Local Government Energy Audit Report

Dewitt D. Barlow Elementary School

January 13, 2023

Prepared for:

Plainfield Board of Education
E. Front St. & Farragut Rd.
Plainfield, New Jersey 07060

Prepared by:

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Disclaimer

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

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

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

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

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

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ENERGY EFFICIENCY INCENTIVE & REBATE TRANSITION

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

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

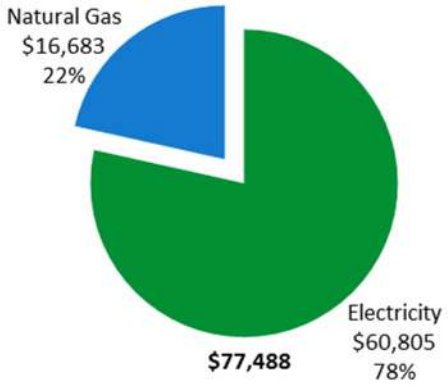
These next generation energy efficiency programs feature new ways of managing and delivering programs historically administered by New Jersey's Clean Energy Program™ (NJCEP). All of the investor-owned gas and electric utility companies will now also offer complementary energy efficiency programs and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

New utility programs are under development. Keep up to date with developments by visiting the NJCEP website.

1 EXECUTIVE SUMMARY

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

BUILDING PERFORMANCE REPORT

Annual Utilities	Costs: $77,488 Electricity: 515,327 kWh Natural Gas: 28,706 Therms	
ENERGY STAR® Benchmarking Score	27 *(1-100 scale)*	This building performs at or below the national average. This report contains suggestions about how to improve building performance and reduce energy costs.

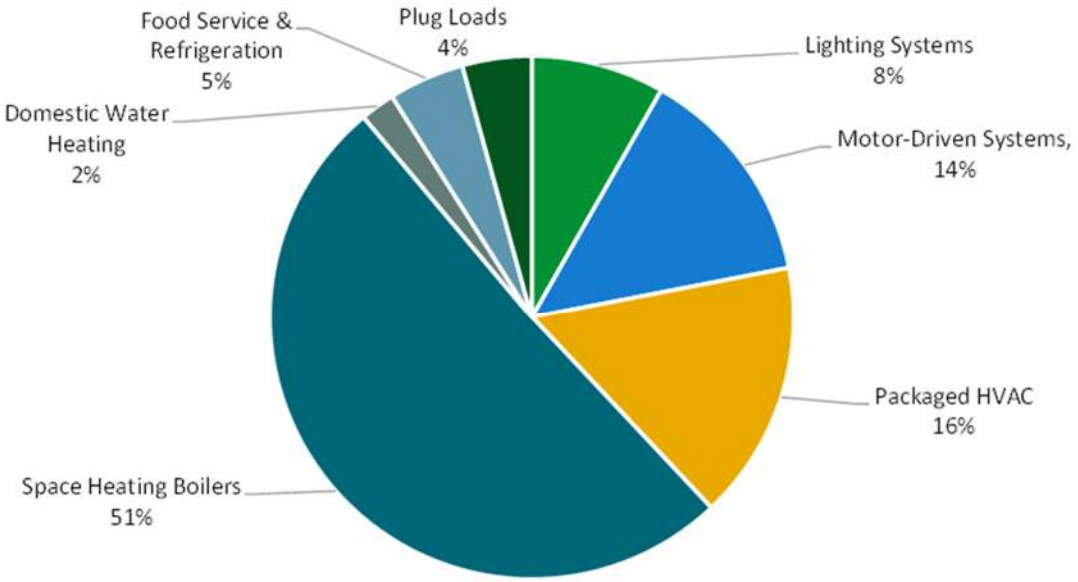


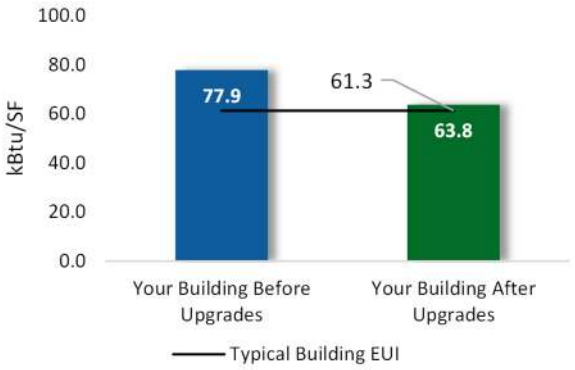
Figure 1 - Energy Use by System

POTENTIAL IMPROVEMENTS

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

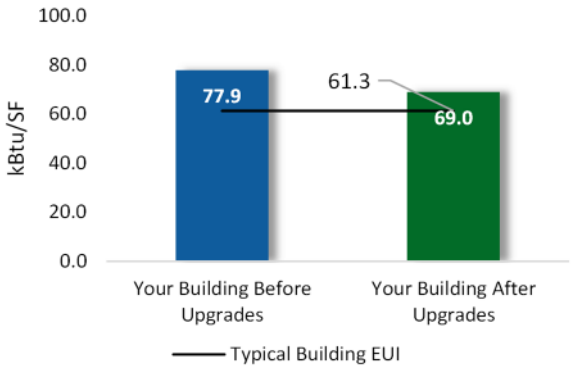
Scenario 1: Full Package (All Evaluated Measures)

Installation Cost	$224,418
Potential Rebates & Incentives[1]	$14,900
Annual Cost Savings	$20,698
Annual Energy Savings	Electricity: 161,232 kWh Natural Gas: 2,881 Therms
Greenhouse Gas Emission Savings	98 Tons
Simple Payback	10.1 Years
Site Energy Savings (All Utilities)	18%



Scenario 2: Cost Effective Package[2]

Installation Cost	$77,776
Potential Rebates & Incentives	$13,415
Annual Cost Savings	$16,224
Annual Energy Savings	Electricity: 133,992 kWh Natural Gas: 711 Therms
Greenhouse Gas Emission Savings	72 Tons
Simple Payback	4.0 Years
Site Energy Savings (all utilities)	11%



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			**42,324**	**8.1**	**-9**	**$4,943**	**$12,606**	**$3,398**	**$9,208**	**1.9**	**41,587**
ECM 1	Retrofit Fixtures with LED Lamps	Yes	42,189	8.1	-9	$4,927	$12,533	$3,398	$9,135	1.9	41,455
ECM 2	Install LED Exit Signs	Yes	135	0.0	0	$16	$72	$0	$72	4.6	133
Lighting Control Measures			**13,685**	**2.5**	**-3**	**$1,598**	**$15,033**	**$2,325**	**$12,708**	**8.0**	**13,446**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	12,961	2.4	-3	$1,514	$13,108	$1,660	$11,448	7.6	12,734
ECM 4	Install High/Low Lighting Controls	Yes	725	0.1	0	$85	$1,125	$665	$460	5.4	712
Variable Frequency Drive (VFD) Measures			**73,907**	**19.7**	**0**	**$8,721**	**$52,975**	**$7,650**	**$45,325**	**5.2**	**74,424**
ECM 5	Install VFDs on Constant Volume (CV) Fans	Yes	73,209	19.4	0	$8,638	$46,194	$7,500	$38,694	4.5	73,721
ECM 6	Install VFDs on Heating Water Pumps	No	699	0.3	0	$82	$6,781	$150	$6,631	80.5	703
Unitary HVAC Measures			**3,428**	**2.2**	**0**	**$405**	**$26,902**	**$1,335**	**$25,567**	**63.2**	**3,452**
ECM 7	Install High Efficiency Air Conditioning Units	No	3,428	2.2	0	$405	$26,902	$1,335	$25,567	63.2	3,452
HVAC System Improvements			**1,769**	**0.0**	**81**	**$680**	**$2,753**	**$6**	**$2,747**	**4.0**	**11,275**
ECM 8	Implement Demand Control Ventilation (DCV)	Yes	1,769	0.0	79	$670	$2,719	$0	$2,719	4.1	11,076
ECM 9	Install Pipe Insulation	Yes	0	0.0	2	$10	$35	$6	$29	2.9	199
Domestic Water Heating Upgrade			**0**	**0.0**	**2**	**$10**	**$50**	**$16**	**$35**	**3.4**	**203**
ECM 10	Install Low-Flow DHW Devices	Yes	0	0.0	2	$10	$50	$16	$35	3.4	203
Food Service & Refrigeration Measures			**3,005**	**0.3**	**0**	**$355**	**$1,140**	**$170**	**$970**	**2.7**	**3,026**
ECM 11	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	1,393	0.1	0	$164	$910	$120	$790	4.8	1,403
ECM 12	Vending Machine Control	Yes	1,612	0.2	0	$190	$230	$50	$180	0.9	1,623
Custom Measures			**23,113**	**0.0**	**217**	**$3,988**	**$112,959**	**$0**	**$112,959**	**28.3**	**48,684**
ECM 13	Installation of an Energy Management System	No	23,113	0.0	217	$3,988	$112,959	$0	$112,959	28.3	48,684
TOTALS (COST EFFECTIVE MEASURES)			**133,992**	**30.3**	**71**	**$16,224**	**$76,976**	**$13,415**	**$63,561**	**3.9**	**143,258**
TOTALS (ALL MEASURES)			**161,232**	**32.8**	**288**	**$20,698**	**$224,418**	**$14,900**	**$209,519**	**10.1**	**196,098**

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

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

Figure 2 – Evaluated Energy Improvements

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

1.1 Planning Your Project

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

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

Pick Your Installation Approach

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

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

Options from Around the State

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

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

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

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

Successor Solar Incentive Program (SuSI)

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

Ongoing Electric Savings with Demand Response

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

Large Energy User Program (LEUP)

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

2 EXISTING CONDITIONS

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

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

2.1 Site Overview

On June 15, 2022, TRC performed an energy audit at Dewitt D. Barlow Elementary School located in Plainfield, New Jersey. TRC met with facility staff to review the facility operations and help focus our investigation on specific energy-using systems.

Dewitt D. Barlow Elementary School is a one-story, 59,452 square foot building built in 1952. There is a newer two-story addition that includes the cafeteria, plus some classrooms, and other areas. Spaces include classrooms, gymnasium, auditorium, offices, cafeteria, corridors, stairwells, offices, kitchen, and mechanical space.

2.2 Building Occupancy

The facility is occupied from September through June. Typical weekday occupancy is 419 people including staff and students.

Building Name	Weekday/Weekend	Operating Schedule
Dewitt D. Barlow Elementary School	Weekday	6:30 AM - 10:00 PM
	Weekend	No Operation

Figure 3 - Building Occupancy Schedule

2.3 Building Envelope

Building walls are concrete block with a brick facade. The roof areas are a mixture of pitched and flat sections. The flat roof areas are covered with black EPDM membrane while pitched roof areas have asphalt shingles. Roof areas are in good condition.

Most of the windows are double glazed with aluminum frames. The glass-to-frame seals are in good condition. The operable window weather seals are in good condition. Exterior doors have aluminum frames and are in good condition with undamaged door seals.

Windows

Pitched and Flat Roof Portions

Single and Two-story Facade

Facade

2.4 Lighting Systems

The primary interior lighting system uses a mix of 32-Watt linear fluorescent T8 lamps and 2-foot x 4-foot LED fixtures. Additionally, there are some 23-Watt and 65-Watt compact fluorescent lamps (CFL), 60-Watt incandescent and 10-Watt LED general purpose lamps. Typically, T8 fluorescent lamps use electronic ballasts.

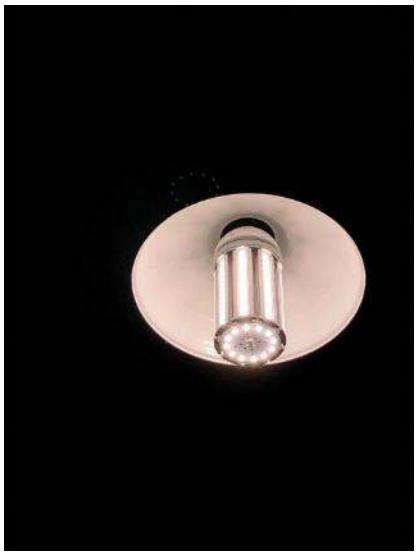
Fixture types include 2-lamp, 3-lamp, or 4-lamp, 2-foot or 4-foot-long troffer and surface mounted fixtures and 2-foot fixtures with U-bend tube lamps.

Interior lighting control is provided by a mix of wall switches and occupancy sensors.

Most exit signs are 2-Watt LED units; however, there is a fluorescent unit. Most fixtures are in good condition. Interior lighting levels were generally sufficient.

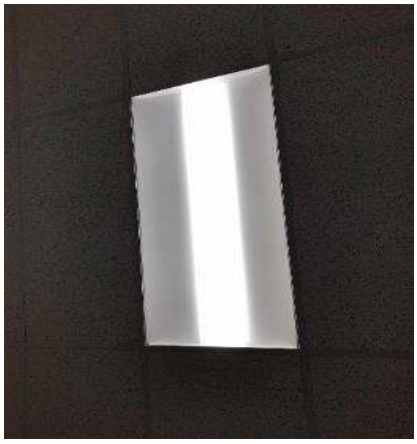
Exterior lighting is provided mainly by 22-Watt and 55-Watt “corn bulb” screw in LED lamps, LED wall pack fixtures, 50-Watt and 100-Watt LED flood fixtures, and recessed some 55-Watt CFLs.

Exterior light fixtures are controlled by a time clock, switch, or photocell, depending on the fixture.



LED Corn Bulb

Linear T8 Troffers



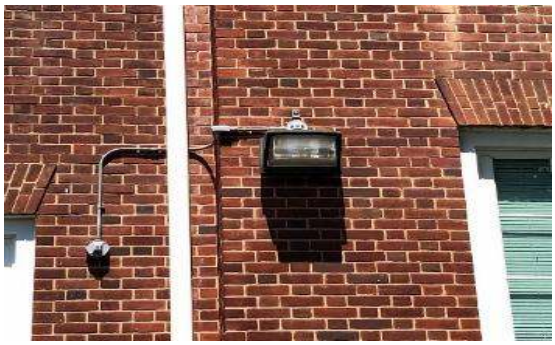
2-2-foot x 4-foot LED Fixture

Exit Sign

Gymnasium High Bay Fixture

Exterior LED Fixture

Occupancy Sensor



55-Watt LED Fixture

2.5 Air Handling Systems

Unit Ventilators

Heat is distributed in the cafeteria and classroom addition section of the school using unit ventilators equipped with hot water coils, supply fan motors, and pneumatically controlled outside air dampers. Connected to the steam boilers, a heat exchanger provides hot water to this distribution system.

The original section has steam coil unit ventilators. The hallways have convectors or radiators.

Unitary Electric HVAC Equipment

Server rooms are cooled using ductless mini-split AC units, each with a capacity of 1 ton. The units have an average EER of 11. Temperatures are controlled using thermostats located in the respective zones. Older units are being evaluated for replacement.

Several classrooms and offices are cooled using window AC units with capacities ranging from 0.83 tons to 1.6 tons. These units have an average EER of 10.3. These units were assessed to be operating within their useful life and are in good condition.

Mini split

Window AC Unit - Office

Packaged Units

The gymnasium and the cafetorium are served by AAON packaged air conditioning units with built-in, gas-fired furnaces. The 12.17 EER gymnasium unit has a heating capacity of 648 MBh and a nominal 30-ton cooling capacity. The 60-ton unit serving the cafetorium has an 11.9 EER and a gas-fired furnace with a heating capacity of 864 MBh. These units were installed 2019 and in good condition.

The library, nurse's office, corridor, and restroom sections are served by a 15-ton AAON unit. This cooling-only unit has an EER of 11. This unit is old and has been evaluated for replacement.

These units are controlled by room thermostats.

30-ton AAON Unit

15-ton AAON Unit

Thermostat - Classroom

Thermostat - Gymnasium

Unitary Heating Equipment

Server room DR119, several restrooms, Classroom 120, and stairwell new A are heated by electric resistance heaters. These vary in capacity between 2.5 MBh to 10 MBh. The units are in fair condition. Equipment is controlled by manual dial thermostats.

Electric resistance heater

2.6 Steam Heating System

Two Weil McLain 3480 MBh steam boilers serve the building's heating load. The burners are fully modulating with a nominal efficiency of 79%. The boilers are configured in a lead-lag control scheme. Both boilers are required under high load conditions. Installed in 1993, they are operating past their useful life. There is a service contract in place.

The distribution system is a two-pipe, heating-only system. Steam is distributed to the unit ventilators with steam coils that provide heating to the respective spaces. Newer portions of the building are served by a heat exchanger that converts steam to hot water and distributes this to hot water coils in unit ventilators using two, 1.5 hp constant speed hot water pumps.

Space temperatures are controlled using zonal thermostats.

Steam Boiler

Air Compressor

Heat Exchanger

Unit Ventilator

2.7 Domestic Hot Water

Hot water is produced by two natural gas-fired water heaters having input capacities of 76 MBh and 199 MBh and tank capacities of 75 gallons and 96 gallons, respectively. The water heaters were installed between 2018 to 2019 and are operating within their useful life.

The domestic hot water pipes are partially insulated, and insulation measures have been evaluated.

DHW – AO Smith

DHW – Bradford White

2.8 Food Service Equipment

The kitchen has a mix of gas and electric equipment that is used to prepare meals for students and staff. Most cooking is done using gas ovens, however, there are also electric steamers and an electric griddle. 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.

Gas Stove

Oven

2.9 Refrigeration

The kitchen has several stand-up refrigerators with solid doors and a couple of refrigerator chests. All equipment is standard and in good condition.

The walk-in refrigerator has an estimated 1.2-ton compressor located in the roof and a two-fan evaporator with electric defrost controls.

The walk-in medium temperature freezer has a 0.9-ton compressor located in the ceiling and a single fan evaporator.

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

Refrigeration Chest

Stand-up Refrigerator

2.10 Plug Load and Vending Machines

There are 33 computer workstations throughout the facility and one laptop per student and staff. Plug loads throughout the building include general cafe and office equipment. There are classroom typical loads such as smartboards, projectors, and fans.

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

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

Copy Machine

Vending Machine

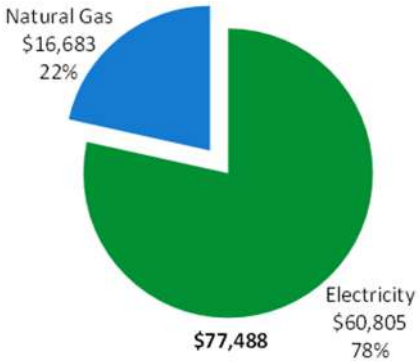
2.11 Water-Using Systems

Some faucets have flow rates of 2.2 gallons per minute (gpm). Toilets are rated at 1.6 gallons per flush (gpf) and urinals are rated at 1.0 gpf.

3 Energy Use and Costs

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

Utility Summary		
Fuel	**Usage**	**Cost**
Electricity	515,327 kWh	$60,805
Natural Gas	28,706 Therms	$16,683
Total		**$77,488**



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.

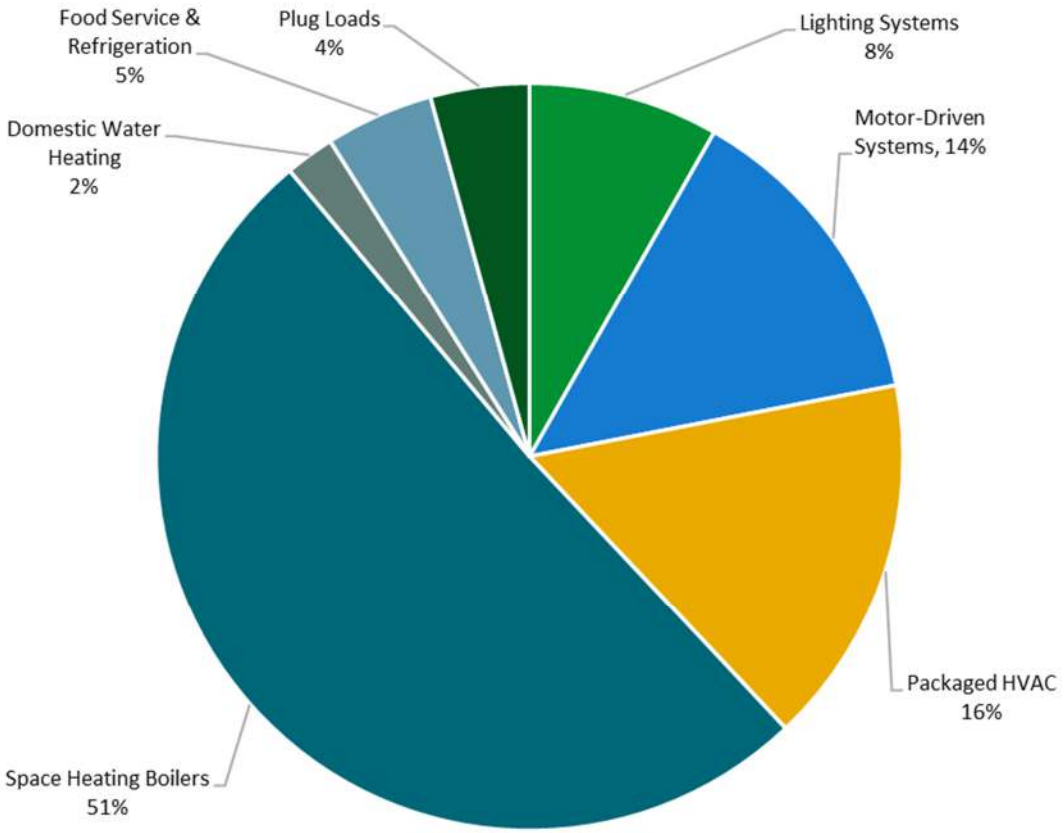
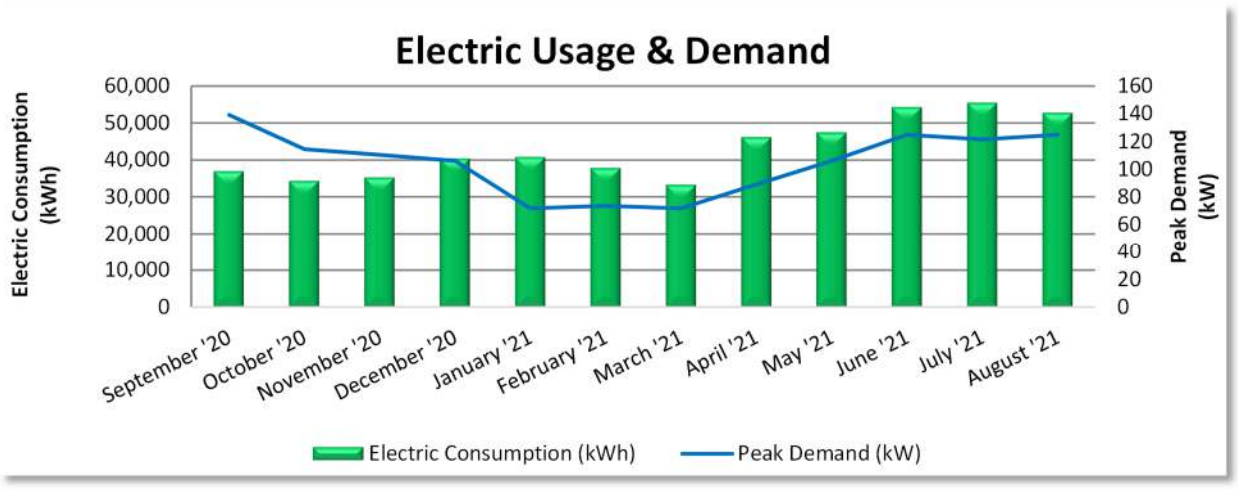


Figure 4 - Energy Balance

3.1 Electricity

PSE&G delivers electricity under rate class LPLS.



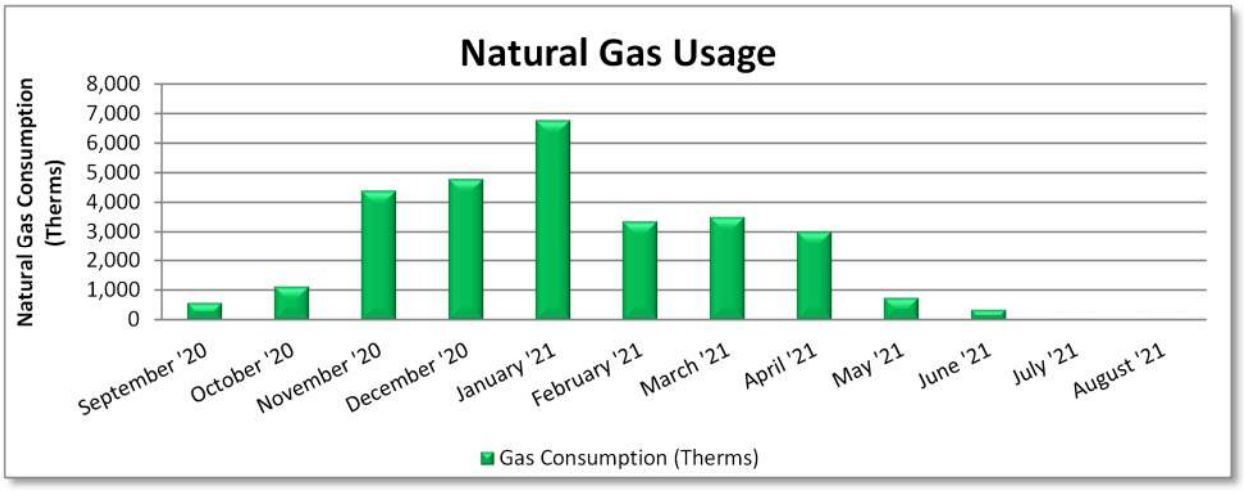
Electric Billing Data					
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**
9/24/20	30	37,030	139	$1,771	$5,962
10/23/20	29	34,342	115	$440	$4,403
11/24/20	32	35,280	110	$424	$4,586
12/24/20	30	40,405	106	$399	$4,870
1/26/21	33	40,810	72	$270	$4,537
2/25/21	30	37,909	74	$277	$4,241
3/24/21	27	33,370	72	$270	$3,671
4/24/21	31	46,200	89	$335	$5,082
5/24/21	30	47,500	106	$399	$5,225
6/26/21	33	54,250	125	$1,598	$5,968
7/27/21	31	55,463	122	$1,554	$6,193
8/25/21	29	52,768	125	$1,598	$6,067
Totals	**365**	**515,327**	**139**	**$9,333**	**$60,805**
Annual	**365**	**515,327**	**139**	**$9,333**	**$60,805**

Notes:

- Peak demand of 139 kW occurred in September 2020.
- Average demand over the past 12 months was 104 kW.
- The average electric cost over the past 12 months was $0.118/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 LVG.



Gas Billing Data			
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**
9/24/20	30	574	$557
10/23/20	29	1,127	$707
11/23/20	31	4,399	$2,345
12/24/20	31	4,798	$2,579
1/26/21	33	6,792	$3,711
2/25/21	30	3,364	$1,831
3/26/21	29	3,508	$1,905
4/27/21	32	3,023	$1,664
5/26/21	29	746	$724
6/25/21	30	335	$326
7/27/21	32	20	$167
8/25/21	29	18	$167
Totals	**365**	**28,706**	**$16,683**
Annual	**365**	**28,706**	**$16,683**

Notes:

- The average gas cost for the past 12 months is $0.581/therm, which is the blended rate used throughout the analysis.

3.3 Benchmarking

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

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

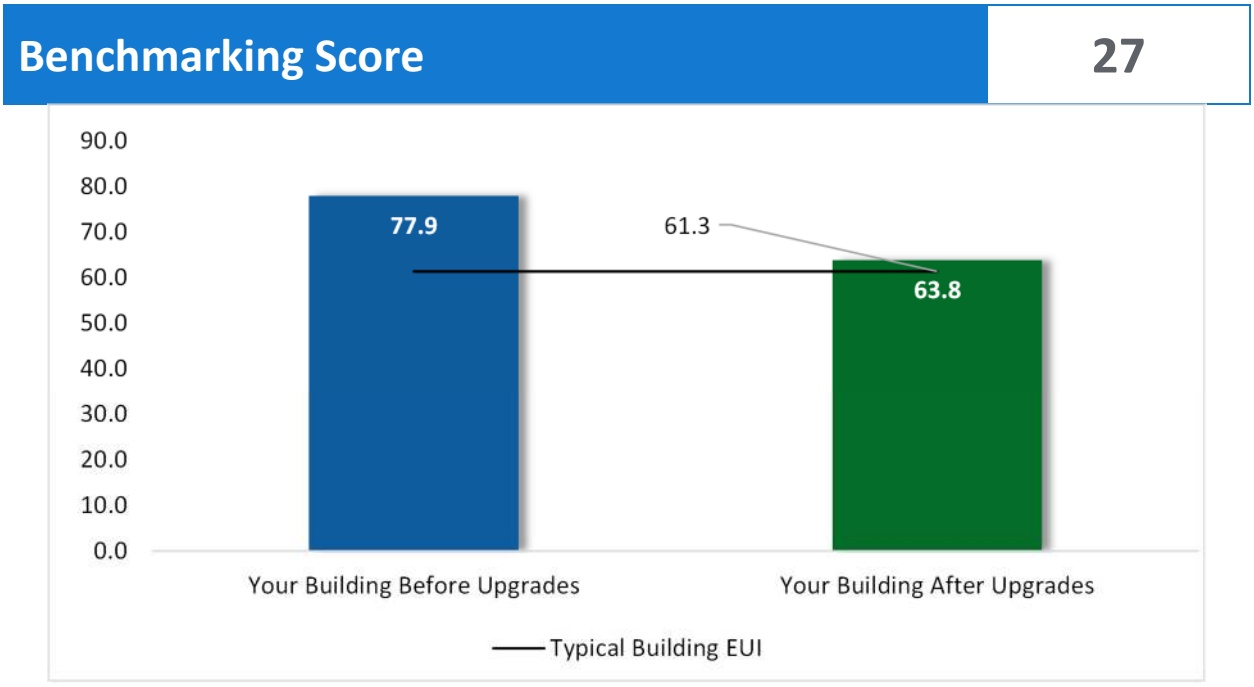


Figure 5 - Energy Use Intensity Comparison[3]

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

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

[3] Based on all evaluated ECMs

Tracking Your Energy Performance

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

We have created a Portfolio Manager® account for your facility, and 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			**42,324**	**8.1**	**-9**	**$4,943**	**$12,606**	**$3,398**	**$9,208**	**1.9**	**41,587**
ECM 1	Retrofit Fixtures with LED Lamps	Yes	42,189	8.1	-9	$4,927	$12,533	$3,398	$9,135	1.9	41,455
ECM 2	Install LED Exit Signs	Yes	135	0.0	0	$16	$72	$0	$72	4.6	133
Lighting Control Measures			**13,685**	**2.5**	**-3**	**$1,598**	**$14,233**	**$2,325**	**$11,908**	**7.5**	**13,446**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	12,961	2.4	-3	$1,514	$13,108	$1,660	$11,448	7.6	12,734
ECM 4	Install High/Low Lighting Controls	Yes	725	0.1	0	$85	$1,125	$665	$460	5.4	712
Variable Frequency Drive (VFD) Measures			**73,907**	**19.7**	**0**	**$8,721**	**$52,975**	**$7,650**	**$45,325**	**5.2**	**74,424**
ECM 5	Install VFDs on Constant Volume (CV) Fans	Yes	73,209	19.4	0	$8,638	$46,194	$7,500	$38,694	4.5	73,721
ECM 6	Install VFDs on Heating Water Pumps	No	699	0.3	0	$82	$6,781	$150	$6,631	80.5	703
Unitary HVAC Measures			**3,428**	**2.2**	**0**	**$405**	**$26,902**	**$1,335**	**$25,567**	**63.2**	**3,452**
ECM 7	Install High Efficiency Air Conditioning Units	No	3,428	2.2	0	$405	$26,902	$1,335	$25,567	63.2	3,452
HVAC System Improvements			**1,769**	**0.0**	**81**	**$680**	**$2,753**	**$6**	**$2,747**	**4.0**	**11,275**
ECM 8	Implement Demand Control Ventilation (DCV)	Yes	1,769	0.0	79	$670	$2,719	$0	$2,719	4.1	11,076
ECM 9	Install Pipe Insulation	Yes	0	0.0	2	$10	$35	$6	$29	2.9	199
Domestic Water Heating Upgrade			**0**	**0.0**	**2**	**$10**	**$50**	**$16**	**$35**	**3.4**	**203**
ECM 10	Install Low-Flow DHW Devices	Yes	0	0.0	2	$10	$50	$16	$35	3.4	203
Food Service & Refrigeration Measures			**3,005**	**0.3**	**0**	**$355**	**$1,140**	**$170**	**$970**	**2.7**	**3,026**
ECM 11	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	1,393	0.1	0	$164	$910	$120	$790	4.8	1,403
ECM 12	Vending Machine Control	Yes	1,612	0.2	0	$190	$230	$50	$180	0.9	1,623
Custom Measures			**23,113**	**0.0**	**217**	**$3,988**	**$112,959**	**$0**	**$112,959**	**28.3**	**48,684**
ECM 13	Installation of an Energy Management System	No	23,113	0.0	217	$3,988	$112,959	$0	$112,959	28.3	48,684
TOTALS			**161,232**	**32.8**	**288**	**$20,698**	**$223,618**	**$14,900**	**$208,719**	**10.1**	**196,098**

* - 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		**42,324**	**8.1**	**-9**	**$4,943**	**$12,606**	**$3,398**	**$9,208**	**1.9**	**41,587**
ECM 1	Retrofit Fixtures with LED Lamps	42,189	8.1	-9	$4,927	$12,533	$3,398	$9,135	1.9	41,455
ECM 2	Install LED Exit Signs	135	0.0	0	$16	$72	$0	$72	4.6	133
Lighting Control Measures		**13,685**	**2.5**	**-3**	**$1,598**	**$14,233**	**$2,325**	**$11,908**	**7.5**	**13,446**
ECM 3	Install Occupancy Sensor Lighting Controls	12,961	2.4	-3	$1,514	$13,108	$1,660	$11,448	7.6	12,734
ECM 4	Install High/Low Lighting Controls	725	0.1	0	$85	$1,125	$665	$460	5.4	712
Variable Frequency Drive (VFD) Measures		**73,209**	**19.4**	**0**	**$8,638**	**$46,194**	**$7,500**	**$38,694**	**4.5**	**73,721**
ECM 5	Install VFDs on Constant Volume (CV) Fans	73,209	19.4	0	$8,638	$46,194	$7,500	$38,694	4.5	73,721
HVAC System Improvements		**1,769**	**0.0**	**81**	**$680**	**$2,753**	**$6**	**$2,747**	**4.0**	**11,275**
ECM 8	Implement Demand Control Ventilation (DCV)	1,769	0.0	79	$670	$2,719	$0	$2,719	4.1	11,076
ECM 9	Install Pipe Insulation	0	0.0	2	$10	$35	$6	$29	2.9	199
Domestic Water Heating Upgrade		**0**	**0.0**	**2**	**$10**	**$50**	**$16**	**$35**	**3.4**	**203**
ECM 10	Install Low-Flow DHW Devices	0	0.0	2	$10	$50	$16	$35	3.4	203
Food Service & Refrigeration Measures		**3,005**	**0.3**	**0**	**$355**	**$1,140**	**$170**	**$970**	**2.7**	**3,026**
ECM 11	Refrigerator/Freezer Case Electrically Commutated Motors	1,393	0.1	0	$164	$910	$120	$790	4.8	1,403
ECM 12	Vending Machine Control	1,612	0.2	0	$190	$230	$50	$180	0.9	1,623
TOTALS		**133,992**	**30.3**	**71**	**$16,224**	**$76,976**	**$13,415**	**$63,561**	**3.9**	**143,258**

* - 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		**42,324**	**8.1**	**-9**	**$4,943**	**$12,606**	**$3,398**	**$9,208**	**1.9**	**41,587**
ECM 1	Retrofit Fixtures with LED Lamps	42,189	8.1	-9	$4,927	$12,533	$3,398	$9,135	1.9	41,455
ECM 2	Install LED Exit Signs	135	0.0	0	$16	$72	$0	$72	4.6	133

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: Retrofit Fixtures with LED Lamps

Replace fluorescent, HID, or incandescent lamps with LED lamps. Many LED tubes are direct replacements for existing fluorescent tubes and can be installed while leaving the fluorescent fixture ballast in place. LED lamps can be used in existing fixtures as a direct replacement for most other lighting technologies. Be sure to specify replacement lamps that are compatible with existing dimming controls, where applicable. In some circumstances, you may need to upgrade your dimming system for optimum performance.

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

Affected Building Areas: all areas with fluorescent fixtures with T8 tubes, incandescent, and CFLs.

ECM 2: Install LED Exit Signs

Replace fluorescent exit signs with LED exit signs. LED exit signs require virtually no maintenance and have a life expectancy of at least 20 years. This measure saves energy by installing LED fixtures, which use less power than other technologies with an equivalent lighting output. Maintenance savings and improved reliability may also be achieved, as the longer-lasting LED lamps will not need to be replaced as often as the existing lamps.

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**13,685**	**2.5**	**-3**	**$1,598**	**$15,033**	**$2,325**	**$12,708**	**8.0**	**13,446**
ECM 3	Install Occupancy Sensor Lighting Controls	12,961	2.4	-3	$1,514	$13,108	$1,660	$11,448	7.6	12,734
ECM 4	Install High/Low Lighting Controls	725	0.1	0	$85	$1,125	$665	$460	5.4	712

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.

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

Affected Building Areas: hallways and stairwells.

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		**73,907**	**19.7**	**0**	**$8,721**	**$52,975**	**$7,650**	**$45,325**	**5.2**	**74,424**
ECM 5	Install VFDs on Constant Volume (CV) Fans	73,209	19.4	0	$8,638	$46,194	$7,500	$38,694	4.5	73,721
ECM 6	Install VFDs on Heating Water Pumps	699	0.3	0	$82	$6,781	$150	$6,631	80.5	703

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

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

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

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

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

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

Affected Air Handlers: packaged units serving cafeteria, multipurpose room, and library section.

ECM 6: Install VFDs on Heating Water Pumps

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

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

Affected Pumps: HHW pumps.

4.4 Unitary HVAC

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Unitary HVAC Measures		**3,428**	**2.2**	**0**	**$405**	**$26,902**	**$1,335**	**$25,567**	**63.2**	**3,452**
ECM 8	Install High Efficiency Air Conditioning Units	3,428	2.2	0	$405	$26,902	$1,335	$25,567	63.2	3,452

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

ECM 7: Install High Efficiency Air Conditioning Units

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

Affected Units: ductless mini splits serving the server rooms.

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		**1,769**	**0.0**	**81**	**$680**	**$2,753**	**$6**	**$2,747**	**4.0**	**11,275**
ECM 9	Implement Demand Control Ventilation (DCV)	1,769	0.0	79	$670	$2,719	$0	$2,719	4.1	11,076
ECM 10	Install Pipe Insulation	0	0.0	2	$10	$35	$6	$29	2.9	199

ECM 8: Implement Demand Control Ventilation (DCV)

DCV monitors the indoor air's carbon dioxide (CO_2) content to measure room occupancy. This data is used to regulate the amount of outdoor air provided to the space for ventilation. For this measure to be implemented, the site will require an energy management system (EMS) as outlined in ECM 14, evaluated below. Savings estimated for DCV would be in addition to those estimated in ECM 14.

Standard ventilation systems often provide outside air based on a space's estimated maximum occupancy but not actual occupancy. During low occupancy periods, the space may then be over ventilated. This wastes energy through heating and cooling the excess outside air flow. DCV reduces unnecessary outdoor air intake by regulating ventilation based on actual occupancy levels. DCV is most suited for facilities where occupancy levels vary significantly from hour to hour and day to day.

Energy savings associated with DCV are based on hours of operation, space occupancy, outside air reduction, and other factors. Energy savings results from eliminating unnecessary ventilation and space conditioning.

Affected Building Areas: gymnasium, cafeteria, and library.

ECM 9: Install Pipe Insulation

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

Affected Systems: domestic hot water piping.

4.6 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		**0**	**0.0**	**2**	**$10**	**$50**	**$16**	**$35**	**3.4**	**203**
ECM 11	Install Low-Flow DHW Devices	0	0.0	2	$10	$50	$16	$35	3.4	203

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		**3,005**	**0.3**	**0**	**$355**	**$1,140**	**$170**	**$970**	**2.7**	**3,026**
ECM 12	Refrigerator/Freezer Case Electrically Commutated Motors	1,393	0.1	0	$164	$910	$120	$790	4.8	1,403
ECM 13	Vending Machine Control	1,612	0.2	0	$190	$230	$50	$180	0.9	1,623

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 coolers and freezers. Fractional horsepower EC motors are significantly more efficient than mechanically commutated, brushed motors, particularly at low speeds or partial load. By using variable-speed technology, EC motors can optimize fan usage. Because these motors are brushless and use DC power, losses due to friction and phase shifting are eliminated.

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

ECM 12: Vending Machine Control

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

4.8 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		**23,113**	**0.0**	**217**	**$3,988**	**$112,959**	**$0**	**$112,959**	**28.3**	**48,684**
ECM 14	Installation of an Energy Management System	23,113	0.0	217	$3,988	$112,959	$0	$112,959	28.3	48,684

ECM 13: Installation of an Energy Management System

We evaluated the installation of an energy management system for this facility.

Most larger facilities have some type of energy management system (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 dead bands 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 8% of the HVAC energy consumption baseline.

5 Energy Efficient Best Practices

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

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

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

Energy Tracking with ENERGY STAR® Portfolio Manager®

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

Lighting Maintenance

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

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

Motor Maintenance

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

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

Thermostat Schedules and Temperature Resets

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

AC System Evaporator/Condenser Coil Cleaning

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

HVAC Filter Cleaning and Replacement

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

Boiler Maintenance

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

Optimize HVAC Equipment Schedules

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

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

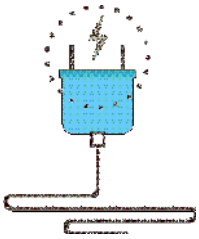
Water Heater Maintenance

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

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

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

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 gallons per flush (gpf) and for flush valve toilets is 1.28 gpf (this is lower than the current 1.6 gpf federal standard).

[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.

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

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

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

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

Procurement Strategies

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

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

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

6 On-site Generation

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

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

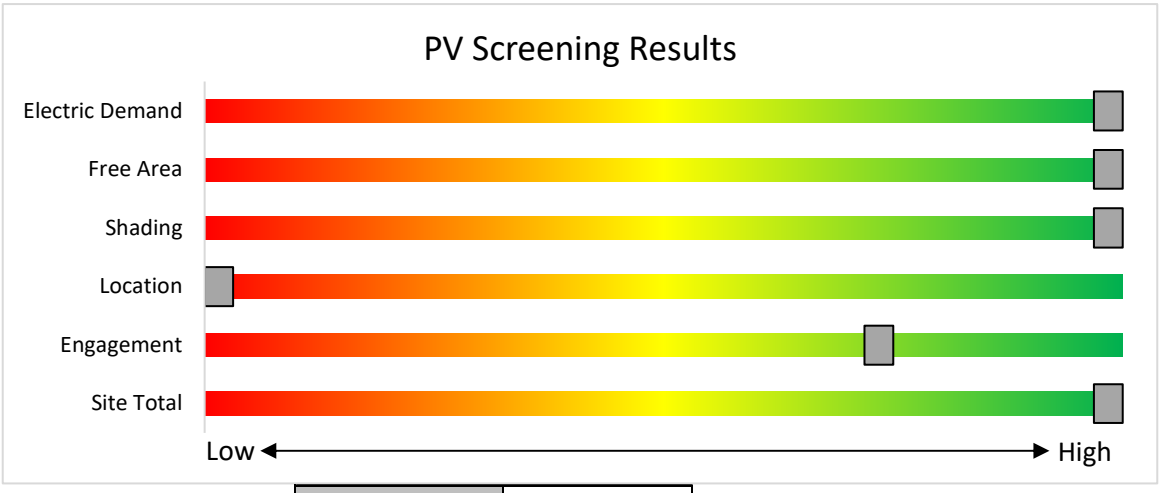
6.1 Solar Photovoltaic

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

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

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

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



Potential	High	
System Potential	104	kW DC STC
Electric Generation	123,903	kWh/yr
Displaced Cost	$14,620	/yr
Installed Cost	$351,500	

Figure 8 - Photovoltaic Screening

Successor Solar Incentive Program (SuSI)

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

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

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

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

6.2 Combined Heat and Power

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

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

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

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

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

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

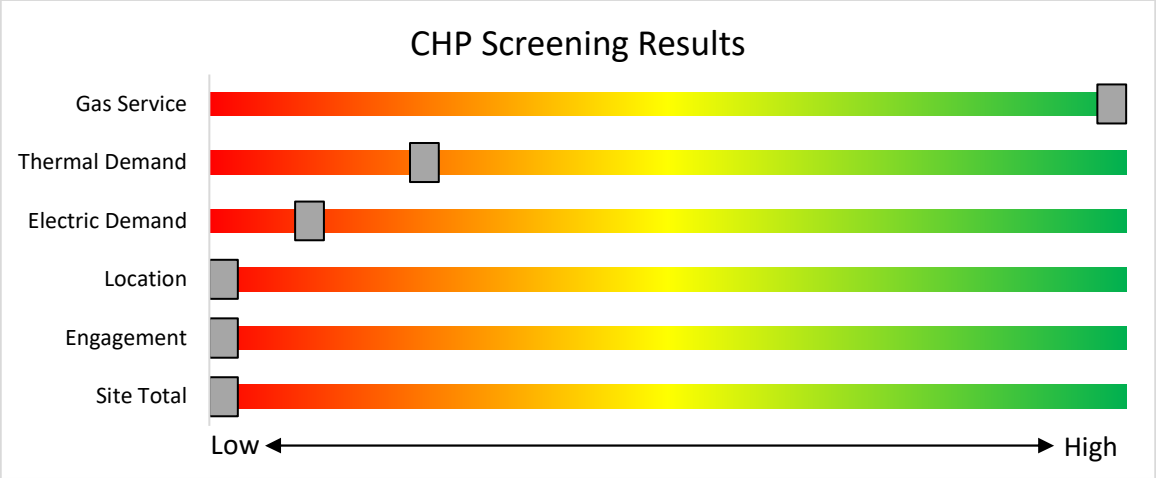


Figure 9 - Combined Heat and Power Screening

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

7 PROJECT FUNDING AND INCENTIVES

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

7.1 Utility Energy Efficiency Programs

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

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

https://www.njcleanenergy.com/transition

8 New Jersey's Clean Energy Programs

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

8.1 Large Energy Users

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

Incentives

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

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

How to Participate

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

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

8.2 Combined Heat and Power

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

Incentives

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

8.3 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.

8.4 Energy Savings Improvement Program

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

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

How to Participate

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

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

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

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

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

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

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

9 PROJECT DEVELOPMENT

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

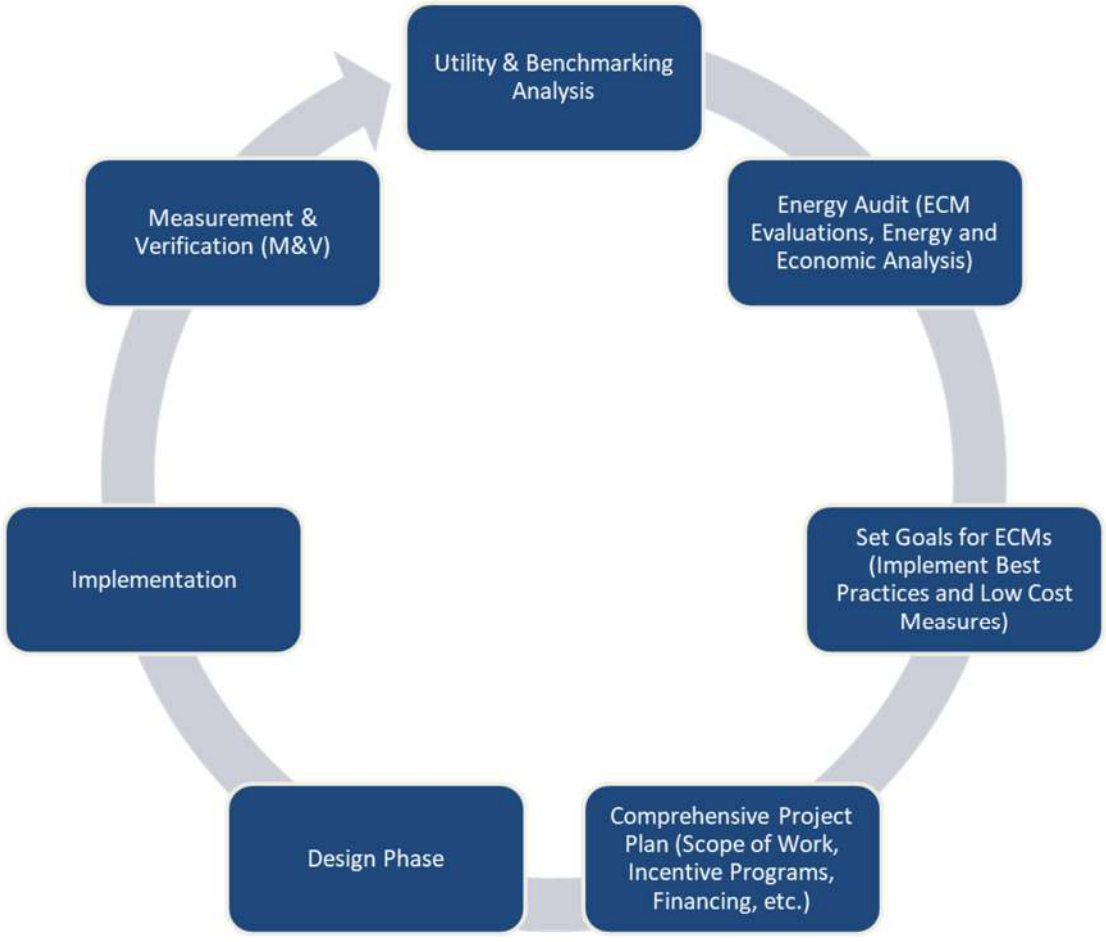


Figure 10 – Project Development Cycle

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
Classroom 116	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Classroom 116	18	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	35	2,460		None	No	18	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	2,460	0.0	0	0	$0	$0	$0	0.0
Classroom 116	1	LED Lamps: (1) 22W Corn Bulb Screw-In Lamp	Wall Switch	S	22	3,565		None	No	1	LED Lamps: (1) 22W Corn Bulb Screw-In Lamp	Wall Switch	22	3,565	0.0	0	0	$0	$0	$0	0.0
Classroom 116	4	LED - Fixtures: Ceiling Mount	Occupancy Sensor	S	20	2,460		None	No	4	LED - Fixtures: Ceiling Mount	Occupancy Sensor	20	2,460	0.0	0	0	$0	$0	$0	0.0
Classroom 116	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,565	0.0	129	0	$15	$37	$10	1.8
Classroom 120	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.1	329	0	$38	$189	$40	3.9
Classroom 120	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	988	0	$115	$489	$95	3.4
Classroom 120	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	988	0	$115	$489	$95	3.4
Classroom 120	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,565	1	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,565	0.0	114	0	$13	$72	$10	4.7
Classroom 125	15	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	35	2,460		None	No	15	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	2,460	0.0	0	0	$0	$0	$0	0.0
Classroom 126	15	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	35	2,460		None	No	15	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	2,460	0.0	0	0	$0	$0	$0	0.0
Classroom 127	15	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	35	2,460		None	No	15	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	2,460	0.0	0	0	$0	$0	$0	0.0
Classroom 128	15	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	35	2,460		None	No	15	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	2,460	0.0	0	0	$0	$0	$0	0.0
Classroom 129	15	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	35	2,460		None	No	15	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	2,460	0.0	0	0	$0	$0	$0	0.0
Classroom 141	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	35	2,460		None	No	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	2,460	0.0	0	0	$0	$0	$0	0.0
Classroom 142	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	35	2,460		None	No	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	2,460	0.0	0	0	$0	$0	$0	0.0
Classroom 157	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.1	494	0	$58	$380	$65	5.5
Classroom 157	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,565	0.1	388	0	$45	$110	$30	1.8
Classroom 157	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,565	0.1	388	0	$45	$110	$30	1.8
Classroom 159	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	823	0	$96	$453	$85	3.8
Classroom 159	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	823	0	$96	$453	$85	3.8
Classroom 159	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	823	0	$96	$453	$85	3.8
Classroom 160	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.1	659	0	$77	$416	$75	4.4
Classroom 160	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	1,317	0	$154	$562	$115	2.9
Classroom 160	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	1,317	0	$154	$562	$115	2.9

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Corridor 4 e exit	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	40	2,460		None	No	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	2,460	0.0	0	0	$0	$0	$0	0.0
Corridor 5 main corridor	1	Exit Signs: Fluorescent	None		20	8,760	2	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.0	135	0	$16	$72	$0	4.6
Corridor 5 main corridor	6	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor 5 main corridor	1	Linear Fluorescent - RWT8: 4' RWT8 (28W) - 1L	None	S	25	3,565	1	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	None	15	3,565	0.0	41	0	$5	$18	$5	2.8
Corridor 5 main corridor	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,460	1	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.1	536	0	$63	$219	$60	2.5
Corridor 5 main corridor	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,460	1	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.1	446	0	$52	$183	$50	2.5
Corridor 5 main corridor	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,460	1	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.1	357	0	$42	$146	$40	2.5
Corridor 5 main corridor	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,565	0.0	129	0	$15	$37	$10	1.8
Corridor 5 main corridor	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,460	1	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	714	0	$83	$292	$80	2.5
Corridor 5 main corridor	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,565	0.0	129	0	$15	$37	$10	1.8
Corridor 6 new wing	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor 6 new wing	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	60	3,565		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	60	3,565	0.0	0	0	$0	$0	$0	0.0
Corridor 6 new wing	1	LED - Fixtures: Linear Strip	None	S	40	3,565		None	No	1	LED - Fixtures: Linear Strip	None	40	3,565	0.0	0	0	$0	$0	$0	0.0
Corridor 6 new wing	7	LED - Fixtures: Linear Strip	Wall Switch	S	40	3,565	5	None	Yes	7	LED - Fixtures: Linear Strip	High/Low Control	40	2,460	0.1	340	0	$40	$450	$245	5.2
Electrical Room 1	10	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	3,565	3	None	Yes	10	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	2,460	0.0	122	0	$14	$270	$35	16.6
Electrical Room 3	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	40	3,565		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	3,565	0.0	0	0	$0	$0	$0	0.0
Elevator MEELE	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,565	1	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,565	0.0	194	0	$23	$55	$15	1.8
Exterior 1	2	Compact Fluorescent: (1) 55W Spiral Plug-In Lamp	Wall Switch		55	4,380	1, 4	Relamp	Yes	2	LED Lamps: (1) 55W Spiral Plug-In Lamp	Photocell	39	4,380	0.0	145	0	$17	$225	$2	13.1
Exterior 1	3	LED Lamps: (1) 22W Corn Bulb Screw-In Lamp	Wall Switch		22	4,380	4	None	Yes	3	LED Lamps: (1) 22W Corn Bulb Screw-In Lamp	Photocell	22	4,380	0.0	0	0	$0	$200	$0	0.0
Exterior 1	3	LED Lamps: (1) 55W Corn Bulb Screw-In Lamp	Photocell		55	4,380		None	No	3	LED Lamps: (1) 55W Corn Bulb Screw-In Lamp	Photocell	55	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 1	1	LED Lamps: (1) 75W Corn Bulb Screw-In Lamp	None		75	4,380	4	None	Yes	1	LED Lamps: (1) 75W Corn Bulb Screw-In Lamp	Photocell	75	4,380	0.0	0	0	$0	$200	$0	0.0
Exterior 1	1	LED - Fixtures: Flood Fixture	Photocell		100	4,380		None	No	1	LED - Fixtures: Flood Fixture	Photocell	100	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 1	5	LED - Fixtures: Flood Fixture	Timeclock		50	4,380		None	No	5	LED - Fixtures: Flood Fixture	Timeclock	50	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 1	2	LED - Fixtures: Outdoor Pole/Arm-Mounted Decorative Fixture	Photocell		75	4,380		None	No	2	LED - Fixtures: Outdoor Pole/Arm-Mounted Decorative Fixture	Photocell	75	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 1	3	LED - Fixtures: Wall Pack	Photocell		18	4,380		None	No	3	LED - Fixtures: Wall Pack	Photocell	18	4,380	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
Exterior 1	7	LED - Fixtures: Wall Pack	Photocell		30	4,380		None	No	7	LED - Fixtures: Wall Pack	Photocell	30	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 1	2	LED - Fixtures: Wall Sconces	Wall Switch		20	4,380	4	None	Yes	2	LED - Fixtures: Wall Sconces	Photocell	20	4,380	0.0	0	0	$0	$200	$0	0.0
Gymnasium 1	1	Compact Fluorescent: (1) 23W Spiral Plug-In Lamp	Wall Switch	S	23	3,565	1	Relamp	No	1	LED Lamps: (1) 23W Spiral Plug-In Lamp	Wall Switch	16	3,565	0.0	27	0	$3	$13	$1	3.6
Gymnasium 1	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
Gymnasium 1	8	LED - Fixtures: High-Bay	Wall Switch	S	120	3,565	3	None	Yes	8	LED - Fixtures: High-Bay	Occupancy Sensor	120	2,460	0.2	1,167	0	$136	$270	$35	1.7
Janitorial 2	1	Compact Fluorescent: (1) 65W Spiral Plug-In Lamp	Wall Switch	S	65	3,565	1	Relamp	No	1	LED Lamps: (1) 65W Spiral Plug-In Lamp	Wall Switch	46	3,565	0.0	76	0	$9	$13	$1	1.3
Kitchen 112	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,565	1, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,460	0.1	494	0	$58	$226	$50	3.0
Kitchen 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
Kitchen 2	3	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	S	20	2,460		None	No	3	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	20	2,460	0.0	0	0	$0	$0	$0	0.0
Kitchen 2	1	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	40	2,460		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	2,460	0.0	0	0	$0	$0	$0	0.0
Kitchen 2	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	40	2,460		None	No	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	2,460	0.0	0	0	$0	$0	$0	0.0
Kitchen 2	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	40	2,460		None	No	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	2,460	0.0	0	0	$0	$0	$0	0.0
Library 154	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
Library 154	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,565	1	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,565	0.0	194	0	$23	$55	$15	1.8
Library 154	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,565	1, 3	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,460	0.4	1,976	0	$231	$708	$155	2.4
Library 154	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,565	1, 3	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,460	0.5	2,717	-1	$317	$872	$200	2.1
Library 154	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,565	1, 3	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,460	0.5	2,470	-1	$288	$818	$185	2.2
Library 154	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,565	1, 3	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,460	0.2	1,235	0	$144	$544	$110	3.0
Library 154	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,565	1, 3	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,460	0.2	1,235	0	$144	$544	$110	3.0
Multipurpose 1	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
Multipurpose 1	8	LED - Fixtures: Ambient - 4' - Direct Fixture	Occupancy Sensor	S	25	2,460		None	No	8	LED - Fixtures: Ambient - 4' - Direct Fixture	Occupancy Sensor	25	2,460	0.0	0	0	$0	$0	$0	0.0
Multipurpose 1	24	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	3,565	3	None	Yes	24	LED - Fixtures: Ceiling Mount	Occupancy Sensor	20	2,460	0.1	584	0	$68	$540	$70	6.9
Multipurpose 1	6	LED - Fixtures: High-Bay	Wall Switch	S	100	3,565	3	None	Yes	6	LED - Fixtures: High-Bay	Occupancy Sensor	100	2,460	0.1	729	0	$85	$270	$35	2.8
Multipurpose 1	8	LED - Fixtures: Linear Strip	Wall Switch	S	100	3,565	3	None	Yes	8	LED - Fixtures: Linear Strip	Occupancy Sensor	100	2,460	0.2	973	0	$114	$270	$35	2.1
Multipurpose 1	1	LED - Fixtures: Linear Strip	None	S	300	3,565		None	No	1	LED - Fixtures: Linear Strip	None	300	3,565	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
Multipurpose 1	1	LED - Fixtures: Linear Strip	Occupancy Sensor	S	40	2,460		None	No	1	LED - Fixtures: Linear Strip	Occupancy Sensor	40	2,460	0.0	0	0	$0	$0	$0	0.0
Multipurpose 1	1	LED - Fixtures: Wall Sconces	Wall Switch	S	30	3,565		None	No	1	LED - Fixtures: Wall Sconces	Wall Switch	30	3,565	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 104	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,565	1, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,460	0.1	494	0	$58	$226	$50	3.0
Office - Enclosed 104	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,565	1	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,565	0.0	220	0	$26	$73	$20	2.1
Office - Enclosed 106	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,565	1, 3	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,460	0.2	988	0	$115	$489	$95	3.4
Office - Enclosed 109	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	3,565		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	3,565	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 109	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.1	329	0	$38	$189	$40	3.9
Office - Enclosed 109	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,565	0.0	129	0	$15	$37	$10	1.8
Office - Enclosed 120	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	None	S	62	3,565	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	None	29	3,565	0.0	129	0	$15	$37	$10	1.8
Office - Enclosed 154A	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.1	329	0	$38	$189	$40	3.9
Office - Enclosed 162	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	None	S	62	3,565	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	None	29	3,565	0.0	129	0	$15	$37	$10	1.8
Office - Enclosed 162	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	None	S	93	3,565	1	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	None	44	3,565	0.0	194	0	$23	$55	$15	1.8
Office - Enclosed 162	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,565	1	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,565	0.0	194	0	$23	$55	$15	1.8
Office - Enclosed 162	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,565	1	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,565	0.0	194	0	$23	$55	$15	1.8
Office - Enclosed 162A	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	None	S	62	3,565	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	None	29	3,565	0.0	129	0	$15	$37	$10	1.8
Office - Enclosed 8	1	LED - Fixtures: Ambient - 8' - Direct Fixture	Wall Switch	S	40	3,565		None	No	1	LED - Fixtures: Ambient - 8' - Direct Fixture	Wall Switch	40	3,565	0.0	0	0	$0	$0	$0	0.0
Restroom - Female GT103	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.1	329	0	$38	$189	$20	4.4
Restroom - Female GT131	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.1	329	0	$38	$189	$20	4.4
Restroom - Female WT152	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.1	329	0	$38	$189	$20	4.4
Restroom - Male BT113	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.1	329	0	$38	$189	$20	4.4
Restroom - Unisex 104TR	1	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	3,565	1	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	9	3,565	0.0	200	0	$23	$17	$1	0.7
Restroom - Unisex 116CT	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	3,565		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	3,565	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex 121CT	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,565	0.0	129	0	$15	$37	$10	1.8
Restroom - Unisex 125CT	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,565	0.0	129	0	$15	$37	$10	1.8
Restroom - Unisex 162TR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,565	0.0	129	0	$15	$37	$10	1.8

	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 - Unisex 7 nw	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	40	3,565		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	3,565	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex 7 nw	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	40	3,565		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	3,565	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex 7 nw	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	40	3,565		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	3,565	0.0	0	0	$0	$0	$0	0.0
Server Room 154DR	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,565	1, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,460	0.1	494	0	$58	$226	$50	3.0
Server Room DR119	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	None	S	62	3,565	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	None	29	3,565	0.0	129	0	$15	$37	$10	1.8
Storage 10 multipurpose	3	LED - Fixtures: Ambient - 8' - Direct Fixture	Wall Switch	S	40	3,565	3	None	Yes	3	LED - Fixtures: Ambient - 8' - Direct Fixture	Occupancy Sensor	40	2,460	0.0	146	0	$17	$116	$0	6.8
Storage 160SC	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,565	0.0	129	0	$15	$37	$10	1.8
Storage 168	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,460	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.0	89	0	$10	$37	$10	2.5
Storage 168	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,565	0.0	129	0	$15	$37	$10	1.8
Storage 8 new wing	2	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	40	3,565	3	None	Yes	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	2,460	0.0	97	0	$11	$116	$0	10.2
Storage 9 multipurpose	2	LED - Fixtures: Linear Strip	Wall Switch	S	40	3,565	3	None	Yes	2	LED - Fixtures: Linear Strip	Occupancy Sensor	40	2,460	0.0	97	0	$11	$116	$0	10.2
Storage outdoor	1	LED - Fixtures: Linear Strip	Wall Switch	S	30	3,565		None	No	1	LED - Fixtures: Linear Strip	Wall Switch	30	3,565	0.0	0	0	$0	$0	$0	0.0
Classroom 203	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	None	S	62	3,565	1, 3	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.0	165	0	$19	$37	$10	1.4
Classroom 203	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,565	0.0	129	0	$15	$37	$10	1.8
Classroom 203 (1)	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	988	0	$115	$489	$95	3.4
Classroom 203 (1)	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	988	0	$115	$489	$95	3.4
Classroom 208	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	35	2,460		None	No	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	2,460	0.0	0	0	$0	$0	$0	0.0
Classroom 209	12	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	35	3,565	3	None	Yes	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	2,460	0.1	511	0	$60	$270	$35	3.9
Classroom 209 (1)	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	35	2,460		None	No	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	2,460	0.0	0	0	$0	$0	$0	0.0
Classroom 255	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	823	0	$96	$453	$85	3.8
Classroom 255	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	823	0	$96	$453	$85	3.8
Classroom 255	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	823	0	$96	$453	$85	3.8
Classroom 256	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	823	0	$96	$453	$85	3.8
Classroom 256	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	823	0	$96	$453	$85	3.8
Classroom 256	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	823	0	$96	$453	$85	3.8

	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 257	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	823	0	$96	$453	$85	3.8
Classroom 257	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	823	0	$96	$453	$85	3.8
Classroom 257	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	823	0	$96	$453	$85	3.8
Classroom 259	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	823	0	$96	$453	$85	3.8
Classroom 259	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	823	0	$96	$453	$85	3.8
Classroom 259	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	823	0	$96	$453	$85	3.8
Corridor 2 Old Building	6	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	30	3,565	5	None	Yes	6	LED - Fixtures: Ambient 2x4 Fixture	High/Low Control	30	2,460	0.0	219	0	$26	$225	$210	0.6
Corridor New Building	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor New Building	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,460	1	Relamp	No	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	804	0	$94	$329	$90	2.5
Janitorial JC202	1	Incandescent: (1) 60W A19 Screw-In Lamp	None	S	60	3,565	1	Relamp	No	1	LED Lamps: A19 Lamps	None	9	3,565	0.0	200	0	$23	$17	$1	0.7
Restroom - Female GT167	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.1	329	0	$38	$189	$20	4.4
Restroom - Female GT202	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.1	329	0	$38	$189	$20	4.4
Restroom - Male BT166	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.1	329	0	$38	$189	$20	4.4
Restroom - Male BT205	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.1	329	0	$38	$189	$20	4.4
Restroom - Male MT151	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.1	329	0	$38	$189	$20	4.4
Restroom - Unisex BT252	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.0	165	0	$19	$153	$10	7.4
Restroom - Unisex GT252	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.0	165	0	$19	$153	$10	7.4
Restroom - Unisex TR253	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.0	165	0	$19	$153	$10	7.4
Storage Attic	2	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	3,565	1, 3	Relamp	Yes	2	LED Lamps: A19 Lamps	Occupancy Sensor	9	2,460	0.1	422	0	$49	$150	$2	3.0
Storage GS206	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,565	1, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,460	0.1	494	0	$58	$226	$30	3.4
Storage ME258	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,565	0.0	129	0	$15	$37	$10	1.8
Storage new wing	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,565	1	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,565	0.0	194	0	$23	$55	$15	1.8
Corridor 3	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	3,565	5	None	Yes	2	LED Lamps: (1) 10W A19 Screw-In Lamp	High/Low Control	10	2,460	0.0	24	0	$3	$225	$70	54.6
Corridor 3	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 5	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,460	0.1	659	0	$77	$371	$180	2.5
Mechanical BR004	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

	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
Mechanical BR004	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	1,153	0	$135	$526	$105	3.1
Old Electrical Rm ME003	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,565	1	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,565	0.0	220	0	$26	$73	$20	2.1
Storage 001	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
Storage 001	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,460	1	Relamp	No	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,460	0.5	1,818	0	$212	$876	$240	3.0
Stairs New 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
Stairs New A	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1, 3	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,460	0.2	823	0	$96	$408	$225	1.9
Stairs New A	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,565	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,565	0.0	129	0	$15	$37	$10	1.8
Stairs New A	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,565	1, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,460	0.1	494	0	$58	$335	$100	4.1

Motor Inventory & Recommendations

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Restroom - Unisex BT252	Restroom - Unisex BT252	1	Supply Fan	0.0	60.0%	No			W	2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex GT252	Restroom - Unisex GT252	1	Supply Fan	0.0	60.0%	No			W	2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex TR253	Restroom - Unisex TR253	1	Supply Fan	0.0	60.0%	No			W	2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	Exterior 2	1	Makeup Air Fan	2.0	86.5%	No			W	2,745	6	No	86.5%	Yes	1	0.6	1,776	0	$209	$3,261	$100	15.1
Classroom 116	Classroom 116	1	Fan Coil Unit	0.3	60.0%	No			W	780		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 120	Classroom 120	1	Fan Coil Unit	0.3	60.0%	No			W	780		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 125	Classroom 125	1	Fan Coil Unit	0.3	60.0%	No			W	780		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 126	Classroom 126	1	Fan Coil Unit	0.3	60.0%	No			W	780		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 127	Classroom 127	1	Fan Coil Unit	0.3	60.0%	No			W	780		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 128	Classroom 128	1	Fan Coil Unit	0.3	60.0%	No			W	780		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 129	Classroom 129	1	Fan Coil Unit	0.3	60.0%	No			W	780		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 141	Classroom 141	1	Fan Coil Unit	0.3	60.0%	No			W	780		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 142	Classroom 142	1	Fan Coil Unit	0.3	60.0%	No			W	780		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 157	Classroom 157	1	Fan Coil Unit	0.3	60.0%	No			W	780		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 159	Classroom 159	1	Fan Coil Unit	0.3	60.0%	No			W	780		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 160	Classroom 160	1	Fan Coil Unit	0.3	60.0%	No			W	780		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 120	Office - Enclosed 120	1	Fan Coil Unit	0.3	60.0%	No			W	780		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 203	Classroom 203	2	Fan Coil Unit	0.3	60.0%	No			W	780		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 203 (1)	Classroom 203 (1)	2	Fan Coil Unit	0.3	60.0%	No			W	780		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 208	Classroom 208	2	Fan Coil Unit	0.3	60.0%	No			W	780		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 209	Classroom 209	2	Fan Coil Unit	0.3	60.0%	No			W	780		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 209 (1)	Classroom 209 (1)	2	Fan Coil Unit	0.3	60.0%	No			W	780		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 255	Classroom 255	2	Fan Coil Unit	0.3	60.0%	No			W	780		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 256	Classroom 256	2	Fan Coil Unit	0.3	60.0%	No			W	780		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 257	Classroom 257	2	Fan Coil Unit	0.3	60.0%	No			W	780		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 259	Classroom 259	2	Fan Coil Unit	0.3	60.0%	No			W	780		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior	Cafetroium	2	Supply Fan	15.0	92.4%	No	AAON	RN-060-8-0-EB09	W	3,565	6	No	93.0%	Yes	2	8.7	32,756	0	$3,865	$14,082	$2,400	3.0
Exterior 2	Multipurpose	2	Supply Fan	7.5	91.7%	No	AAON	RN-031-8-0-EA09-3D9	W	3,565	6	No	91.7%	Yes	2	4.3	16,314	0	$1,925	$9,476	$2,000	3.9
Exterior 3	RTU 1 - Library, corridor, restrooms, nurse office	1	Supply Fan	5.0	89.5%	No	AAON	RK-15-2-E0-750	B	3,565	6	No	89.5%	Yes	1	1.4	5,572	0	$657	$4,076	$900	4.8
Exterior	All building	2	Return Fan	5.0	89.5%	No	AAON	RN-060-8-0-EB09	W	3,565	6	No	89.5%	Yes	2	3.0	11,143	0	$1,315	$8,152	$1,800	4.8
Exterior 2	Multipurpose	1	Return Fan	3.0	89.5%	No	AAON	RN-031-8-0-EA09-3D9	W	3,565	6	No	89.5%	Yes	1	0.9	3,343	0	$394	$3,884	$200	9.3
Exterior 3	RTU 1 - Library, corridor, restrooms, nurse office	1	Exhaust Fan	2.0	86.5%	No	AAON	RK-15-2-E0-750	B	3,565	6	No	86.5%	Yes	1	0.6	2,306	0	$272	$3,261	$100	11.6
Mechanical BR004	Mechanical BR004	2	Air Compressor	1.0	84.5%	No			W	1,200		No	84.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical BR004	Mechanical BR004	2	Boiler Feed Water Pump	1.0	84.5%	No	Century		W	720		No	84.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical BR004	Mechanical BR004	2	Combustion Air Fan	1.0	84.5%	No	Marathom		W	720		No	84.5%	No		0.0	0	0	$0	$0	$0	0.0
Restroom - Female GT103	Restroom - Female GT103	1	Exhaust Fan	0.5	70.0%	No			W	2,745		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Restroom - Female WT152	Restroom - Female WT152	1	Exhaust Fan	0.3	60.0%	No			W	2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Restroom - Male BT113	Restroom - Male BT113	1	Exhaust Fan	0.3	60.0%	No			W	2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Restroom - Female GT167	Restroom - Female GT167	1	Exhaust Fan	0.3	60.0%	No			W	2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Restroom - Female GT202	Restroom - Female GT202	1	Exhaust Fan	0.3	60.0%	No			W	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
Restroom - Male BT166	Restroom - Male BT166	1	Exhaust Fan	0.3	60.0%	No			W	2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Restroom - Male BT205	Restroom - Male BT205	1	Exhaust Fan	0.3	60.0%	No			W	2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Restroom - Male MT151	Restroom - Male MT151	1	Exhaust Fan	0.3	60.0%	No			W	2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical BR004	Mechanical BR004	1	Exhaust Fan	0.3	60.0%	No			W	2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	Various	1	Exhaust Fan	0.3	60.0%	No			W	2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	Various	1	Exhaust Fan	0.3	60.0%	No			W	2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	Various	1	Exhaust Fan	0.3	60.0%	No			W	2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2	Various	3	Exhaust Fan	0.3	60.0%	No			W	2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 3	Various	4	Exhaust Fan	0.3	60.0%	No			W	2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical BR004	Mechanical BR004	1	DHW Circulation Pump	0.2	60.0%	No			W	8,760		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical BR004	New wing	2	Heating Hot Water Pump	1.5	86.5%	No			W	720	7	No	86.5%	Yes	2	0.3	699	0	$82	$6,781	$150	80.5
Elevator MEELE	Elevator	1	Other	15.0	70.0%	No			W	480		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical BR004	Boiler system	2	Condensate Pump	2.0	85.5%	No	Baldor	VEM3555	W	720		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical BR004	Mechanical BR004	2	Other	0.5	84.5%	No			W	240		No	84.5%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 120	Classroom 120	1	Supply Fan	0.3	60.0%	No			W	720		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 157	Classroom 157	1	Supply Fan	0.3	60.0%	No			W	720		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 159	Classroom 159	1	Supply Fan	0.3	60.0%	No			W	720		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 160	Classroom 160	1	Supply Fan	0.3	60.0%	No			W	720		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 255	Classroom 255	1	Supply Fan	0.3	60.0%	No			W	720		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 256	Classroom 256	1	Supply Fan	0.3	60.0%	No			W	720		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 257	Classroom 257	1	Supply Fan	0.3	60.0%	No			W	720		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom 259	Classroom 259	1	Supply Fan	0.3	60.0%	No			W	720		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical BR004	New wing	2	Condensate Pump	1.0	86.5%	No	AO Smith Century	P48L2EB7A1 P48M2EB7H	W	720		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0

Packaged HVAC Inventory & Recommendations

		Existing Conditions									Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/ EER)	Heating Mode Efficiency	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/ EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Server Room DR119	Server Room DR119	1	Electric Resistance Heat		10.23		1 COP					No							0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex BT252	Restroom - Unisex BT252	1	Electric Resistance Heat		10.23		1 COP					No							0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex GT252	Restroom - Unisex GT252	1	Electric Resistance Heat		10.23		1 COP					No							0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex TR253	Restroom - Unisex TR253	1	Electric Resistance Heat		10.23		1 COP					No							0.0	0	0	$0	$0	$0	0.0
Exterior 2	Gymnasium	1	Package Unit	31.00	648.00	12.70	0.8 Et	AAON	RN-031-8-0-EA09-3D9	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 3	RTU 1 - Library, corridor, restrooms, nurse office	1	Package Unit	15.00		11.00		AAON	RK-15-2-E0-750	B	8	Yes	1	Package Unit	15.00		14.00		1.8	2,735	0	$323	$16,553	$1,335	47.2
Classroom 120	Classroom 120	1	Electric Resistance Heat		2.56		1 COP					No							0.0	0	0	$0	$0	$0	0.0
Stairs New A	Stairs New A	1	Electric Resistance Heat		2.56		1 COP					No							0.0	0	0	$0	$0	$0	0.0
Classroom 125	Classroom 125	1	Window AC	0.83		10.57		Dayton	40JZ85	W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 142	Classroom 142	1	Window AC	0.75		10.50		JHS	JHS-016B1	W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 157	Classroom 157	1	Window AC	1.00		10.00		Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Classroom 159	Classroom 159	1	Window AC	0.83		10.00		Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 104	Office - Enclosed 104	1	Window AC	1.67		10.00		Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 106	Office - Enclosed 106	1	Window AC	1.67		10.00		Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 109	Office - Enclosed 109	1	Window AC	1.00		10.00		Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 120	Office - Enclosed 120	1	Window AC	1.00		10.00		Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 162A	Office - Enclosed 162A	1	Window AC	0.83		12.00		LG	LW1016ER	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior	Cafetorium	1	Package Unit	60.00	864.00	11.90	0.8 Et	AAON	RN-060-8-0-EB09	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1	Server Room 154DR	1	Ductless Mini-Split AC	1.00		10.80		Mitsubishi		B	8	Yes	1	Ductless Mini-Split AC	1.00		18.00		0.2	347	0	$41	$5,175	$0	126.5
Exterior 3	Server Room DR119	1	Ductless Mini-Split AC	1.00		10.80		Daikin	RK18NMVJU	B	8	Yes	1	Ductless Mini-Split AC	1.00		18.00		0.2	347	0	$41	$5,175	$0	126.5

Space Heating Boiler Inventory & Recommendations

		Existing Conditions						Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical BR004	All school	2	Forced Draft Steam Boiler	3,480	Weil Mclain	1394	B		No						0.0	0	0	$0	$0	$0	0.0

Demand Control Ventilation Recommendations

		Recommendation Inputs					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	ECM #	Number of Zones	Cooling Capacity of Controlled System (Tons)	Electric Heating Capacity of Controlled System (kBtu/hr)	Output Heating Capacity of Controlled System (MBh)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Exterior 2	Gymnasium	9	1.00	31.00		648.00	0.0	577	34	$266	$1,359	$0	5.1
Exterior	Cafetorium	9	1.00	60.00		864.00	0.0	1,192	45	$404	$1,359	$0	3.4

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
Mechanical BR004	DHW	10	6	0.50	0.0	0	2	$10	$35	$6	2.9

DHW Inventory & Recommendations

		Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Manufacturer	Model	Remaining Useful Life	ECM #	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical	Restrooms	1	Storage Tank Water Heater (> 50 Gal)	Bradford White	RG275H6N	W		No						0.0	0	0	$0	$0	$0	0.0
Storage 8 New wing	Kitchen - new wing	1	Storage Tank Water Heater (> 50 Gal)	AO Smith	BTH 199 300	W		No						0.0	0	0	$0	$0	$0	0.0

Low-Flow Device Recommendations

	Recommedation Inputs					Energy Impact & Financial Analysis						
Location	ECM #	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classrooms	11	6	Faucet Aerator (Kitchen)	2.20	1.50	0.0	0	1	$7	$43	$12	4.6
Restroom	11	1	Faucet Aerator (Lavatory)	2.50	0.50	0.0	0	1	$3	$7	$4	1.1

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
Kitchen	1	Low Temp Freezer (-35F to -5F)	Kolpak	PC68MZOP-3P	12	Yes	No	No	0.1	981	0	$116	$607	$80	4.5
Kitchen	1	Medium Temp Freezer (0F to 30F)	Kolpak	PC198LZOP-3P	12	Yes	No	No	0.0	412	0	$49	$303	$40	5.4

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	Manufacturer	Model	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen 2	1	Stand-Up Refrigerator, Solid Door (>50 cu. ft.)	Continental		Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen 2	1	Refrigerator Chest			No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen 2	1	Refrigerator Chest			No		No	0.0	0	0	$0	$0	$0	0.0

Cooking Equipment Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	Manufacturer	Model	High Efficiency Equipement?	ECM #	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen 2	1	Electric Griddle (≤2 Feet Width)			No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen 2	4	Insulated Food Holding Cabinet (Full Size)	Continental		No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen 2	1	Electric Steamer			No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen 2	2	Electric Steamer			No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen 2	1	Gas Combination Oven/Steam Cooker (<15 Pans)	Cleveland		No		No	0.0	0	0	$0	$0	$0	0.0

Dishwasher Inventory & Recommendations

	Existing Conditions							Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Dishwasher Type	Manufacturer	Model	Water Heater Fuel Type	Booster Heater Fuel Type	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Payback w/ Incentives in Years
Kitchen 2	1	Single Tank Conveyor (Low Temp)	Insinger		None	None	No		No	0.0	0	0	$0	$0	$0	0.0

Plug Load Inventory

	Existing Conditions					
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?	Manufacturer	Model
Dewitt D Barlow ES	3	Coffee Machine	400			
Dewitt D Barlow ES	33	Desktop	145			
Dewitt D Barlow ES	2	Electric space heater	1,500			
Dewitt D Barlow ES	16	Fan - portable	60			
Dewitt D Barlow ES	419	Laptop	75			
Dewitt D Barlow ES	2	Microwave	900			
Dewitt D Barlow ES	1	Other	200			
Dewitt D Barlow ES	3	Other	25			
Dewitt D Barlow ES	2	Paper shredder	200			
Dewitt D Barlow ES	27	Printer (Small/Medium)	60			
Dewitt D Barlow ES	4	Copier - large	200			
Dewitt D Barlow ES	1	Projector	200			
Dewitt D Barlow ES	2	Refrigerator Mini	80			
Dewitt D Barlow ES	2	Residential refrigerator	220			
Dewitt D Barlow ES	1	Scanner/Fax machine	30			
Dewitt D Barlow ES	27	Smart Board	5			
Dewitt D Barlow ES	3	Television	100			
Dewitt D Barlow ES	5	Water fountain	50			

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	ECM #	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen 112	1	Refrigerated	13	Yes	0.2	1,612	0	$190	$230	$50	0.9

Custom (High Level) Measure Analysis

Installation of an Energy Management System

Building Square Footage: 59,452
Percent of Conditioned Area Impacted: 95%
Fuel Utility Rate: $5.812 MMBtu
Blended Electric Utility Rate: $0.118 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	184,277	104,636	2,713	Installation of an Energy Management System	8%	8%	8%	$2.00	0.00	23,113	217	$3,988	$112,959	$0	$0	$0	$112,959	28.32	28.32

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.

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Dewitt D. Barlow Elementary School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 59,452
Built: 1939

For Year Ending: July 31, 2021
Date Generated: July 18, 2022

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
Dewitt D. Barlow Elementary School 19 Farragut Road Plainfield, New Jersey 07060	PlainfieldBOE 920 Park Avenue Plainfield, NJ 07060 (908) 731-4356	Kenneth Welch, Jr. 920 Park Avenue Plainfield, NJ 07060 (908) 731-4356 kwelch@plainfield.k12.nj.us

Property ID: 4721088

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
77 kBtu/ft²

Source EUI
131.2 kBtu/ft²

Annual Energy by Fuel

Natural Gas (kBtu)	2,870,823 (63%)
Electric - Grid (kBtu)	1,708,816 (37%)

National Median Comparison

National Median Site EUI (kBtu/ft²)	61.3
National Median Source EUI (kBtu/ft²)	104.4
% Diff from National Median Source EUI	26%

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO2e/year)	311

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

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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.