5,355	$1,845	2.6	5,572

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

ECM 3: Install Occupancy Sensor Lighting Controls

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

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

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

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

Affected Building Areas: offices, conference rooms, classrooms, gymnasium, library, restrooms, and storage rooms.

ECM 4: Install High/Low Lighting Controls

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

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

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

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

Affected Building Areas: hallways and stairwells.

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

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		**13,634**	**4.4**	**0**	**$1,724**	**$28,913**	**$2,625**	**$26,288**	**15.2**	**13,729**
ECM 5	Install VFDs on Constant Volume (CV) Fans	9,022	2.9	0	$1,141	$19,436	$625	$18,811	16.5	9,085
ECM 6	Install VFDs on Heating Water Pumps	4,611	1.4	0	$583	$9,476	$2,000	$7,476	12.8	4,644

VFDs control motors for fans, pumps, and process equipment based on the actual output required of the driven equipment. Energy savings result from more efficient control of motor energy usage when equipment operates at partial load. The magnitude of energy savings depends on the estimated amount of time that the motor would operate at partial load.

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

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

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

For air handlers with 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: gymnasium and cafeteria/kitchen air handlers.

ECM 6: Install VFDs on Heating Water Pumps

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

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

Affected Pumps: two 7.5hp heating water pumps

4.4 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**	**195**	**$2,838**	**$134,032**	**$10,018**	**$124,014**	**43.7**	**31,949**
ECM 7	Install High Efficiency Hot Water Boilers	0	0.0	195	$2,838	$134,032	$10,018	$124,014	43.7	31,949

ECM 7: Install High Efficiency Hot Water Boilers

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

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

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

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

4.5 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		**766**	**0.0**	**3**	**$139**	**$173**	**$58**	**$115**	**0.8**	**1,066**
ECM 8	Install Pipe Insulation	766	0.0	3	$139	$173	$58	$115	0.8	1,066

ECM 8: 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 (both systems).

4.6 Domestic Water Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**834**	**0.0**	**4**	**$164**	**$1,352**	**$267**	**$1,085**	**6.6**	**1,252**
ECM 9	Install High Efficiency Gas-Fired Water Heater	0	0.0	4	$58	$1,309	$245	$1,064	18.2	412
ECM 10	Install Low-Flow DHW Devices	834	0.0	0	$105	$43	$22	$22	0.2	840

ECM 9: Install High Efficiency Gas-Fired Water Heater

We evaluated replacing the existing gas-fired 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 10: Install Low-Flow DHW Devices

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

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

Low-flow devices reduce the overall water flow from the fixture, while still providing adequate pressure for washing. Additional cost savings may result from reduced water usage.

4.7 Food Service & Refrigeration Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Food Service & Refrigeration Measures		**2,915**	**0.2**	**0**	**$369**	**$3,924**	**$335**	**$3,589**	**9.7**	**2,936**
ECM 11	Refrigerator/Freezer Case Electrically Commutated Motors	1,051	0.1	0	$133	$1,213	$160	$1,053	7.9	1,059
ECM 12	Refrigeration Controls	1,864	0.0	0	$236	$2,711	$175	$2,536	10.8	1,877

ECM 11: Refrigerator/Freezer Case Electrically Commutated Motors

Replace shaded pole or permanent split capacitor (PSC) motors with electronically commutated (EC) motors in walk-in cooler. 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 12: 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.

4.8 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		**78,218**	**0.0**	**269**	**$13,800**	**$207,688**	**$0**	**$207,688**	**15.0**	**122,748**
ECM 13	Installation of an Energy Management System	14,209	0.0	269	$5,704	$204,288	$0	$204,288	35.8	58,292
ECM 14	Install Heat Pump Water Heater	64,009	0.0	0	$8,096	$3,400	$0	$3,400	0.4	64,457

ECM 13: Installation of an Energy Management System (EMS)

Most larger facilities have some type of EMS, which provides for centralized, remote control and monitoring of HVAC equipment, and sometimes lighting or other building systems. An EMS utilizes a system of temperature and pressure sensors that obtain feedback about field conditions and provide signals to control systems that adjust HVAC system operation for optimal functioning. Thirty years ago, most control systems were pneumatic systems driven by compressed air, with pneumatic thermostats and air driven actuators for valves and dampers. Pneumatic controls have largely been replaced by direct digital control (DDC) systems, but many pneumatic systems remain. Contemporary DDC systems afford tighter controls and enhanced monitoring and trending capabilities as compared to the older systems.

Often smaller facilities are not equipped with central controls. For many small sites, it has been less costly to install distributed local controls, such as programmable thermostats and timeclocks, rather than centralized DDC. Local controls do a reasonably good job of scheduling equipment and maintaining operating conditions by relying on controls integral to HVAC units, such as logic for compressor staging, to manage the equipment operating algorithms.

Even for smaller sites, inefficiencies arise when temperature sensors and thermostat schedules are not maintained, when there are separate systems for heating and cooling, and especially when equipment is added or the facility is reconfigured or repurposed.

Based on our survey, it appears that the installation of an EMS at your site could increase the efficiency of your building HVAC system operation.

A controls upgrade would enable automated equipment start and stop times, temperature setpoints, lockouts, and deadbands to be programmed remotely using a graphic interface. Controls can be configured to optimize ventilation and outside air intake by adjusting economizer position, damper function, and fan speed. Existing chilled and hot water distribution system controls are typically tied in, including associated pumps and valves. Coordinated control of HVAC systems is dependent on a network of sensors and status points. A comprehensive building control system provides monitoring and control for all HVAC systems, so operators can adjust system programming for optimal comfort and energy savings.

It is recommended that an HVAC engineer or contractor who specializes in EMS be contacted for a detailed evaluation and implementation costs. For the purposes of this report, the potential energy savings and measure costs were estimated based on industry standards and previous project experience. Further analysis should be conducted for the feasibility of this measure. This is not an investment grade analysis nor should be used as a basis for design and construction.

A high-level evaluation of potential savings and costs is provided for demonstration purposes only. It is a screening evaluation for the potential in installing an EMS. Based on industry standards and previous

project experience, the potential energy savings may be up to 20% of existing HVAC energy use. The average cost for installing and EMS may be between $2 and $4 per square foot. Actual savings and costs will need to be outlined by the specific contractor engaged to implement the system. For the purposes of this report, we have conservatively estimated savings to be 9% of the HVAC energy consumption baseline.

ECM 14: Install Heat Pump Water Heater (HPWH)

A typical electric water heater uses electric resistance coils to heat water at a coefficient of performance (COP) of 1. HPWHs 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. HPWHs 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.

HPWHs 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.

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

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

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

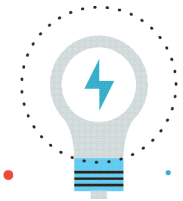
Energy Tracking with ENERGY STAR Portfolio Manager

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

Weatherization

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

Lighting Maintenance



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

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

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

Motor Maintenance

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

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 AC or heat pump system, which increases the load on the distribution fans.

Boiler Maintenance

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

Optimize HVAC Equipment Schedules

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.

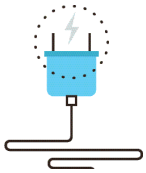
Refrigeration Equipment Maintenance

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 five and ten percent 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.

Plug Load Controls



Reducing plug loads is a common way to decrease your electrical use. Limiting the energy use of plug loads can include increasing occupant awareness, removing under-used equipment, installing hardware controls, and using software controls. Consider enabling the most

aggressive power settings on existing devices or install load sensing or occupancy sensing (advanced) power strips[5]. Your local utility may offer incentives or rebates for this equipment.

Water Conservation

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

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

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

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

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

Procurement Strategies

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

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

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

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

6 On-site Generation

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

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

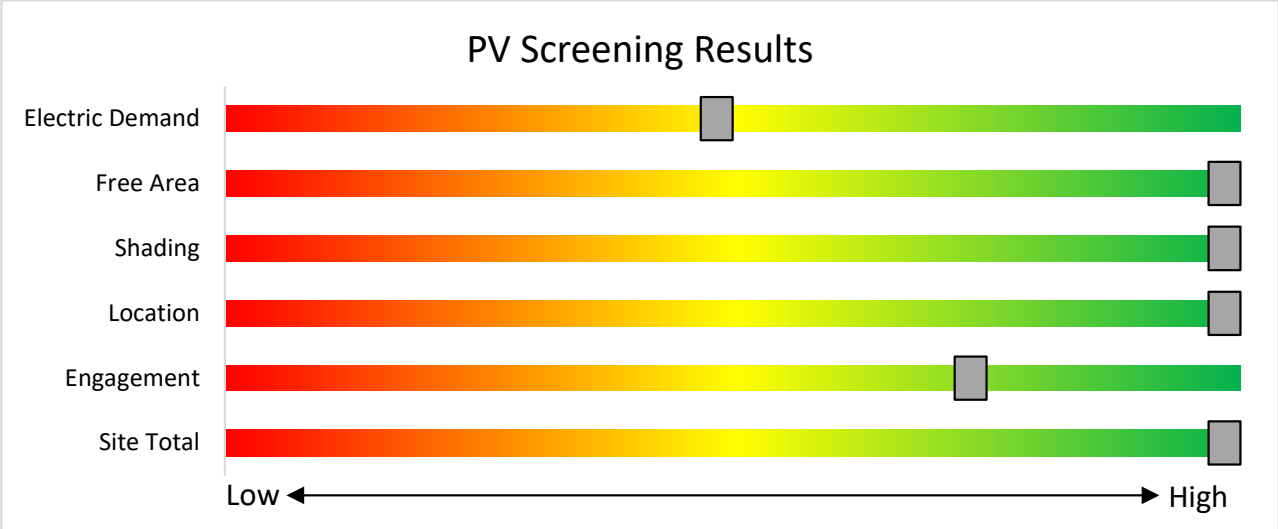
6.1 Solar Photovoltaic

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

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

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

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



Potential	High	
System Potential	215	kW DC STC
Electric Generation	256,145	kWh/yr
Displaced Cost	$32,400	/yr
Installed Cost	$559,000	

Figure 8 - Photovoltaic Screening

Successor Solar Incentive Program (SuSI)

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

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

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

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

6.2 Combined Heat and Power

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

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

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

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

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

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

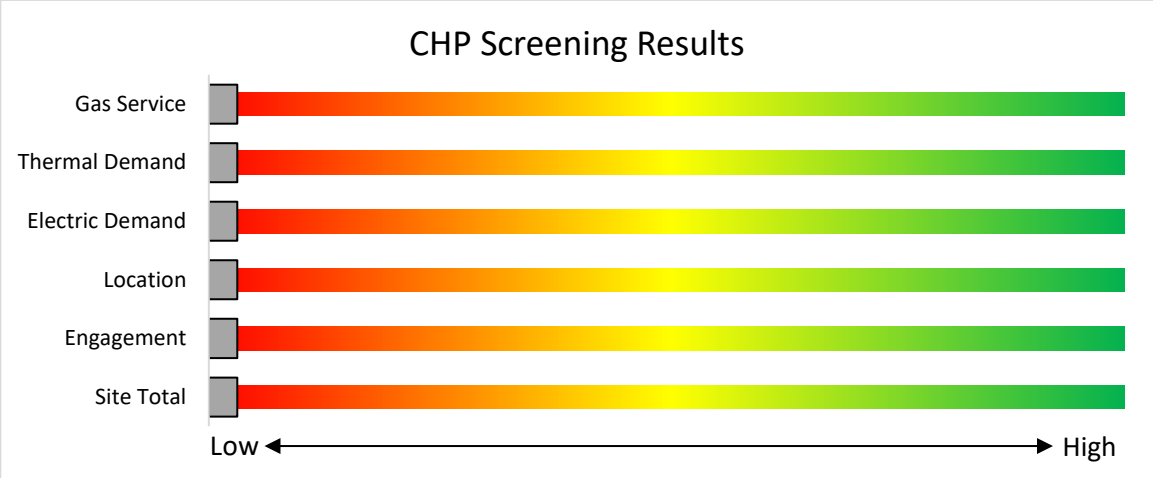


Figure 9 - Combined Heat and Power Screening

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

7 PROJECT FUNDING AND INCENTIVES

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

7.1 Utility Energy Efficiency Programs

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

8 New Jersey's Clean Energy Programs

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

8.1 Combined Heat and Power

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

Incentives

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

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

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

How to Participate

You 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.

8.2 Energy Savings Improvement Program

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

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

How to Participate

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

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

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

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

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

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

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

8.3 Successor Solar Incentive Program (SuSI)

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

Administratively Determined Incentive (ADI) Program

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

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

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

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

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

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

Competitive Solar Incentive Program

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

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

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

9 PROJECT DEVELOPMENT

Energy conservation measures (ECMs) have been identified for your site, and their energy and economic analyses are provided within this LGEA report. 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.

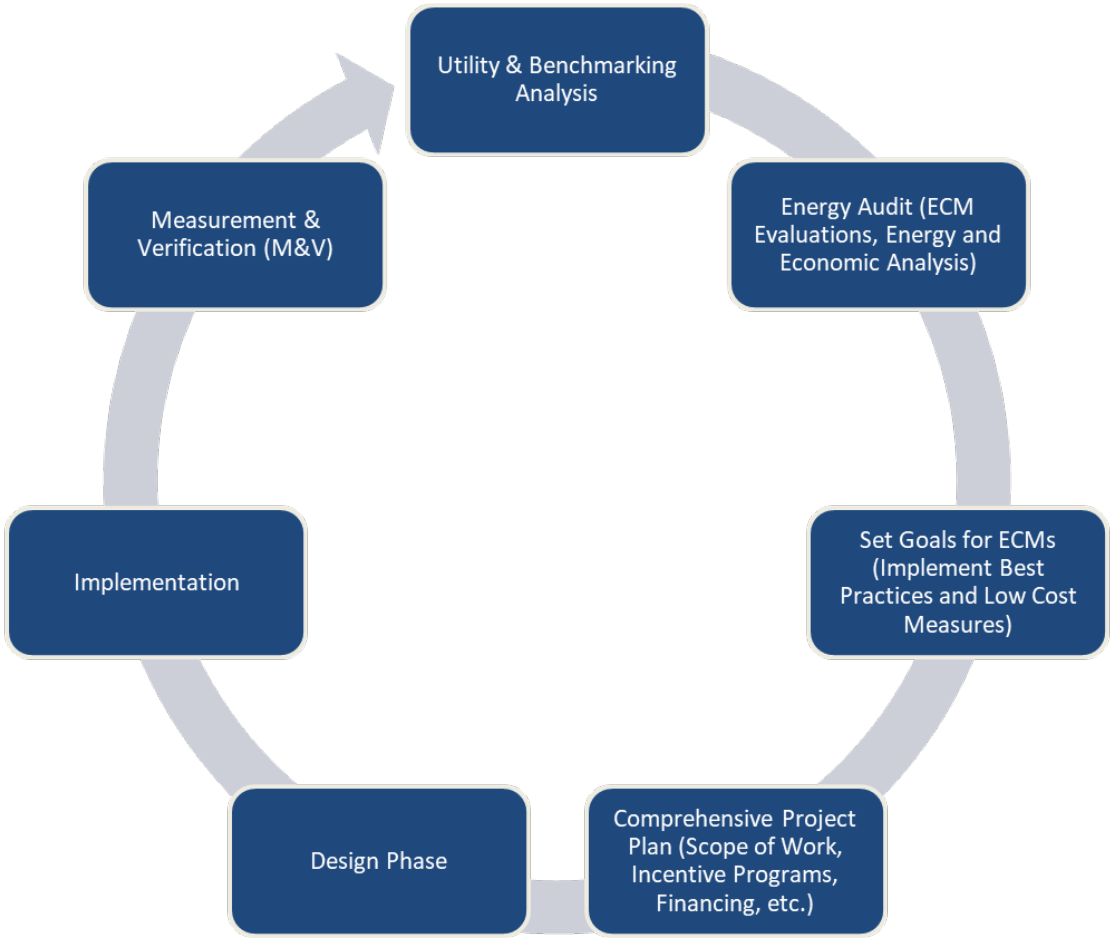


Figure 10 – Project Development Cycle

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[8].

10.2 Retail Natural Gas Supply Options

The natural gas market in New Jersey is also deregulated. Most customers that remain with the utility for natural gas service pay rates that are market based and 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[9].

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

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

APPENDIX A: EQUIPMENT INVENTORY & RECOMMENDATIONS

Lighting Inventory & Recommendations

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Band Classroom A2	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	721	0	$87	$489	$95	4.5
Cafeteria / Kitchen	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Cafeteria / Kitchen	76	LED - Fixtures: Ceiling Mount	Wall Switch	S	40	2,600	3	None	Yes	76	LED - Fixtures: Ceiling Mount	Occupancy Sensor	40	1,794	0.7	2,695	-1	$325	$1,620	$210	4.3
Cafeteria / Kitchen	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.4	1,441	-1	$174	$708	$155	3.2
Classroom A3	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	721	0	$87	$489	$95	4.5
Corridor 1A	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor 1A	9	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	20	4,380	4	None	Yes	9	LED - Fixtures: Ambient 2x2 Fixture	High/Low Control	20	3,022	0.0	269	0	$32	$450	$315	4.2
Elevator Room	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,600	0.1	472	0	$57	$183	$50	2.3
Janitorial 1A	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.1	240	0	$29	$189	$40	5.2
Multipurpose	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Multipurpose	24	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	24	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,794	0.7	2,693	-1	$324	$2,279	$310	6.1
Office - IT	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,600	2, 3	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,794	0.1	423	0	$51	$262	$60	4.0
Restroom - Boys 1st Annex	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	40	1,794		None	No	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	1,794	0.0	0	0	$0	$0	$0	0.0
Restroom - Boys 1st Annex	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	40	2,600		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	2,600	0.0	0	0	$0	$0	$0	0.0
Restroom - Girls 1st Annex	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	40	1,794		None	No	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	1,794	0.0	0	0	$0	$0	$0	0.0
Restroom - Girls 1st Annex	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	40	2,600		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	2,600	0.0	0	0	$0	$0	$0	0.0
Restroom - IT	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,600	0.0	94	0	$11	$37	$10	2.3
Restroom - Kitchen	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,600	0.0	94	0	$11	$37	$10	2.3
Stairs E	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,380	2, 4	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,022	0.2	1,012	0	$122	$408	$225	1.5
Stairs F	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,380	2, 4	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,022	0.2	1,012	0	$122	$408	$225	1.5
Stairs G	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,380	2, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,022	0.2	1,214	-1	$146	$444	$270	1.2
Storage - Multipurpose	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.1	240	0	$29	$189	$40	5.2
Storage A2	2	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Wall Switch	S	63	2,600	2, 3	Relamp	Yes	2	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	1,794	0.1	226	0	$27	$246	$44	7.4
Storage A2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,600	0.0	94	0	$11	$37	$10	2.3
Classroom 101	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 102	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 103	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 104	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 107	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.1	480	0	$58	$416	$75	5.9
Classroom 108	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 109	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 110	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Corridor 1st Main	5	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor 1st Main	9	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	4,380	2, 4	Relamp	Yes	9	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	3,022	0.1	954	0	$115	$614	$360	2.2
Corridor 1st Main	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,380	2, 4	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,022	0.2	1,416	-1	$171	$706	$315	2.3
Main Office	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	721	0	$87	$489	$95	4.5
Nurses Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.1	240	0	$29	$189	$40	5.2
Office - Copy Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.1	240	0	$29	$189	$40	5.2
Office 111	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.1	240	0	$29	$189	$40	5.2
Phone Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	2,600	2	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,600	0.0	50	0	$6	$18	$5	2.2
Principals Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.1	480	0	$58	$416	$75	5.9
Restroom - 109	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	2,600	2	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,600	0.0	46	0	$6	$33	$6	4.8
Restroom - 110	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	2,600	2	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,600	0.0	46	0	$6	$33	$6	4.8
Restroom - Boys 1st	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	40	1,794		None	No	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	1,794	0.0	0	0	$0	$0	$0	0.0
Restroom - Boys 1st	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,794	2	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,794	0.0	35	0	$4	$18	$5	3.2
Restroom - Boys B	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	600	0	$72	$453	$85	5.1
Restroom - Girls 1st	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	40	1,794		None	No	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	1,794	0.0	0	0	$0	$0	$0	0.0
Restroom - Girls 1st	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Occupancy Sensor	S	22	1,794	2	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Occupancy Sensor	9	1,794	0.0	27	0	$3	$16	$3	4.1
Restroom - Nurse	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	2,600	2	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,600	0.0	50	0	$6	$18	$5	2.2
Stairs A	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Stairs A	6	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch		32	4,380	2, 4	Relamp	Yes	6	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	3,022	0.1	636	0	$77	$335	$240	1.2
Stairs A	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,380	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,380	0.0	159	0	$19	$37	$10	1.4
Stairs B	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Stairs B	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch		32	4,380	2, 4	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	3,022	0.1	530	0	$64	$316	$200	1.8
Stairs B	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,380	2, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,022	0.1	405	0	$49	$298	$90	4.3
Stairs C	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Stairs C	6	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch		32	4,380	2, 4	Relamp	Yes	6	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	3,022	0.1	636	0	$77	$335	$240	1.2
Stairs C	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,380	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,380	0.0	159	0	$19	$37	$10	1.4
Stairs D	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Stairs D	6	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch		32	4,380	2, 4	Relamp	Yes	6	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	3,022	0.1	636	0	$77	$335	$240	1.2
Stairs D	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,380	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,380	0.0	159	0	$19	$37	$10	1.4
Storage - Nurse	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	2,600	2	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	2,600	0.0	39	0	$5	$16	$3	2.9
Storage - Nurse #2	1	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Wall Switch	S	63	2,600	2	Relamp	No	1	LED - Linear Tubes: (4) 2' Lamps	Wall Switch	34	2,600	0.0	83	0	$10	$65	$12	5.3
Storage - Nurse #3	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	2,600	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,794	0.0	122	0	$15	$181	$32	10.2
Classroom 10	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.5	2,162	-1	$260	$1,197	$250	3.6
Classroom 11	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.5	2,162	-1	$260	$1,197	$250	3.6
Classroom 12	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.5	2,162	-1	$260	$1,197	$250	3.6
Classroom 13	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.5	2,162	-1	$260	$1,197	$250	3.6
Classroom 14	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.5	2,162	-1	$260	$1,197	$250	3.6
Classroom 15	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.5	2,162	-1	$260	$1,197	$250	3.6
Classroom 16	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.5	2,162	-1	$260	$1,197	$250	3.6
Classroom 16B	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	841	0	$101	$526	$105	4.2
Classroom 17	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.5	2,162	-1	$260	$1,197	$250	3.6
Classroom 19	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.5	2,162	-1	$260	$1,197	$250	3.6
Classroom 27	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.5	2,162	-1	$260	$1,197	$250	3.6

	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
Computer Lab 18	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.5	2,162	-1	$260	$1,197	$250	3.6
Corridor 2A	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor 2A	12	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	20	4,380	4	None	Yes	12	LED - Fixtures: Ambient 2x2 Fixture	High/Low Control	20	3,022	0.1	358	0	$43	$450	$420	0.7
Corridor Bridge	6	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	20	4,380	4	None	Yes	6	LED - Fixtures: Ambient 2x2 Fixture	High/Low Control	20	3,022	0.0	179	0	$22	$225	$210	0.7
Corridor E Exit	5	LED - Fixtures: Ceiling Mount	Wall Switch	S	40	4,380	4	None	Yes	5	LED - Fixtures: Ceiling Mount	High/Low Control	40	3,022	0.0	299	0	$36	$225	$175	1.4
Janitorial 2A	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.1	240	0	$29	$189	$40	5.2
Restroom - Boys 2nd Annex	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	40	1,794		None	No	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	1,794	0.0	0	0	$0	$0	$0	0.0
Restroom - Boys 2nd Annex	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	40	2,600		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	2,600	0.0	0	0	$0	$0	$0	0.0
Restroom - Girls 2nd Annex	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	40	2,600		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	2,600	0.0	0	0	$0	$0	$0	0.0
Restroom - Girls 2nd Annex	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	40	1,794		None	No	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	1,794	0.0	0	0	$0	$0	$0	0.0
Restroom - Lounge Annex	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	20	2,600		None	No	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	20	2,600	0.0	0	0	$0	$0	$0	0.0
Teachers Lounge Annex	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,600	2, 3	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,794	0.3	1,269	-1	$153	$708	$155	3.6
Classroom 201	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 202	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 203	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 204	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 205	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 206	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 208	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 209	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 212	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 213	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 214	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 215	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Computer Lab 207	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9

Location	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Corridor 2nd Main	5	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor 2nd Main	11	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	4,380	2, 4	Relamp	Yes	11	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	3,022	0.2	1,166	0	$140	$651	$440	1.5
Corridor 2nd Main	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,380	2, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,022	0.1	405	0	$49	$298	$90	4.3
Corridor 2nd Main	3	Linear Fluorescent - T8: 8' T8 (59W) - 2L	Wall Switch	S	110	4,380	2, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 8' Lamps	High/Low Control	72	3,022	0.1	872	0	$105	$491	$165	3.1
Office - 213A	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,600	2	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,600	0.0	160	0	$19	$73	$20	2.8
Office 211	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.1	240	0	$29	$189	$40	5.2
Restroom - 213A	1	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Wall Switch	S	63	2,600	2	Relamp	No	1	LED - Linear Tubes: (4) 2' Lamps	Wall Switch	34	2,600	0.0	83	0	$10	$65	$12	5.3
Restroom - Boys 2nd	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	40	1,794		None	No	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	1,794	0.0	0	0	$0	$0	$0	0.0
Restroom - Boys 2nd	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Occupancy Sensor	S	22	1,794	2	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Occupancy Sensor	9	1,794	0.0	27	0	$3	$16	$3	4.1
Restroom - Girls 2nd	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	40	1,794		None	No	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	1,794	0.0	0	0	$0	$0	$0	0.0
Restroom - Girls 2nd	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,794	2	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,794	0.0	35	0	$4	$18	$5	3.2
Classroom 20	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.5	2,162	-1	$260	$1,197	$250	3.6
Classroom 21	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.5	2,162	-1	$260	$1,197	$250	3.6
Classroom 22	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.5	2,162	-1	$260	$1,197	$250	3.6
Classroom 23	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.5	2,162	-1	$260	$1,197	$250	3.6
Classroom 24	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.5	2,162	-1	$260	$1,197	$250	3.6
Classroom 25	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.5	2,162	-1	$260	$1,197	$250	3.6
Classroom 26	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.5	2,162	-1	$260	$1,197	$250	3.6
Classroom 26B	7	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,600	2, 3	Relamp	Yes	7	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,794	0.4	1,481	-1	$178	$781	$175	3.4
Classroom 27	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.5	2,162	-1	$260	$1,197	$250	3.6
Classroom 28	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.5	2,162	-1	$260	$1,197	$250	3.6
Classroom 29	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.5	2,162	-1	$260	$1,197	$250	3.6
Corridor 3A	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor 3A	12	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	20	4,380	4	None	Yes	12	LED - Fixtures: Ambient 2x2 Fixture	High/Low Control	20	3,022	0.1	358	0	$43	$450	$420	0.7
Janitorial 3A	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.1	240	0	$29	$189	$40	5.2

	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
Restroom - Boys 3rd Annex	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	40	2,600		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	2,600	0.0	0	0	$0	$0	$0	0.0
Restroom - Boys 3rd Annex	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	40	1,794		None	No	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	1,794	0.0	0	0	$0	$0	$0	0.0
Restroom - Girls 3rd Annex	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	40	1,794		None	No	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	1,794	0.0	0	0	$0	$0	$0	0.0
Restroom - Girls 3rd Annex	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	40	2,600		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	2,600	0.0	0	0	$0	$0	$0	0.0
Teachers Lounge 26a	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,600	2, 3	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,794	0.3	1,269	-1	$153	$708	$155	3.6
Classroom 301	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 302	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 303	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 304	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 305	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 308	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 309	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 310	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 312	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,600	2, 3	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,794	0.7	2,882	-1	$347	$1,416	$310	3.2
Classroom 314	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Classroom 315	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	961	0	$116	$562	$115	3.9
Corridor 3rd Main	1	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	52	4,380	2	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	37	4,380	0.0	72	0	$9	$25	$2	2.6
Corridor 3rd Main	5	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor 3rd Main	7	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	4,380	2, 4	Relamp	Yes	7	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	3,022	0.1	742	0	$89	$578	$280	3.3
Corridor 3rd Main	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,380	2, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,022	0.1	809	0	$97	$371	$180	2.0
Library 307	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.5	1,921	-1	$231	$1,124	$230	3.9
Office 300	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.1	240	0	$29	$189	$40	5.2
Office 306	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.1	240	0	$29	$189	$40	5.2
Office 311	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.1	240	0	$29	$189	$40	5.2
Restroom - 306	1	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Wall Switch	S	63	2,600	2	Relamp	No	1	LED - Linear Tubes: (4) 2' Lamps	Wall Switch	34	2,600	0.0	83	0	$10	$65	$12	5.3

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Restroom - Boys 3rd	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	40	1,794		None	No	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	1,794	0.0	0	0	$0	$0	$0	0.0
Restroom - Boys 3rd	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Occupancy Sensor	S	22	1,794	2	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Occupancy Sensor	9	1,794	0.0	27	0	$3	$16	$3	4.1
Restroom - Faculty 3rd	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	S	33	2,600		None	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,600	0.0	0	0	$0	$0	$0	0.0
Restroom - Girls 3rd	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	40	1,794		None	No	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	1,794	0.0	0	0	$0	$0	$0	0.0
Restroom - Girls 3rd	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	1,794	2	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,794	0.0	35	0	$4	$18	$5	3.2
Teachers Lounge 313	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.1	240	0	$29	$189	$40	5.2
Boiler Room	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Boiler Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,600	0.1	283	0	$34	$110	$30	2.3
Boiler Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,600	2	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,600	0.1	566	0	$68	$219	$60	2.3
Classroom B1	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,600	2, 3	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,794	0.2	635	0	$76	$489	$95	5.2
Classroom B3	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,600	0.0	94	0	$11	$37	$10	2.3
Classroom B3	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,600	2	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,600	0.0	160	0	$19	$73	$20	2.8
Classroom B3	9	Linear Fluorescent - T8: 8' T8 (59W) - 2L	Wall Switch	S	110	2,600	2, 3	Relamp	Yes	9	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	1,794	0.4	1,553	-1	$187	$1,067	$215	4.6
Classroom B8	15	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,600	2, 3	Relamp	Yes	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,794	0.8	3,174	-1	$382	$1,365	$335	2.7
Corridor Basement #1	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor Basement #1	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,380	2, 4	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,022	0.3	1,821	-1	$219	$779	$405	1.7
Corridor Basement #1	5	Linear Fluorescent - T8: 8' T8 (59W) - 2L	Wall Switch	S	110	4,380	2, 4	Relamp	Yes	5	LED - Linear Tubes: (2) 8' Lamps	High/Low Control	72	3,022	0.2	1,453	-1	$175	$668	$275	2.2
Corridor Basement #2	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor Basement #2	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,380	2, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,022	0.2	1,214	-1	$146	$444	$270	1.2
Corridor Basement #2	5	Linear Fluorescent - T8: 8' T8 (59W) - 2L	Wall Switch	S	110	4,380	2, 4	Relamp	Yes	5	LED - Linear Tubes: (2) 8' Lamps	High/Low Control	72	3,022	0.2	1,453	-1	$175	$668	$275	2.2
Electric Meter Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.1	360	0	$43	$380	$65	7.3
Electrical Room 2	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	2,600	2, 3	Relamp	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,794	0.0	189	0	$23	$171	$35	6.0
Gymnasium	7	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	7	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Gymnasium	15	Metal Halide: (1) 250W Lamp	Wall Switch	S	295	2,600	1, 3	Fixture Replacement	Yes	15	LED - Fixtures: High-Bay	Occupancy Sensor	75	1,794	2.6	10,435	-4	$1,256	$8,117	$820	5.8
Gymnasium	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,600	2, 3	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,794	0.1	423	0	$51	$262	$60	4.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Office - Custodians	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.2	600	0	$72	$453	$85	5.1
Restroom - B8	1	Compact Fluorescent: (1) 39W Triple Biaxial Plug-In Lamp	Wall Switch	S	39	2,600	2	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	28	2,600	0.0	31	0	$4	$13	$1	3.0
Restroom - Girls B	1	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	S	20	1,794		None	No	1	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	20	1,794	0.0	0	0	$0	$0	$0	0.0
Restroom - Girls B	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	40	1,794		None	No	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	1,794	0.0	0	0	$0	$0	$0	0.0
Storage B2	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,600	2, 3	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,794	0.2	635	0	$76	$489	$60	5.6
Storage B3	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.1	360	0	$43	$380	$30	8.1
Storage B3	1	Linear Fluorescent - T8: 8' T8 (59W) - 2L	Wall Switch	S	110	2,600	2	Relamp	No	1	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	2,600	0.0	109	0	$13	$89	$20	5.2
Exterior	7	Compact Fluorescent: (1) 39W Triple Biaxial Plug-In Lamp	Timeclock		39	4,380	2	Relamp	No	7	LED Lamps: GX23 (Plug-In) Lamps	Timeclock	28	4,380	0.0	337	0	$43	$88	$7	1.9
Exterior	10	High-Pressure Sodium: (1) 250W Lamp	Timeclock		295	4,380	1	Fixture Replacement	No	10	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	75	4,380	0.0	9,636	0	$1,219	$4,707	$500	3.5
Exterior	2	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch		40	4,380		None	No	2	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	4,380	0.0	0	0	$0	$0	$0	0.0

Motor Inventory & Recommendations

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 108	Classroom 108	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 109	Classroom 109	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 110	Classroom 110	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 101	Classroom 101	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 102	Classroom 102	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 103	Classroom 103	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 104	Classroom 104	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Main Office	Main Office	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Storage - Nurse #3	Storage - Nurse #3	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 201	Classroom 201	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 202	Classroom 202	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 203	Classroom 203	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 204	Classroom 204	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 205	Classroom 205	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 206	Classroom 206	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 208	Classroom 208	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 209	Classroom 209	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 212	Classroom 212	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 213	Classroom 213	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 214	Classroom 214	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 215	Classroom 215	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Computer Lab 207	Computer Lab 207	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 301	Classroom 301	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 302	Classroom 302	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 303	Classroom 303	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 304	Classroom 304	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 305	Classroom 305	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 308	Classroom 308	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 309	Classroom 309	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 310	Classroom 310	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 312	Classroom 312	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 314	Classroom 314	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 315	Classroom 315	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Library 307	Library 307	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom B3	Classroom B3	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom B8	Classroom B8	1	Fan Coil Unit	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Gymnasium	Gymnasium	1	Supply Fan	3.0	89.0%	No				2,745	5	No	89.5%	Yes	1	0.9	2,615	0	$331	$3,884	$200	11.1
Gymnasium	Gymnasium	1	Return Fan	1.0	85.0%	No				2,745	5	No	85.5%	Yes	1	0.3	913	0	$115	$3,010	$75	25.4
Classroom B1	Classroom B1	1	Fan Coil Unit	0.1	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler room	Boiler	2	Combustion Air Fan	3.0	80.0%	No				1,000		No	80.0%	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	Various	2	Exhaust Fan	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof Annex	Various	2	Exhaust Fan	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof Main	Various	1	Exhaust Fan	0.8	74.0%	No				2,745		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof Main	Various	2	Exhaust Fan	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof Main	Boys restroom	1	Exhaust Fan	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof Main	Girls restroom	1	Exhaust Fan	0.3	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Elevator room	Elevator	1	Other	20.0	93.0%	No				0		No	93.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler room	Boiler	2	Process Pump	0.2	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler room	Boiler	2	Heating Hot Water Pump	7.5	91.0%	No				1,000	6	No	91.0%	Yes	2	1.4	4,611	0	$583	$9,476	$2,000	12.8
Roof	Cafeteria / Kitchen	2	Supply Fan	2.0	86.0%	No				2,745	5	No	86.5%	Yes	2	1.2	3,609	0	$456	$6,522	$200	13.9
Roof	Cafeteria / Kitchen	2	Return Fan	1.0	84.0%	No				2,745	5	No	85.5%	Yes	2	0.6	1,886	0	$239	$6,020	$150	24.6

Packaged HVAC Inventory & Recommendations

		Existing Conditions									Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/ EER)	Heating Mode Efficiency	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/ EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 108	Classroom 108	1	Window AC	1.25		11.00		Frigidaire	FFRE153ZA	W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 109	Classroom 109	1	Window AC	1.25		11.00		Frigidaire	FFRE153ZA	W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 110	Classroom 110	1	Window AC	1.25		11.00		Frigidaire	FFRE153ZA	W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 101	Classroom 101	1	Window AC	2.00		11.00		Frigidaire	FFRE253	W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 102	Classroom 102	1	Window AC	1.25		11.00		Frigidaire	FFRE153ZA	W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 103	Classroom 103	1	Window AC	1.25		10.70		Frigidaire	FAM156R	W		No							0.0	0	0	$0	$0	$0	0.0
Main Office	Main Office	1	Window AC	1.25		10.80		LG	LW1511ER	W		No							0.0	0	0	$0	$0	$0	0.0
Nurses Office	Nurses Office	1	Window AC	1.25		10.80		Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Principals Office	Principals Office	1	Window AC	0.83		9.20		GE	AGN10AAG1	W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 10	Classroom 10	1	Window AC	1.19		11.90		GE				No							0.0	0	0	$0	$0	$0	0.0
Classroom 16	Classroom 16	1	Window AC	1.25		11.00		Frigidaire	FFRE153ZA	W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 17	Classroom 17	1	Window AC	1.25		11.00		Frigidaire	FFRE153ZA	W		No							0.0	0	0	$0	$0	$0	0.0
Computer Lab 18	Computer Lab 18	1	Window AC	1.25		11.00		Frigidaire	FFRE153ZA	W		No							0.0	0	0	$0	$0	$0	0.0
Teachers Lounge Annex	Teachers Lounge Annex	1	Window AC	0.67		9.70		Frigidaire		B		No							0.0	0	0	$0	$0	$0	0.0
Classroom 205	Classroom 205	1	Window AC	1.25		11.00		Frigidaire	FFRE153ZA	W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 213	Classroom 213	1	Window AC	1.25		11.00		Frigidaire	FFRE153ZA	W		No							0.0	0	0	$0	$0	$0	0.0
Computer Lab 207	Computer Lab 207	1	Window AC	1.25		11.00		Frigidaire	FFRE153ZA	W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 20	Classroom 20	1	Window AC	1.25		11.00		Frigidaire	FFRE153ZA	W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 21	Classroom 21	1	Window AC	1.25		11.00		Frigidaire	FFRE153ZA	W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 25	Classroom 25	1	Window AC	1.25		11.00		Frigidaire	FFRE153ZA	W		No							0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/EER)	Heating Mode Efficiency	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 29	Classroom 29	1	Window AC	1.25		11.00		Frigidaire	FFRE153ZA	W		No							0.0	0	0	$0	$0	$0	0.0
Library 307	Library 307	1	Window AC	1.25		11.00		Frigidaire	FFRE153ZA	W		No							0.0	0	0	$0	$0	$0	0.0
Office 306	Office 306	1	Window AC	1.25		10.70		Frigidaire	FAM156R	W		No							0.0	0	0	$0	$0	$0	0.0
Classroom B3	Classroom B3	1	Window AC	1.25		10.70		Frigidaire	FAM156R	W		No							0.0	0	0	$0	$0	$0	0.0
Classroom B8	Classroom B8	1	Window AC	1.25		10.80		LG	LW1511ER	W		No							0.0	0	0	$0	$0	$0	0.0
Cafeteria / Kitchen	Cafeteria / Kitchen	2	Split-System Air-Source HP	10.00	119.02	11.20	1 COP	Trane	TTA120E40RAA TWE120E4R3AA	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior	Gym	1	Package Unit	30.00		10.80		Trane	RAUCC304BG00	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	VP office	1	Split-System	3.00		10.30		Trane	TTA036C400A0	W		No							0.0	0	0	$0	$0	$0	0.0
Multipurpose room	Multipurpose room	1	Electric Resistance Heat		10.23		1 COP	Dayton	2YU60	W		No							0.0	0	0	$0	$0	$0	0.0

Space Heating Boiler Inventory & Recommendations

		Existing Conditions						Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Boiler	Various	2	Non-Condensing Hot Water Boiler	3,853	HB Smith	4500A-S/W-12	B	7	Yes	2	Non-Condensing Hot Water Boiler	3,853	85.00%	Ec	0.0	0	195	$2,838	$134,032	$10,018	43.7

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	DHW	8	4	2.00	0.0	766	0	$97	$29	$8	0.2
Boiler room	DHW	8	25	1.00	0.0	0	3	$42	$144	$50	2.3

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
Elevator Room	Restrooms	1	Storage Tank Water Heater (> 50 Gal)	Rheem	E85A-54-G	W		No						0.0	0	0	$0	$0	$0	0.0
Boiler room	Various	1	Storage Tank Water Heater (> 50 Gal)	Rheem	RHLN1106100510	B	9	Yes	1	Storage Tank Water Heater (> 50 Gal)	Natural Gas	93.00%	UEF	0.0	0	4	$58	$1,309	$245	18.2

Low-Flow Device Recommendations

	Recommedation Inputs					Energy Impact & Financial Analysis						
Location	ECM #	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Restroom - 109	10	1	Faucet Aerator (Lavatory)	2.20	0.50	0.0	139	0	$18	$7	$4	0.2
Restroom - 110	10	1	Faucet Aerator (Lavatory)	2.20	0.50	0.0	139	0	$18	$7	$4	0.2
Restroom - Nurse	10	1	Faucet Aerator (Lavatory)	2.20	0.50	0.0	139	0	$18	$7	$4	0.2
Restroom - IT	10	1	Faucet Aerator (Lavatory)	2.20	0.50	0.0	139	0	$18	$7	$4	0.2
Restroom - Kitchen	10	1	Faucet Aerator (Lavatory)	2.20	0.50	0.0	139	0	$18	$7	$4	0.2
Restroom - Faculty 3rd	10	1	Faucet Aerator (Lavatory)	2.20	0.50	0.0	139	0	$18	$7	$4	0.2

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
Cafeteria / Kitchen	1	Cooler (35F to 55F)	Thermocool		11, 12	Yes	Yes	No	0.1	524	0	$66	$1,125	$130	15.0
Cafeteria / Kitchen	1	Medium Temp Freezer (0F to 30F)			11, 12	Yes	Yes	Yes	0.1	2,391	0	$302	$2,799	$205	8.6

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
Cafeteria / Kitchen	1	Refrigerator Chest			No		No	0.0	0	0	$0	$0	$0	0.0
Cafeteria / Kitchen	1	Refrigerator Chest			No		No	0.0	0	0	$0	$0	$0	0.0
Cafeteria / Kitchen	2	Stand-Up Refrigerator, Solid Door (>50 cu. ft.)	Utility		No		No	0.0	0	0	$0	$0	$0	0.0
Cafeteria / Kitchen	1	Stand-Up Refrigerator, Solid Door (>50 cu. ft.)	Norlake	TR492SSS/0	No		No	0.0	0	0	$0	$0	$0	0.0

Cooking Equipment Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	Manufacturer	Model	High Efficiency Equipement?	ECM #	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Cafeteria	1	Electric Combination Oven/Steam Cooker (>28 Pans)	Air-o-Cconvect		Yes		No	0.0	0	0	$0	$0	$0	0.0
Cafeteria	2	Electric Convection Oven (Full Size)	Toaster oven		No		No	0.0	0	0	$0	$0	$0	0.0
Cafeteria	3	Insulated Food Holding Cabinet (Full Size)	Cvap		Yes		No	0.0	0	0	$0	$0	$0	0.0

Plug Load Inventory

	Existing Conditions					
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?	Manufacturer	Model
PS1	4	Coffee Machine	400	No		
PS1	190	Desktop	145	No		
PS1	5	Fan Portable	60	No		
PS1	630	Chrome books	40	No		
PS1	7	Microwave	900	No		
PS1	1	Deli Slicer	300	No		
PS1	3	Paper shredder	200	No		
PS1	71	Printer - Small/medium	180	No		
PS1	4	Printer Copier/large	200	No		
PS1	3	Refrigerator Mini	60	No		
PS1	3	Refrigerator residential	220	No		
PS1	3	Serving table	3,000	No		
PS1	58	Smart Board	5	No		
PS1	8	Television	120	No		
PS1	1	Toaster	900	No		
PS1	5	Water cooler	520	No		

Custom (High Level) Measure Analysis

Installation of an Energy Management System

Building Square Footage	107,520		Fuel Utility Rate	$14.531	MMBtu
Percent of Conditioned Area Impacted	95%		Blended Electric Utility Rate	$0.126	kWh

Existing Conditions						Proposed Conditions					Energy Impact & Financial Analysis										
Description	Area(s)/System(s) Served	Remaining Useful Life	Total HVAC Motor Usage kWh	Total HVAC Electric Usage kWh	Total HVAC Fuel Usage MMBtu	Description	% Savings HVAC Motor Usage kWh	% Savings HVAC Electric Usage kWh	% Savings HVAC Fuel Usage MMBtu	Estimated Cost per Sqft	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	Simple Payback w/ Incentives in Years
Limited/No HVAC Controls	HVAC Equipment & Systems	15	65,666	111,945	2,688	Installation of an Energy Management System	8%	8%	10%	$2.00	0.00	14,209	269	$5,704	$204,288	$0	$0	$0	$204,288	35.81	35.81

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)	Restrooms	52,000	Electric	54.0	82	Heat Pump Water Heater	2.5	82	$3,400.00	0.00	64,009	0	$8,096	$3,400	$0	$0	$0	$3,400	0.42	0.42

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

60

ENERGY STAR® Score[1]

West New York Public School No. 1

Primary Property Type: K-12 School
Gross Floor Area (ft²): 107,520
Built: 1920

For Year Ending: December 31, 2019
Date Generated: October 18, 2021

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
West New York Public School No. 1 6129 Madison Street West New York, New Jersey 07093	West New York Board of Education 6028 Broadway West New York, NJ 07093 (201) 553-4000	Dean Austin 6028 Broadway West New York, NJ 07093 (201) 553-4000 x 30063 daustin@wnyschools.net

Property ID: 15336888

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
44.5 kBtu/ft²

Source EUI
81.2 kBtu/ft²

Annual Energy by Fuel	
Fuel Oil (No. 2) (kBtu)	2,590,357 (54%)
Natural Gas (kBtu)	25,525 (0%)
Electric - Grid (kBtu)	2,172,906 (45%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	49.4
National Median Source EUI (kBtu/ft²)	90.1
% Diff from National Median Source EUI	-10%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	395

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.