Local Government Energy Audit Report

West New York Middle School

April 1, 2022

Prepared for:
West New York Board of Education
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West New York, New Jersey 07093

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Disclaimer

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

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

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

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

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

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ENERGY EFFICIENCY INCENTIVE & REBATE TRANSITION

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

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

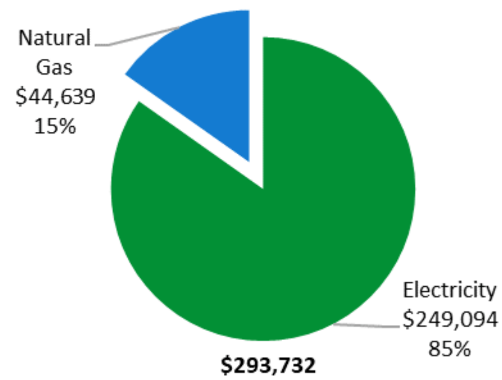
These "next generation" energy efficiency programs feature new ways of managing and delivering programs historically administered by New Jersey's Clean Energy Program™ (NJCEP). All of the investor-owned gas and electric utility companies will now also offer complementary energy efficiency programs and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

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

1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for West New York Middle 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: $293,732 Electricity: 1,997,138 kWh Natural Gas: 51,807 Therms	
ENERGY STAR® Benchmarking Score	28 *(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.

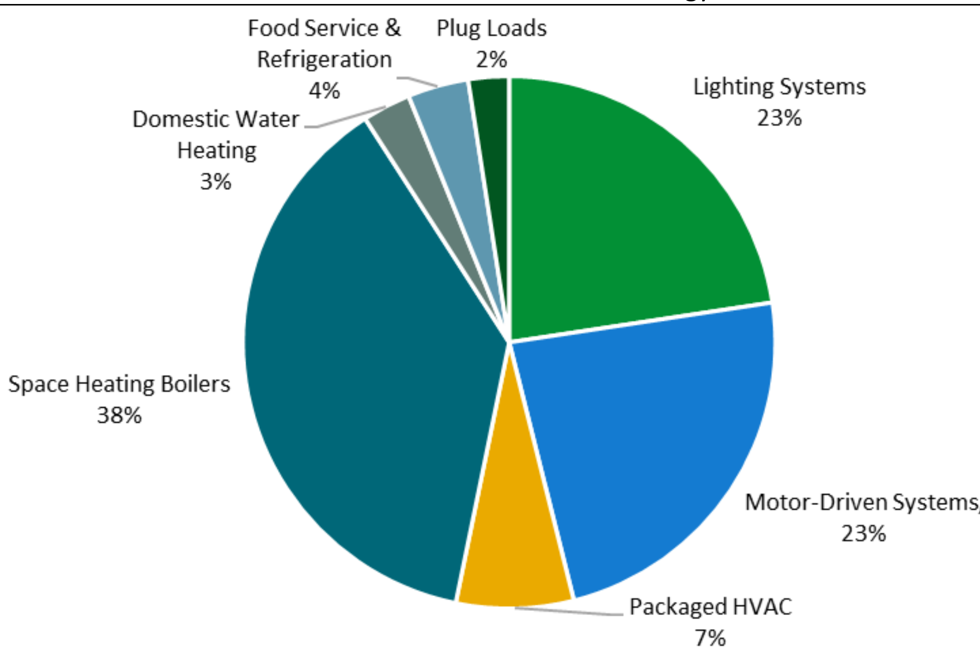


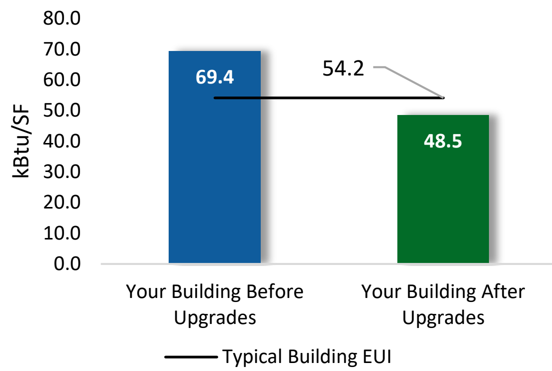
Figure 1 - Energy Use by System

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.

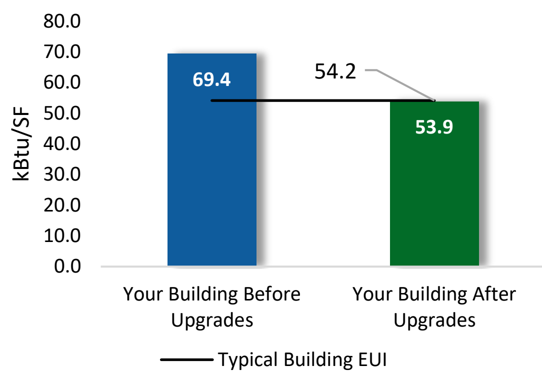
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$655,096
Potential Rebates & Incentives[1]	$84,421
Annual Cost Savings	$109,570
Annual Energy Savings	Electricity: 823,591 kWh Natural Gas: 7,947 Therms
Greenhouse Gas Emission Savings	461 Tons
Simple Payback	5.2 Years
Site Energy Savings (all utilities)	30%



Scenario 2: Cost Effective Package[2]

Installation Cost	$285,913
Potential Rebates & Incentives	$64,081
Annual Cost Savings	$93,565
Annual Energy Savings	Electricity: 738,680 kWh Natural Gas: 1,662 Therms
Greenhouse Gas Emission Savings	382 Tons
Simple Payback	2.4 Years
Site Energy Savings (all utilities)	22%



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			**407,162**	**53.4**	**-85**	**$50,054**	**$87,389**	**$22,000**	**$65,389**	**1.3**	**400,096**
ECM 1	Retrofit Fixtures with LED Lamps	Yes	407,162	53.4	-85	$50,054	$87,389	$22,000	$65,389	1.3	400,096
Lighting Control Measures			**132,138**	**17.3**	**-28**	**$16,243**	**$71,302**	**$24,990**	**$46,312**	**2.9**	**129,827**
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	106,832	14.1	-22	$13,132	$48,802	$5,880	$42,922	3.3	104,964
ECM 3	Install High/Low Lighting Controls	Yes	25,306	3.2	-5	$3,111	$22,500	$19,110	$3,390	1.1	24,863
Motor Upgrades			**4,138**	**1.3**	**0**	**$516**	**$17,723**	**$0**	**$17,723**	**34.3**	**4,167**
ECM 4	Premium Efficiency Motors	No	4,138	1.3	0	$516	$17,723	$0	$17,723	34.3	4,167
Variable Frequency Drive (VFD) Measures			**189,249**	**52.7**	**156**	**$24,952**	**$113,386**	**$16,475**	**$96,911**	**3.9**	**208,885**
ECM 5	Install VFDs on Constant Volume (CV) Fans	Yes	153,144	50.1	0	$19,101	$88,573	$12,375	$76,198	4.0	154,215
ECM 6	Install VFDs on Heating Water Pumps	Yes	10,897	2.4	0	$1,359	$14,215	$3,000	$11,215	8.3	10,974
ECM 7	Install VFDs on Kitchen Hood Fan Motors	Yes	25,207	0.1	156	$4,492	$10,598	$1,100	$9,498	2.1	43,697
Unitary HVAC Measures			**745**	**0.5**	**0**	**$93**	**$5,642**	**$0**	**$5,642**	**60.7**	**750**
ECM 8	Install High Efficiency Air Conditioning Units	No	745	0.5	0	$93	$5,642	$0	$5,642	60.7	750
Electric Chiller Replacement			**80,028**	**10.4**	**0**	**$9,982**	**$221,882**	**$7,020**	**$214,862**	**21.5**	**80,588**
ECM 9	Install High Efficiency Chillers	No	80,028	10.4	0	$9,982	$221,882	$7,020	$214,862	21.5	80,588
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**628**	**$5,415**	**$123,935**	**$13,320**	**$110,615**	**20.4**	**73,578**
ECM 10	Install High Efficiency Hot Water Boilers	No	0	0.0	628	$5,415	$123,935	$13,320	$110,615	20.4	73,578
HVAC System Improvements			**6,141**	**0.0**	**98**	**$1,610**	**$11,191**	**$72**	**$11,119**	**6.9**	**17,651**
ECM 11	Implement Demand Control Ventilation (DCV)	Yes	5,000	0.0	90	$1,398	$10,875	$0	$10,875	7.8	15,563
ECM 12	Install Pipe Insulation	Yes	1,140	0.0	8	$211	$316	$72	$244	1.2	2,089
Domestic Water Heating Upgrade			**0**	**0.0**	**24**	**$208**	**$366**	**$204**	**$162**	**0.8**	**2,833**
ECM 13	Install Low-Flow DHW Devices	Yes	0	0.0	24	$208	$366	$204	$162	0.8	2,833
Food Service & Refrigeration Measures			**3,991**	**0.5**	**0**	**$498**	**$2,280**	**$340**	**$1,940**	**3.9**	**4,018**
ECM 14	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	1,573	0.2	0	$196	$1,820	$240	$1,580	8.1	1,584
ECM 15	Vending Machine Control	Yes	2,418	0.3	0	$302	$460	$100	$360	1.2	2,435
TOTALS (COST EFFECTIVE MEASURES)			**738,680**	**123.8**	**166**	**$93,565**	**$285,913**	**$64,081**	**$221,832**	**2.4**	**763,311**
TOTALS (ALL MEASURES)			**823,591**	**136.0**	**795**	**$109,570**	**$655,096**	**$84,421**	**$570,675**	**5.2**	**922,393**

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

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

Figure 2 – Evaluated Energy Improvements

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

1.1 Planning Your Project

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

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

Pick Your Installation Approach

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

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

Options from Around the State

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

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

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

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

Ongoing Electric Savings with Demand Response

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

2 EXISTING CONDITIONS

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

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

2.1 Site Overview

On September 21, 2021, TRC performed an energy audit at West New York Middle School located in West New York, New Jersey. TRC met with Rick Solares and Ivan Skrabic to review the facility operations and help focus our investigation on specific energy-using systems.

West New York Middle School is a four-story, 172,827 square foot building built in 2004. Spaces include classrooms and offices, as well as a gymnasium, locker rooms, an auditorium, a cafeteria, a kitchen, a computer lab, a library, a conference room, lounges, corridors, stairwells, restrooms, storage rooms, and electrical and mechanical spaces.

2.2 Building Occupancy

The facility is occupied from July to September, with the school year ending for students in July and restarting in September. The weekend occupancy schedule varies, and the facility closes at 11:00 PM on weekdays. During a typical day, the facility is occupied by approximately 150 staff and 1000 students.

Building Name	Weekday/Weekend	Operating Schedule
West New York Middle School	Weekday	6:00 AM - 11:00 PM
	Weekend	Varies

Figure 3 - Building Occupancy Schedule

2.3 Building Envelope

West New York Middle School is a four-floor building. Building walls are concrete block over structural steel with a brick facade. The roof is mostly flat and covered with a black and grey membrane except for a pitched metal roof over the gymnasium, and it is in good condition.

The windows are double glazed and have aluminum frames with thermal breaks. The glass-to-frame seals are in good condition. The operable window weather seals are in good condition, showing no evidence of excess wear. Exterior doors have aluminum frames and are in good condition with undamaged door seals. Overall, the building envelope appears in good condition.

Building Walls

Building Windows


Entrance & Exit Doors

Roof

2.4 Lighting Systems

The primary interior lighting system uses 32-Watt fluorescent T8 lamps. Fixture types include 1-lamp, 2-lamp, 3-lamp, and 4-lamp, 4-foot long recessed, surface mounted, and pendant fixtures with linear and U-bend tube lamps. Compact fluorescent (CFL) and LED lamps are also used in some spaces. Typically, CFLs at this site use 26-watts. Exit signs use LED sources. Gymnasium fixtures have manually controlled high-bay LED lamps. Auditorium fixtures have manually controlled dimmable LED fixtures.

Interior light fixtures are manually controlled. All light fixtures are in good condition. Interior lighting levels were generally sufficient. Exterior fixtures include canopy, recessed, and wall-mounted CFL and LED fixtures. Exterior fixtures are timer controlled.

Fluorescent T8 Fixtures

CFL Fixtures

Gymnasium High Bay LED Fixtures

Exterior CFL & LED Fixtures

2.5 Air Handling Systems

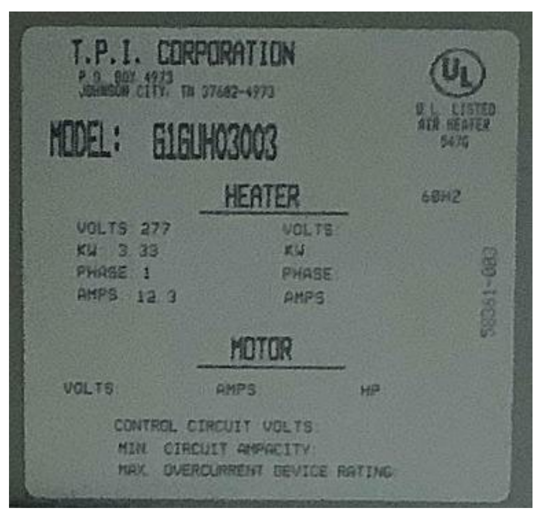
Unitary Electric HVAC Equipment

The principal's office and conference room are conditioned by a mini-split heat pump (HP) unit, while server room 106 is cooled by a mini-split air-conditioning (AC) unit. The mini-split HP unit has a 2.95-ton cooling capacity with an efficiency of 19.2 SEER, and a 36 MBh heating capacity with an efficiency of 11 HSPF. The mini-split AC unit has a 2-ton cooling capacity with an efficiency of 10.6 SEER. The units are in good condition and are not ENERGY STAR® labeled.

Mini-split HP & AC Units

Unitary Heating Equipment

Stairwell C is heated by a TPI Corporation® electric resistance heater with a heating capacity of 3.33 kW. The unit is in good condition and controlled by a manual dial thermostat.

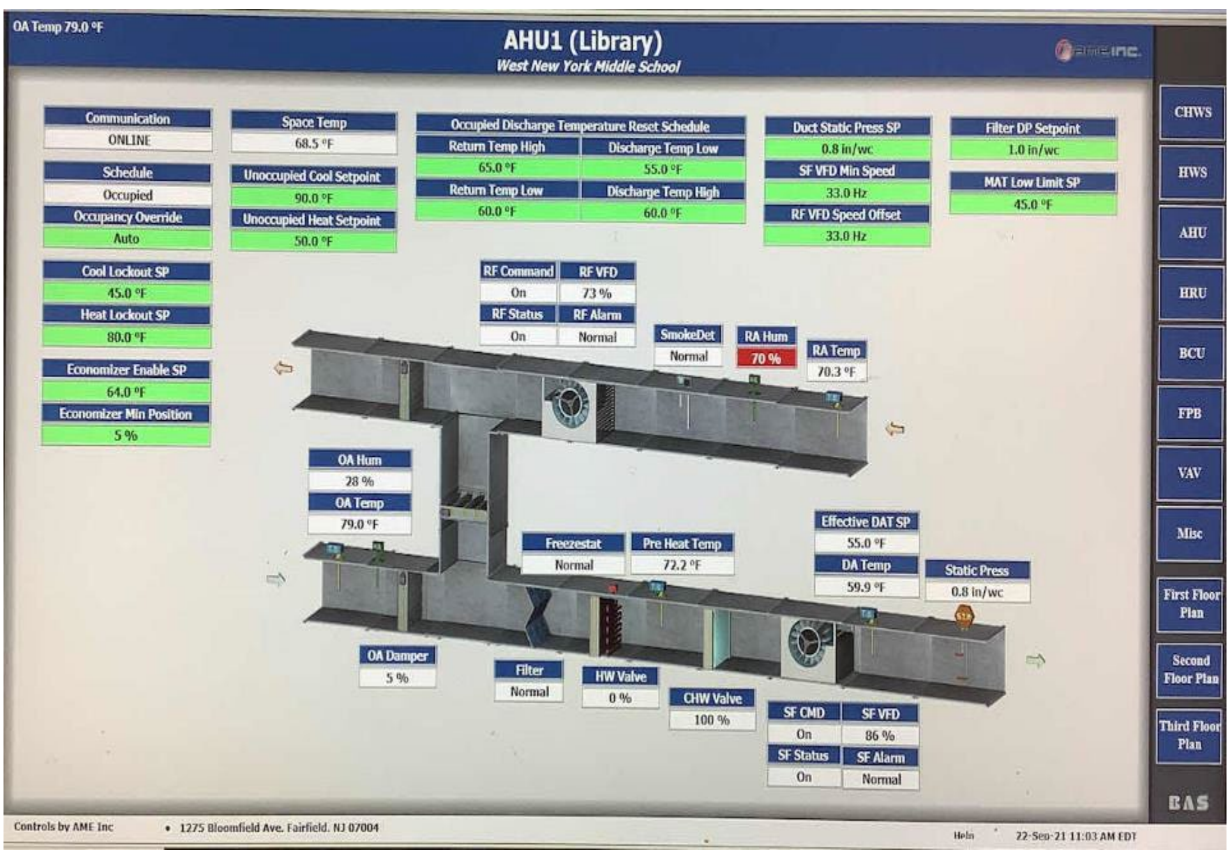
Electric Resistance Heater

Air Handling Units (AHUs)

The facility is served by a total of 12 AHUs with a mix of constant speed and variable frequency drive (VFD) controlled motors that are controlled by the onsite energy management system (EMS).

Units	Area Served	Heating System	Cooling System	VFD Controls	Supply Fan (hp)	Return Fan (hp)
AHU-1	Library	Boilers	Chiller	Yes	10	5
AHU-2	Auditorium	Boilers	Chiller	Yes	15	10
AHU-3	Cafeteria	Boilers	Chiller	No	10	5
AHU-4	Main Office	Boilers	Chiller	Yes	5	2
AHU-5	Main Lobby	Boilers	Chiller	No	7.5	2
AHU-6	Weight Room	Boilers	Chiller	No	2	None
AHU-7	Kitchen	Boilers	Chiller	Yes	5	2
AHU-8	Gymnasium	Boilers	Chiller	No	20	10
AHU-9	Locker Rooms	Boilers	Chiller	No	3	1
HRU-1	Hallways	Boilers	Chiller	Yes	30	15
HRU-2	Hallways	Boilers	Chiller	Yes	25	15
HV-1	(Not specified in BMS)	Boilers	None	No	5	None

AHU-6



AHU EMS Diagram View

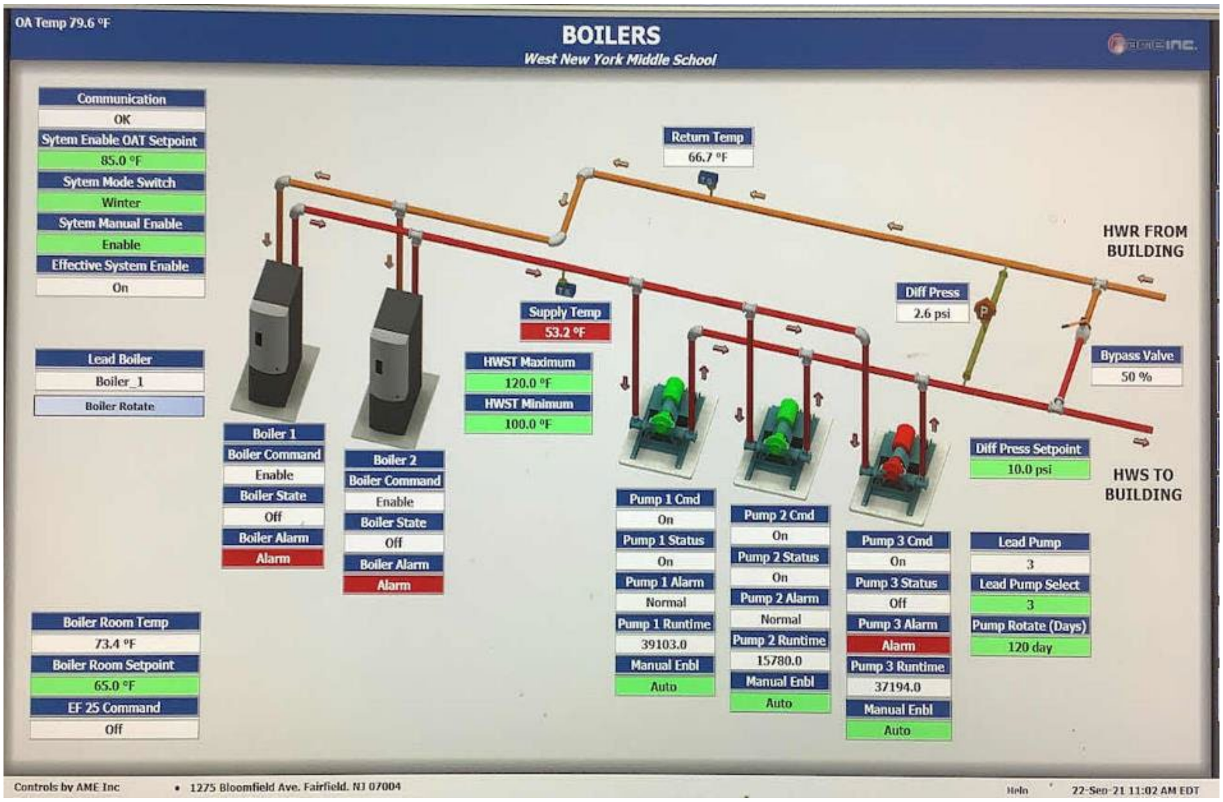
2.6 Heating Hot Water Systems

The main heating system consists of two Smith® gas-fired hot water boilers, each with an output capacity of 3,300 MBh. The burners are fully modulating with a nominal efficiency of 80%. The boilers are configured in a lead-lag control scheme and are controlled by the building's EMS. Both boilers are required under high load conditions. Original to the building, they are in good condition. There is a service contract in place.

The boilers are configured in a constant flow primary distribution with three 7.5 hp constant speed hot water pumps (HWP-1, HWP-2, & HWP-3) operating in an automated control scheme with two pumps running at a time and the lead pump rotating every 120 days. The boilers provide hot water to the AHUs and unit heaters. The boiler's schedules and temperatures are controlled and monitored using the onsite EMS.

Hot Water Boilers

Heating Hot Water Pumps



Hot Water System EMS Diagram View

2.7 Chilled Water Systems

The chiller plant consists of a 351-ton, water-cooled York® variable speed centrifugal chiller. The chiller is configured in a primary-secondary distribution loop with two 15 hp constant flow primary chilled water pumps (CHWP-4 & CHWP-5) and two, 30-hp VFD controlled secondary pumps (CHWP-6 and CHWP-7). The chilled water pumps operate under a lead-lag control scheme, with one primary and one secondary pump being used at a time.

The condenser water system consists of two one-cell cooling towers (CT1 and CT2). Each cooling tower equipped with a 20-hp, two-speed fan that can operate at full or 2/3 fan speed. Condenser water is supplied to the chiller using two, 40 hp constant flow condenser water pumps (CWP-8 & CWP-9). The chiller supplies chilled water to the AHUs. Chilled water temperatures and chiller operating schedules are controlled by the onsite EMS. Original to the building, the chiller is in good condition.

Air Cooled Chiller

Chilled Water Pumps (CHWP-6 & CHWP-7) & VFD

Cooling Tower & Condenser Water Pumps (CWP-8 & CWP-9)

Chilled Water System EMS Diagram View

2.8 Building EMS

An A.M.E. Inc® EMS controls the HVAC equipment, the boilers, the chiller, the AHUs, and the fan coil units. The EMS provides equipment scheduling control and monitors and controls space temperatures, supply air temperatures, humidity, heating water loop temperatures, and chilled water loop temperatures.

Building EMS for West New York Middle School

2.9 Domestic Hot Water

Hot water is produced by two 400 MBh gas-fired Lochinvar boilers with an 85% efficiency rating and a 400-gallon storage tank. Original to the building, the boilers are in good condition. Three circulation pumps ranging from 1/4 hp to 1 hp distribute water to end uses. The circulation pumps operate continuously. The domestic hot water pipes are partially insulated, and the insulation is in good condition.

Gas-fired Domestic Hot Water (DHW) Boiler & Circulation Pump

DHW Storage Tank

2.10 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-fired convection ovens. The kitchen has several other gas appliances. Bulk prepared foods are held in several electric holding cabinets. Only one food holding cabinet is marked high efficiency with the rest of the equipment being standard efficiency, and all are in good condition.

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

Gas-fired Convection Ovens & Electric Holding Cabinet

2.11 Refrigeration

The kitchen has four stand-up refrigerators with either solid or glass doors and one refrigerator chest. All refrigeration equipment is standard efficiency and in good condition.

The walk-in refrigerator has a 0.87-ton compressor located outside of the kitchen and a two-fan evaporator. The walk-in medium temperature freezer has an estimated 1.25-ton compressor located outside of the kitchen and a four-fan evaporator. The walk-in freezer has electric defrost controls and both units have evaporator fan controls.

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

Stand-Up & Walk-in Refrigerators

2.12 Plug Load & Vending Machines

The location is doing a great job managing their electrical plug loads. This report makes additional suggestions for ECMs in this area as well as energy efficient best practices.

There are approximately 200 computer workstations throughout the facility. Plug loads throughout the building include general café and office equipment. There are classroom typical loads such as smartboards and typical office loads such as copiers, printers, microwaves, coffee machines, and mini fridges.

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

There are two refrigerated beverage vending machines and one non-refrigerated vending machine. Vending machines are not equipped with occupancy-based controls.

Residential Refrigerator & Vending Machine

2.13 Water-Using Systems

There are 24 restrooms throughout the facility with toilets, urinals, and sinks. Faucet flow rates are at 2.2 gallons per minute (gpm) or higher.


Typical Restroom Sinks

2.14 On-Site Generation

West New York Middle School has a rooftop photovoltaic (PV) array with approximately 350 panels. The total array size and install date were not provided by the applicant. This system provides approximately 5% of the electricity used.

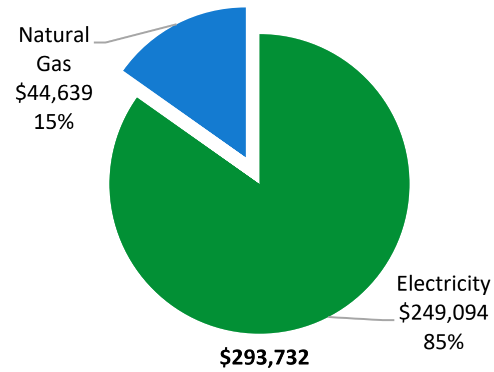
West New York Middle School has an emergency generator that, in the event of a power outage, serves the entire building and is only used for emergency needs.

Rooftop Solar Panels

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	1,997,138 kWh	$249,094
Natural Gas	51,807 Therms	$44,639
Total		**$293,732**



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.

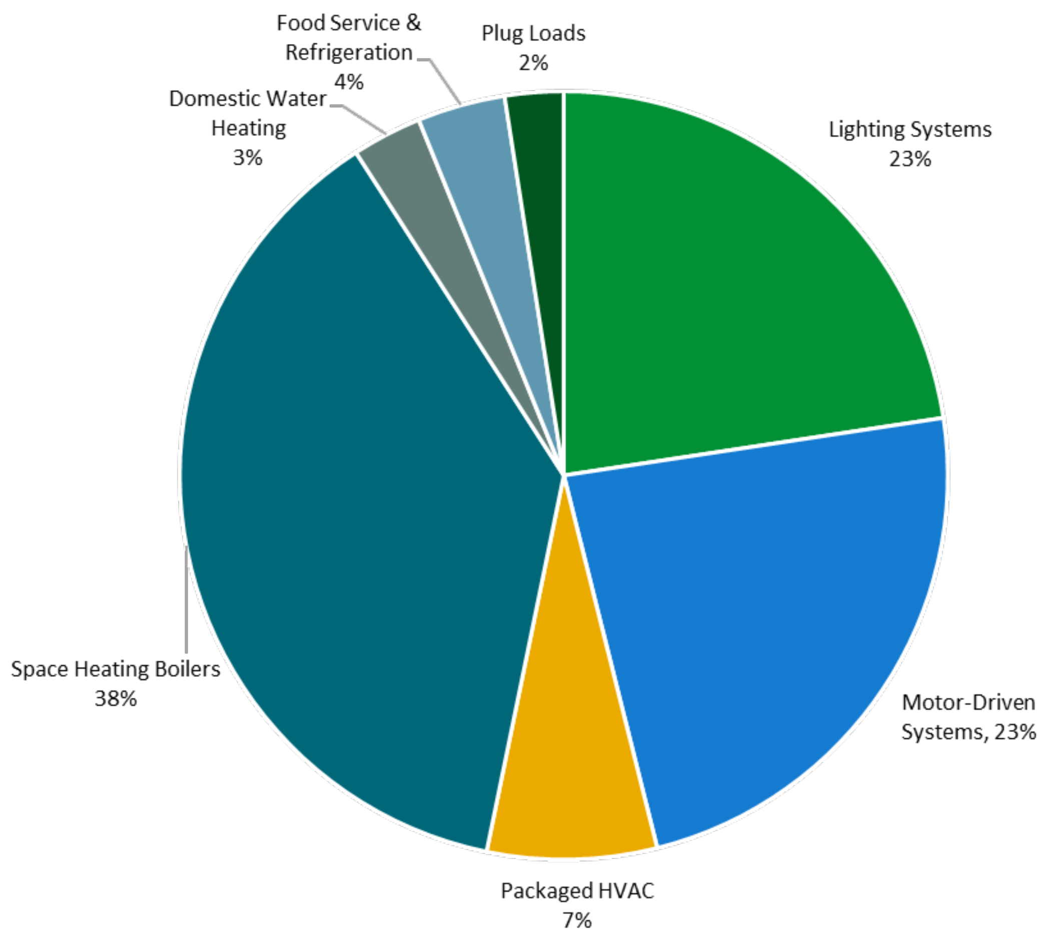
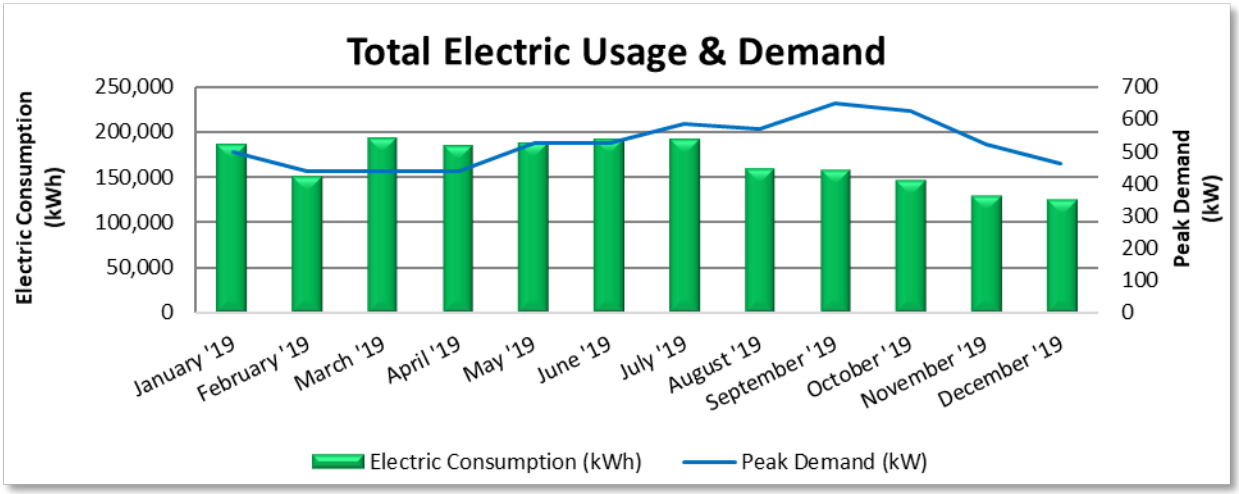
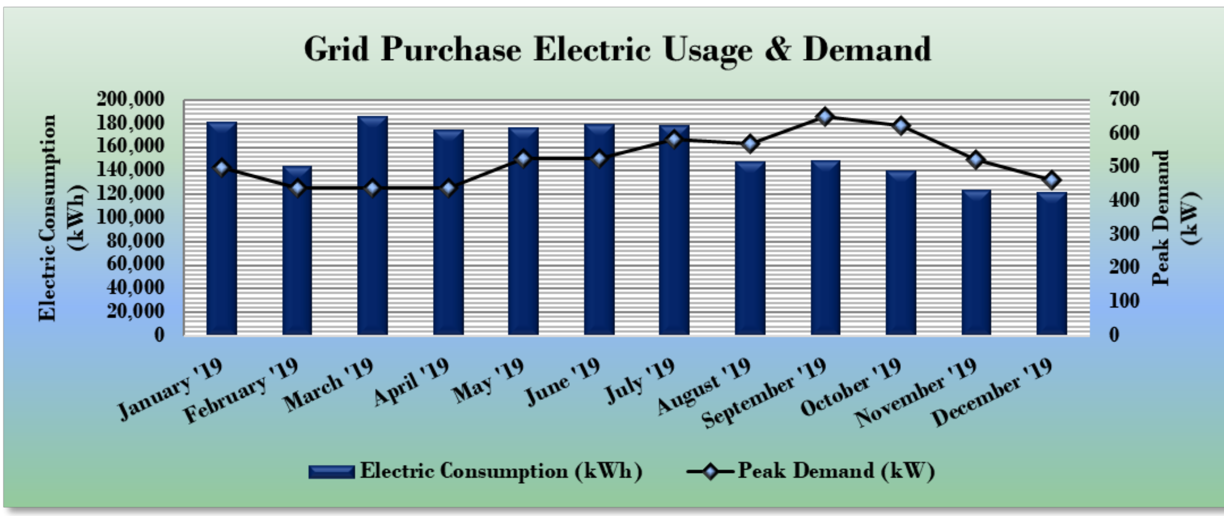


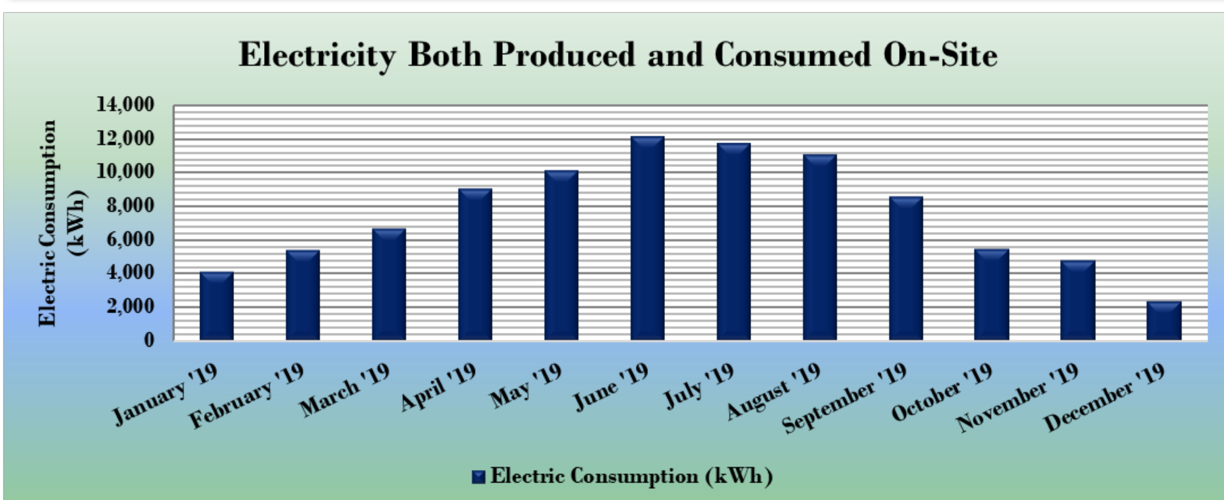
Figure 4 - Energy Balance

3.1 Electricity

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







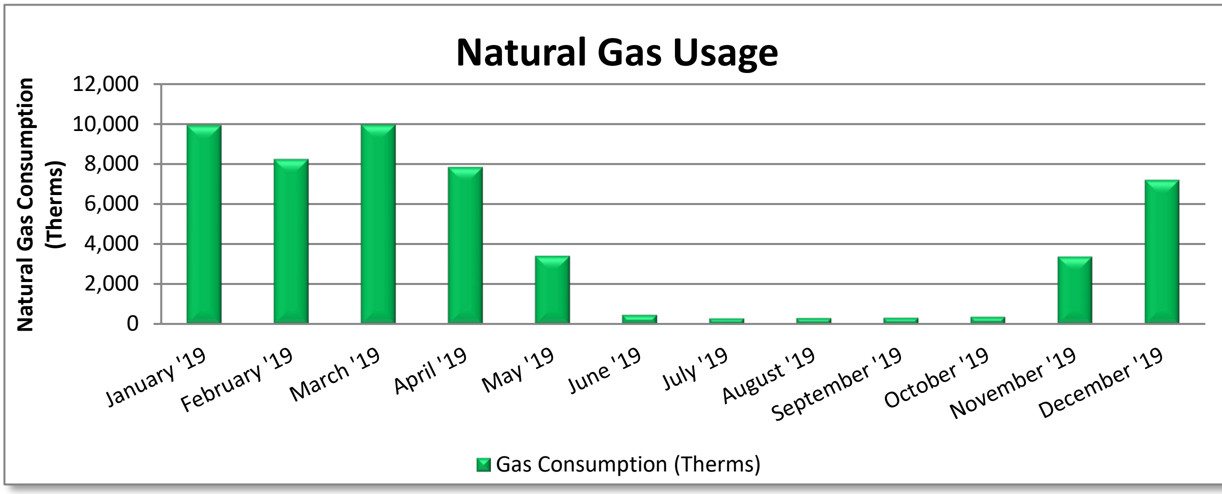
Electric Billing Data					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
1/17/19	31	185,367	499	$1,871	$19,400
2/15/19	29	149,663	437	$1,640	$15,925
3/19/19	32	193,346	437	$1,640	$25,009
4/17/19	29	183,771	437	$1,640	$23,720
5/17/19	30	187,192	527	$1,975	$20,608
6/18/19	32	191,879	527	$1,975	$24,798
7/18/19	30	190,966	584	$7,337	$26,388
8/16/19	29	159,045	570	$7,214	$23,187
9/17/19	32	157,163	651	$8,239	$23,996
10/16/19	29	145,358	626	$2,350	$16,915
11/14/19	29	129,176	523	$1,966	$14,949
12/17/19	33	124,212	462	$1,739	$14,198
Totals	**365**	**1,997,138**	**651**	**$39,585**	**$249,094**
Annual	**365**	**1,997,138**	**651**	**$39,585**	**$249,094**

Notes:

- Peak demand of 651 kW occurred in September '19.
- Average demand over the past 12 months was 523 kW.
- The average electric cost over the past 12 months was $0.125/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges. This report uses this blended rate to estimate energy cost savings.
- On-site generation is through a PPA, and the site purchases the generated electricity from G&S Hudson Solar LLC. Some of the electricity generated on-site is used on-site and the remainder is exported to the grid.
- The first graph shows combined electricity consumption, the second graph shows energy consumed from the grid, and the third graph reflects energy produced by the solar panels.
- The solar meter does not capture kW load and is not displayed on the third graph.

3.2 Natural Gas

PSE&G delivers natural gas under rate class Large Volume Gas (LVG), with natural gas supply provided by East Coast Power & Gas, a third-party supplier.



Gas Billing Data			
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**
1/17/19	31	9,938	$10,277
2/15/19	29	8,241	$8,106
3/19/19	32	9,958	$8,648
4/17/19	29	7,842	$4,309
5/17/19	30	3,420	$1,955
6/18/19	32	477	$453
7/18/19	30	308	$299
8/16/19	29	322	$306
9/17/19	32	336	$315
10/16/19	29	381	$345
11/14/19	29	3,387	$3,618
12/17/19	33	7,198	$6,009
Totals	**365**	**51,807**	**$44,639**
Annual	**365**	**51,807**	**$44,639**

Notes:

- The average gas cost for the past 12 months is $0.862/therm, which is the blended rate used throughout the analysis.
- The reduced natural gas consumption from June ’19 to October ‘19 likely reflects usage for domestic hot water and cooking equipment only.

3.3 Benchmarking

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

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

Benchmarking Score	28

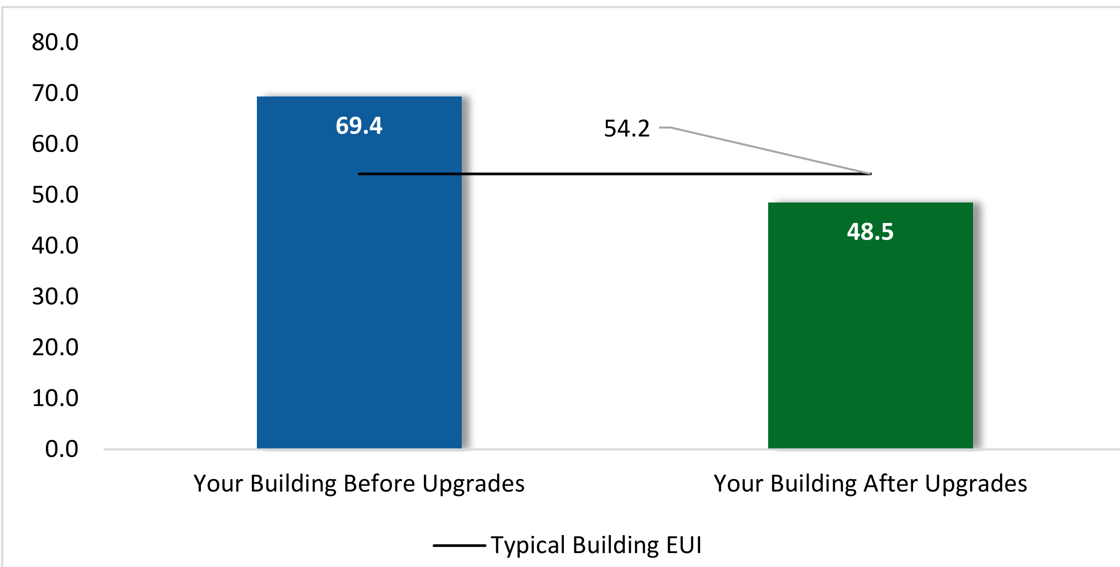


Figure 5 - Energy Use Intensity Comparison[3]

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

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

[3] Based on all evaluated ECMs

Tracking Your Energy Performance

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

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

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

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

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

4 Energy Conservation Measures

The goal of this audit report is to identify and evaluate potential energy efficiency improvements and provide information about the cost effectiveness of those improvements. Most energy conservation measures have received preliminary analysis of feasibility, which identifies expected ranges of savings. This level of analysis is typically sufficient to demonstrate project cost-effectiveness and help prioritize energy measures.

Calculations of energy use and savings are based on the current version of the *New Jersey's Clean Energy Program Protocols to Measure Resource Savings*, which is approved by the NJBPU. Further analysis or investigation may be required to calculate more precise savings based on specific circumstances.

Operation and maintenance costs for the proposed new equipment will generally be lower than the current costs for the existing equipment—especially if the existing equipment is at or past its normal useful life. We have conservatively assumed there to be no impact on overall maintenance costs over the life of the equipment.

Financial incentives are based on previously run state rebate programs. New utility programs are expected to start rolling out in the spring and summer of 2021. Keep up to date with developments by visiting the NJCEP website. Some measures and proposed upgrades may be eligible for higher incentives than those shown below.

For a detailed list of the locations and recommended energy conservation measures for all inventoried equipment, see **Appendix A: Equipment Inventory & Recommendations.**

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**407,162**	**53.4**	**-85**	**$50,054**	**$87,389**	**$22,000**	**$65,389**	**1.3**	**400,096**
ECM 1	Retrofit Fixtures with LED Lamps	Yes	407,162	53.4	-85	$50,054	$87,389	$22,000	$65,389	1.3	400,096
Lighting Control Measures			**132,138**	**17.3**	**-28**	**$16,243**	**$71,302**	**$24,990**	**$46,312**	**2.9**	**129,827**
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	106,832	14.1	-22	$13,132	$48,802	$5,880	$42,922	3.3	104,964
ECM 3	Install High/Low Lighting Controls	Yes	25,306	3.2	-5	$3,111	$22,500	$19,110	$3,390	1.1	24,863
Motor Upgrades			**4,138**	**1.3**	**0**	**$516**	**$17,723**	**$0**	**$17,723**	**34.3**	**4,167**
ECM 4	Premium Efficiency Motors	No	4,138	1.3	0	$516	$17,723	$0	$17,723	34.3	4,167
Variable Frequency Drive (VFD) Measures			**189,249**	**52.7**	**156**	**$24,952**	**$113,386**	**$16,475**	**$96,911**	**3.9**	**208,885**
ECM 5	Install VFDs on Constant Volume (CV) Fans	Yes	153,144	50.1	0	$19,101	$88,573	$12,375	$76,198	4.0	154,215
ECM 6	Install VFDs on Heating Water Pumps	Yes	10,897	2.4	0	$1,359	$14,215	$3,000	$11,215	8.3	10,974
ECM 7	Install VFDs on Kitchen Hood Fan Motors	Yes	25,207	0.1	156	$4,492	$10,598	$1,100	$9,498	2.1	43,697
Unitary HVAC Measures			**745**	**0.5**	**0**	**$93**	**$5,642**	**$0**	**$5,642**	**60.7**	**750**
ECM 8	Install High Efficiency Air Conditioning Units	No	745	0.5	0	$93	$5,642	$0	$5,642	60.7	750
Electric Chiller Replacement			**80,028**	**10.4**	**0**	**$9,982**	**$221,882**	**$7,020**	**$214,862**	**21.5**	**80,588**
ECM 9	Install High Efficiency Chillers	No	80,028	10.4	0	$9,982	$221,882	$7,020	$214,862	21.5	80,588
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**628**	**$5,415**	**$123,935**	**$13,320**	**$110,615**	**20.4**	**73,578**
ECM 10	Install High Efficiency Hot Water Boilers	No	0	0.0	628	$5,415	$123,935	$13,320	$110,615	20.4	73,578
HVAC System Improvements			**6,141**	**0.0**	**98**	**$1,610**	**$11,191**	**$72**	**$11,119**	**6.9**	**17,651**
ECM 11	Implement Demand Control Ventilation (DCV)	Yes	5,000	0.0	90	$1,398	$10,875	$0	$10,875	7.8	15,563
ECM 12	Install Pipe Insulation	Yes	1,140	0.0	8	$211	$316	$72	$244	1.2	2,089
Domestic Water Heating Upgrade			**0**	**0.0**	**24**	**$208**	**$366**	**$204**	**$162**	**0.8**	**2,833**
ECM 13	Install Low-Flow DHW Devices	Yes	0	0.0	24	$208	$366	$204	$162	0.8	2,833
Food Service & Refrigeration Measures			**3,991**	**0.5**	**0**	**$498**	**$2,280**	**$340**	**$1,940**	**3.9**	**4,018**
ECM 14	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	1,573	0.2	0	$196	$1,820	$240	$1,580	8.1	1,584
ECM 15	Vending Machine Control	Yes	2,418	0.3	0	$302	$460	$100	$360	1.2	2,435
TOTALS			**823,591**	**136.0**	**795**	**$109,570**	**$655,096**	**$84,421**	**$570,675**	**5.2**	**922,393**

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

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

Figure 6 – All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**407,162**	**53.4**	**-85**	**$50,054**	**$87,389**	**$22,000**	**$65,389**	**1.3**	**400,096**
ECM 1	Retrofit Fixtures with LED Lamps	407,162	53.4	-85	$50,054	$87,389	$22,000	$65,389	1.3	400,096
Lighting Control Measures		**132,138**	**17.3**	**-28**	**$16,243**	**$71,302**	**$24,990**	**$46,312**	**2.9**	**129,827**
ECM 2	Install Occupancy Sensor Lighting Controls	106,832	14.1	-22	$13,132	$48,802	$5,880	$42,922	3.3	104,964
ECM 3	Install High/Low Lighting Controls	25,306	3.2	-5	$3,111	$22,500	$19,110	$3,390	1.1	24,863
Variable Frequency Drive (VFD) Measures		**189,249**	**52.7**	**156**	**$24,952**	**$113,386**	**$16,475**	**$96,911**	**3.9**	**208,885**
ECM 5	Install VFDs on Constant Volume (CV) Fans	153,144	50.1	0	$19,101	$88,573	$12,375	$76,198	4.0	154,215
ECM 6	Install VFDs on Heating Water Pumps	10,897	2.4	0	$1,359	$14,215	$3,000	$11,215	8.3	10,974
ECM 7	Install VFDs on Kitchen Hood Fan Motors	25,207	0.1	156	$4,492	$10,598	$1,100	$9,498	2.1	43,697
HVAC System Improvements		**6,141**	**0.0**	**98**	**$1,610**	**$11,191**	**$72**	**$11,119**	**6.9**	**17,651**
ECM 11	Implement Demand Control Ventilation (DCV)	5,000	0.0	90	$1,398	$10,875	$0	$10,875	7.8	15,563
ECM 12	Install Pipe Insulation	1,140	0.0	8	$211	$316	$72	$244	1.2	2,089
Domestic Water Heating Upgrade		**0**	**0.0**	**24**	**$208**	**$366**	**$204**	**$162**	**0.8**	**2,833**
ECM 13	Install Low-Flow DHW Devices	0	0.0	24	$208	$366	$204	$162	0.8	2,833
Food Service & Refrigeration Measures		**3,991**	**0.5**	**0**	**$498**	**$2,280**	**$340**	**$1,940**	**3.9**	**4,018**
ECM 14	Refrigerator/Freezer Case Electrically Commutated Motors	1,573	0.2	0	$196	$1,820	$240	$1,580	8.1	1,584
ECM 15	Vending Machine Control	2,418	0.3	0	$302	$460	$100	$360	1.2	2,435
TOTALS		**738,680**	**123.8**	**166**	**$93,565**	**$285,913**	**$64,081**	**$221,832**	**2.4**	**763,311**

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

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

Figure 7 – Cost Effective ECMs

4.1 Lighting

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**407,162**	**53.4**	**-85**	**$50,054**	**$87,389**	**$22,000**	**$65,389**	**1.3**	**400,096**
ECM 1	Retrofit Fixtures with LED Lamps	407,162	53.4	-85	$50,054	$87,389	$22,000	$65,389	1.3	400,096

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

ECM 1: Retrofit Fixtures with LED Lamps

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

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 CFL lamps and fluorescent fixtures with T8 tubes.

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		**132,138**	**17.3**	**-28**	**$16,243**	**$71,302**	**$24,990**	**$46,312**	**2.9**	**129,827**
ECM 2	Install Occupancy Sensor Lighting Controls	106,832	14.1	-22	$13,132	$48,802	$5,880	$42,922	3.3	104,964
ECM 3	Install High/Low Lighting Controls	25,306	3.2	-5	$3,111	$22,500	$19,110	$3,390	1.1	24,863

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

ECM 2: Install Occupancy Sensor Lighting Controls

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

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

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

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

Affected building areas: classrooms, offices, conference room, gymnasium, locker rooms, auditorium, library, cafeteria, kitchen, lounges, restrooms, and storage rooms.

ECM 3: Install High/Low Lighting Controls

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

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

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

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

Affected building areas: hallways, stairwells, and main lobby.

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

4.3 Motors

#	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)
Motor Upgrades		**4,138**	**1.3**	**0**	**$516**	**$17,723**	**$0**	**$17,723**	**34.3**	**4,167**
ECM 4	Premium Efficiency Motors	4,138	1.3	0	$516	$17,723	$0	$17,723	34.3	4,167

ECM 4: Premium Efficiency Motors

We evaluated replacing standard efficiency motors with IHP 2014 efficiency motors. This evaluation assumes that existing motors will be replaced with motors of equivalent size and type. In some cases, additional savings may be possible by downsizing motors to better meet the motor's current load requirements.

Affected motors:

Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Additional Motor Description
Mechanical Room - Boilers	Domestic Hot Water	1	DHW Circulation Pump	0.3	DHW Circulation Pump
Mechanical Room - Boilers	Domestic Hot Water	1	DHW Circulation Pump	0.3	DHW Circulation Pump
Mechanical Room - Boilers	AHU1 - Library	1	Supply Fan	10.0	Air Handling Unit 1
Mechanical Room - Boilers	AHU2 - Auditorium	1	Supply Fan	15.0	Air Handling Unit 2
Mechanical Room - Chiller	AHU4- Main Office	1	Supply Fan	5.0	Air Handling Unit 4
Mechanical 106G	AHU7 - Kitchen	1	Supply Fan	5.0	Air Handling Unit 7
Mechanical Room - Boilers	HRU1 - Hallways	1	Supply Fan	30.0	Energy Recovery Unit 1
Mechanical Room - Chiller	HRU2 - Hallways	1	Supply Fan	25.0	Energy Recovery Unit 2
Mechanical Room - Boilers	AHU2 - Auditorium	1	Return Fan	10.0	Air Handling Unit 2
Mechanical Room - Chiller	AHU4- Main Office	1	Return Fan	2.0	Air Handling Unit 4
Mechanical 106G	AHU7 - Kitchen	1	Return Fan	2.0	Air Handling Unit 7
Mechanical Room - Boilers	HRU1 - Hallways	1	Return Fan	15.0	Energy Recovery Unit 1
Mechanical Room - Chiller	HRU2 - Hallways	1	Return Fan	15.0	Energy Recovery Unit 2

Savings are based on the difference between baseline and proposed efficiencies and the assumed annual operating hours. The base case motor energy consumption is estimated using the efficiencies found on nameplates or estimated based on the age of the motor and our best estimates of motor run hours. Efficiencies of proposed motor upgrades are obtained from the current *New Jersey's Clean Energy Program Protocols to Measure Resource Savings*.

4.4 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		**189,249**	**52.7**	**156**	**$24,952**	**$113,386**	**$16,475**	**$96,911**	**3.9**	**208,885**
ECM 5	Install VFDs on Constant Volume (CV) Fans	153,144	50.1	0	$19,101	$88,573	$12,375	$76,198	4.0	154,215
ECM 6	Install VFDs on Heating Water Pumps	10,897	2.4	0	$1,359	$14,215	$3,000	$11,215	8.3	10,974
ECM 7	Install VFDs on Kitchen Hood Fan Motors	25,207	0.1	156	$4,492	$10,598	$1,100	$9,498	2.1	43,697

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

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

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

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

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

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

Affected air handlers: AHU-3, AHU-5, AHU-6, AHU-8, AHU-9, HV-1, and the large exhaust fans.

ECM 6: Install VFDs on Heating Water Pumps

Install 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: HWP-1, HWP-2, and HWP-3.

ECM 7: Install VFDs on Kitchen Hood Fan Motors

Install VFDs and sensors to control the kitchen hood fan motors. The air flow of the hood is varied based on two key inputs: temperature and smoke/cooking fumes. The VFD controls the amount of exhaust (and kitchen make-up air) based on temperature—the lower the temperature the lower the flow. If the optic sensor is triggered by smoke or cooking fumes, the speed of the fan ramps up to 100%.

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

4.5 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		**745**	**0.5**	**0**	**$93**	**$5,642**	**$0**	**$5,642**	**60.7**	**750**
ECM 8	Install High Efficiency Air Conditioning Units	745	0.5	0	$93	$5,642	$0	$5,642	60.7	750

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 mini-split air conditioning (AC) unit is eventually replaced, consider purchasing equipment that exceeds the minimum efficiency required by building codes.

ECM 8: 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: mini-split AC unit serving server room 106c.

4.6 Electric Chillers

#	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)
Electric Chiller Replacement		**80,028**	**10.4**	**0**	**$9,982**	**$221,882**	**$7,020**	**$214,862**	**21.5**	**80,588**
ECM 9	Install High Efficiency Chillers	80,028	10.4	0	$9,982	$221,882	$7,020	$214,862	21.5	80,588

ECM 9: Install High Efficiency Chillers

We evaluated replacing older inefficient electric chillers with new high efficiency chillers. The type of chiller to be installed depends on the magnitude of the cooling load and variability of the cooling load profile, for example:

- Positive displacement chillers are usually under 600 tons of cooling capacity and centrifugal chillers generally start at 150 tons of cooling capacity.
- Constant speed chillers should be used to meet cooling loads with little or no variation while variable speed chillers are more efficient for variable cooling load profiles.
- Water cooled chillers are more efficient than air cooled chillers but require cooling towers and additional pumps to circulate the cooling water.
- In any given size range, variable speed chillers tend to have better partial load efficiency, but worse full load efficiency, than constant speed chillers.

Energy savings result from the improvement in chiller efficiency and matching the right type of chiller to the cooling load. The energy savings are calculated based on the cooling capacity of the new chiller, the improvement in efficiency compared with the base case equipment, the cooling load profile, and the estimated annual operating hours of the chiller before and after the upgrade.

For the purposes of this analysis, we evaluated the replacement of chillers on a one-for-one basis with equipment of the same capacity. We recommend that you work with your design team to select chillers that are sized appropriately for the cooling load. In some cases, the plant energy use can be reduced by selecting multiple chillers that match the facility load profile rather than one or two large chillers. This can also improve the chiller plant reliability through increased redundancy. Energy savings are maximized by proper selection of new equipment based on the cooling load profile.

Replacing the chiller has a long payback based on energy savings and may not be justifiable based simply on energy considerations. However, the chiller is nearing the end of its normal useful life. Typically, the marginal cost of purchasing a high efficiency chiller can be justified by the marginal savings from the improved efficiency. When the chiller is eventually replaced, consider purchasing equipment that exceed the minimum efficiency required by building codes.

4.7 Gas-Fired Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**628**	**$5,415**	**$123,935**	**$13,320**	**$110,615**	**20.4**	**73,578**
ECM 10	Install High Efficiency Hot Water Boilers	0	0.0	628	$5,415	$123,935	$13,320	$110,615	20.4	73,578

ECM 10: Install High Efficiency Hot Water Boilers

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

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

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

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

4.8 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		**6,141**	**0.0**	**98**	**$1,610**	**$11,191**	**$72**	**$11,119**	**6.9**	**17,651**
ECM 11	Implement Demand Control Ventilation (DCV)	5,000	0.0	90	$1,398	$10,875	$0	$10,875	7.8	15,563
ECM 12	Install Pipe Insulation	1,140	0.0	8	$211	$316	$72	$244	1.2	2,089

ECM 11: 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.

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, auditorium, and library.

ECM 12: Install Pipe Insulation

Install insulation on domestic hot water and chilled 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: chilled water piping around AHU-8 and HRU-2, and domestic hot water piping around the circulation pumps.

4.9 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**	**24**	**$208**	**$366**	**$204**	**$162**	**0.8**	**2,833**
ECM 13	Install Low-Flow DHW Devices	0	0.0	24	$208	$366	$204	$162	0.8	2,833

ECM 13: 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.

4.10 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		**3,991**	**0.5**	**0**	**$498**	**$2,280**	**$340**	**$1,940**	**3.9**	**4,018**
ECM 14	Refrigerator/Freezer Case Electrically Commutated Motors	1,573	0.2	0	$196	$1,820	$240	$1,580	8.1	1,584
ECM 15	Vending Machine Control	2,418	0.3	0	$302	$460	$100	$360	1.2	2,435

ECM 14: Refrigerator/Freezer Case Electrically Commutated Motors

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

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

ECM 15: Vending Machine Control

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

4.11 Measures for Future Consideration

There are additional opportunities for improvement that West New York Board of Education may wish to consider. These potential upgrades typically require further analysis, involve substantial capital investment, and/or include significant system reconfiguration. These measure(s) are therefore beyond the scope of this energy audit. These measure(s) are described here to support a whole building approach to energy efficiency and sustainability.

West New York Board of Education may wish to consider the Energy Savings Improvement Program (ESIP) or other whole building approach. With interest in implementing comprehensive, largescale and/or complex system wide projects, these measures may be pursued during development of a future energy savings plan. We recommend that you work with your energy service company (ESCO) and/or design team to:

- Evaluate these measures further.
- Develop firm costs.
- Determine measure savings.
- Prepare detailed implementation plans.

Other modernization or capital improvement funds may be leveraged for these types of refurbishments. As you plan for capital upgrades, be sure to consider the energy impact of the building systems and controls being specified.

Retro-Commissioning Study

Due to the complexity of today's HVAC systems and controls, a thorough analysis and rebalance of heating, ventilation, and cooling systems should periodically be conducted. There are indications at this site that systems may not be operating correctly or as efficiently as they could be. One important tool available to building operators to ensure proper system operation is retro-commissioning.

Retro-commissioning is a common practice recommended by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) to be implemented every few years. We recommend that you contact a reputable engineering firm that specializes in energy control systems and retro-commissioning. Ask them to propose a scope of work and an outline of the procedures and processes to be implemented, including a schedule and the roles of all responsible parties.

Once goals and responsibilities are established, the objective of the investigation process is to understand how the building is currently operating, identify the issues, and determine the most cost-effective way to improve performance. The retro-commissioning agent will review building documentation, interview building occupants, and inspect and test the equipment. Information is then compiled into a report and shared with facility staff, who will select which recommendations to implement after reviewing the findings.

The implementation phase puts the selected processes into place. Typical measures may include sensor calibration, equipment schedule changes, damper linkage repair and similar relatively low-cost adjustments—although more expensive sophisticated programming and building control system upgrades may be warranted. Approved measures may be implemented by the agent, the building staff, or by subcontractors. Typically, a combination of these individuals makes up the retro-commissioning team.

After the approved measures are implemented, the team will verify that the changes are working as expected. Baseline and post-case measurements will allow building staff to monitor equipment and ensure that the benefits are maintained.

5 Energy Efficient Best Practices

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

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

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

Energy Tracking with ENERGY STAR® Portfolio Manager®

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

Weatherization

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

Doors and Windows

Close exterior doors and windows in heated and cooled areas. Leaving doors and windows open leads to a loss of heat during the winter and chilled air during the summer. Reducing air changes per hour (ACH) can lead to increased occupant comfort as well as heating and cooling savings, especially when combined with proper HVAC controls and adequate ventilation.

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

Lighting Maintenance

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

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

Lighting Controls

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

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.

Fans to Reduce Cooling Load

Install ceiling fans to supplement your cooling system. Thermostat settings can typically be increased by 4°F with no change in overall occupant comfort due to the wind chill effect of moving air.

Economizer Maintenance

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

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

Chiller Maintenance

Service chillers regularly to keep them operating properly. Chillers are responsible for a substantial portion of a commercial building's overall energy usage and when they do not work well, there is usually a noticeable increase in energy bills and increased occupant complaints. Regular diagnostics and service can save five to ten percent of the cost of operating your chiller. If you already have a maintenance contract in place, your existing service company should be able to provide these services.

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 HP system, which increases the load on the distribution fans.

Ductwork Maintenance

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

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

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

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

Boiler Maintenance

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

Water Heater Maintenance

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

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

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

Refrigeration Equipment Maintenance

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

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

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

Water Conservation

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

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

Water conservation devices that do not reduce hot water consumption will not provide energy savings at the site level, but they may significantly affect your water and sewer usage costs. Any reduction in water

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

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

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 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.

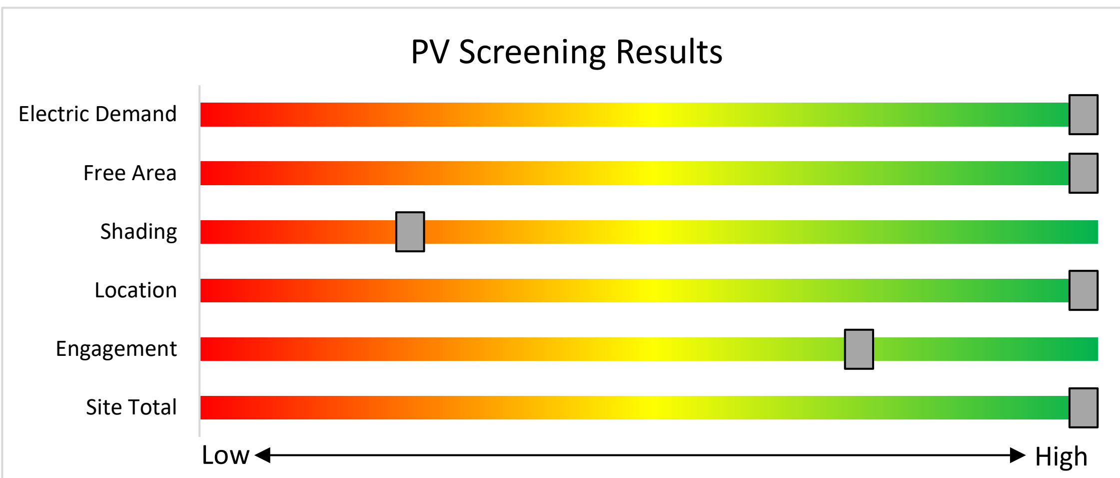
6.1 Solar Photovoltaic

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

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

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

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



Potential	High	
System Potential	215	kW DC STC
Electric Generation	161,776	kWh/yr
Displaced Cost	$20,180	/yr
Installed Cost	$559,000	

Figure 8 - Photovoltaic Screening

Successor Solar Incentive Program (SuSI)

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

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

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

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

6.2 Combined Heat and Power

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

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

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

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

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

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

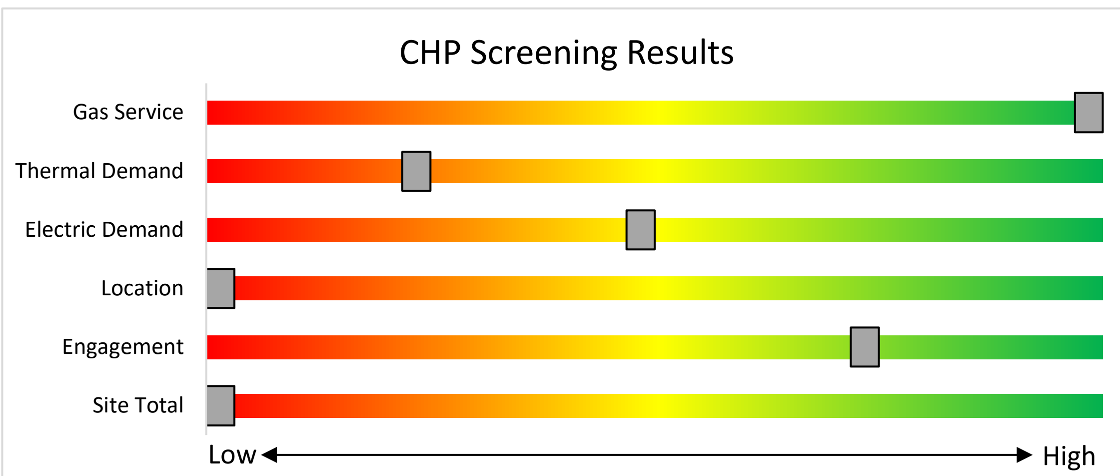


Figure 9 - Combined Heat and Power Screening

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

7 Project Funding and Incentives

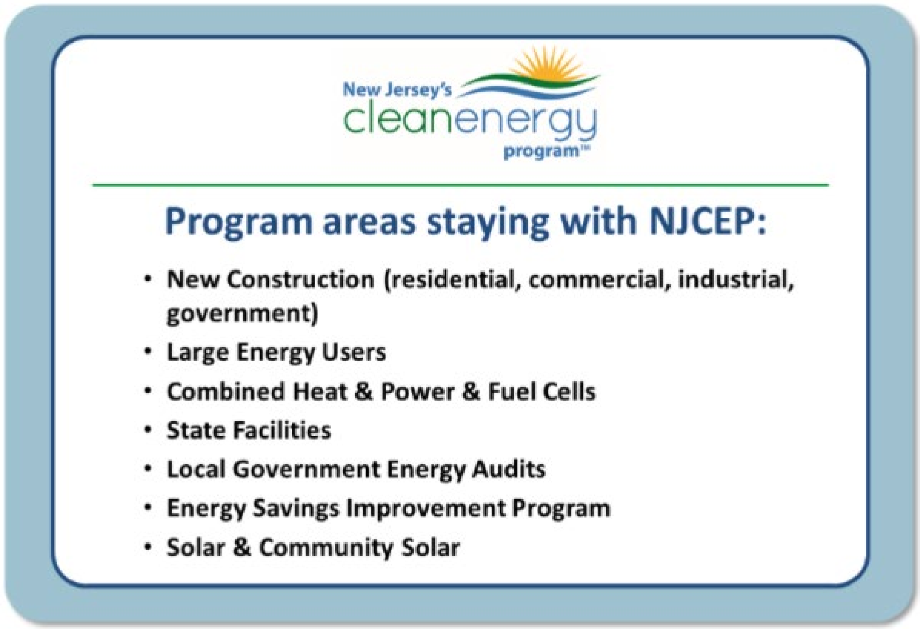
Ready to improve your building's performance? Your utility provider may be able to help.

7.1 Utility Energy Efficiency Programs

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

8 NEW JERSEY'S CLEAN ENERGY PROGRAMS

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



8.1 Combined Heat and Power

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

Incentives

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

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

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

How to Participate

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

8.2 Energy Savings Improvement Program

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

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

How to Participate

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

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

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

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

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

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

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

8.3 Successor Solar Incentive Program (SuSI)

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

Administratively Determined Incentive (ADI) Program

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

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

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

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

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

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

Competitive Solar Incentive Program

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

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

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

9 PROJECT DEVELOPMENT

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

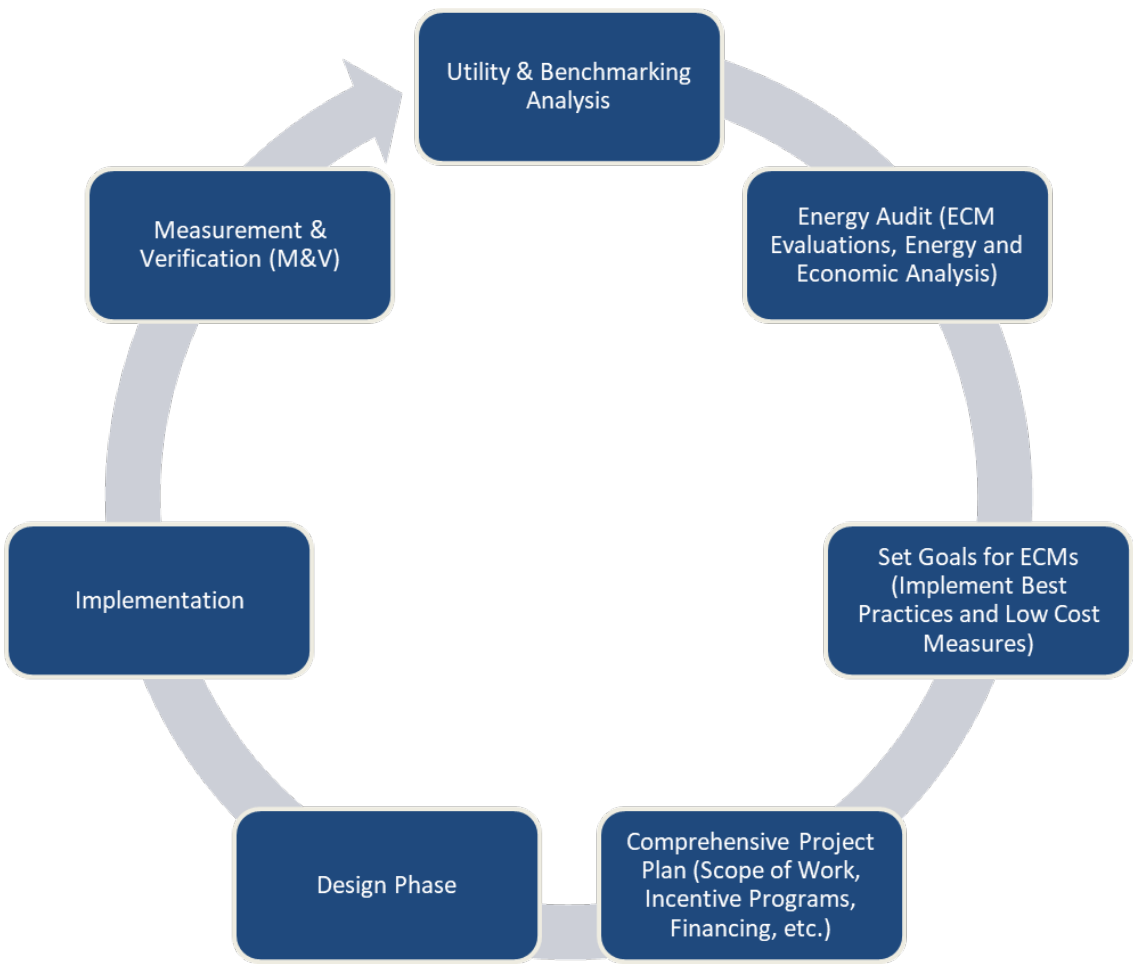


Figure 10 – Project Development Cycle

10 Energy Purchasing and Procurement Strategies

10.1 Retail Electric Supply Options

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

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

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

10.2 Retail Natural Gas Supply Options

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

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

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

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

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

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

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Auditorium	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
Auditorium	56	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	5,236	2	None	Yes	56	LED - Fixtures: Ceiling Mount	Occupancy Sensor	20	3,613	0.2	2,000	0	$246	$1,080	$140	3.8
Cafeteria	20	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	52	5,236	1, 2	Relamp	Yes	20	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	37	3,613	0.4	3,049	-1	$375	$1,040	$110	2.5
Cafeteria	2	Compact Fluorescent: (4) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	104	5,236	1, 2	Relamp	Yes	2	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	73	3,613	0.1	618	0	$76	$216	$28	2.5
Cafeteria	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Cafeteria	92	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	92	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	2.8	22,250	-5	$2,735	$5,249	$1,165	1.5
Cafeteria - Teachers Lounge	5	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	52	5,236	1, 2	Relamp	Yes	5	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	37	3,613	0.1	762	0	$94	$395	$45	3.7
Cafeteria - Teachers Lounge	9	U-Bend Fluorescent - T8: U T8 (32W) - 4L	Wall Switch	S	128	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (4) U-Lamp	Occupancy Sensor	66	3,613	0.5	4,274	-1	$525	$1,574	$35	2.9
Classroom 102	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	5,236	1, 2	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,613	0.6	5,113	-1	$629	$1,146	$275	1.4
Classroom 103	21	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	5,236	1, 2	Relamp	Yes	21	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,613	1.1	8,948	-2	$1,100	$2,074	$490	1.4
Classroom 104	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	5,236	1, 2	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,613	0.6	5,113	-1	$629	$1,146	$275	1.4
Classroom 105	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	5,236	1, 2	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,613	0.4	3,409	-1	$419	$854	$195	1.6
Classroom 109	8	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	40	5,236	2	None	Yes	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	3,613	0.1	571	0	$70	$270	$35	3.3
Classroom 110	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.7	5,804	-1	$713	$1,416	$310	1.6
Classroom 111	22	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	22	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.7	5,321	-1	$654	$1,343	$290	1.6
Classroom 112	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.5	3,870	-1	$476	$1,124	$230	1.9
Conference Room	4	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	52	5,236	1, 2	Relamp	Yes	4	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	37	3,613	0.1	610	0	$75	$370	$43	4.4
Conference Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	5,236	1, 2	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,613	0.2	1,704	0	$210	$562	$115	2.1
Corridor 1st Left	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
Corridor 1st Left	14	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	5,236	1, 3	Relamp	Yes	14	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	3,613	0.2	1,774	0	$218	$931	$560	1.7
Corridor Kitchen/Custodian	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor Kitchen/Custodian	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 3	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,613	0.3	2,418	-1	$297	$815	$450	1.2
Corridor Stage	2	Compact Fluorescent: (4) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	104	5,236	1, 3	Relamp	Yes	2	LED Lamps: GX23 (Plug-In) Lamps	High/Low Control	73	3,613	0.1	618	0	$76	$325	$78	3.3
Corridor Stage	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor Stage	36	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	5,236	1, 3	Relamp	Yes	36	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	3,613	0.6	4,561	-1	$561	$2,007	$1,440	1.0

	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
Electrical Room 1st Floor	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	924	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	638	0.1	85	0	$10	$189	$40	14.2
Elevator 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.1	484	0	$59	$189	$40	2.5
Elevator 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,236	0.0	190	0	$23	$37	$10	1.1
Exterior	30	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Timeclock		52	4,015	1	Relamp	No	30	LED Lamps: GX23 (Plug-In) Lamps	Timeclock	37	4,015	0.0	1,807	0	$225	$750	$60	3.1
Exterior	7	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Timeclock		52	4,015	1	Relamp	No	7	LED Lamps: GX23 (Plug-In) Lamps	Timeclock	37	4,015	0.0	422	0	$53	$175	$14	3.1
Exterior	5	LED - Fixtures: Wall Pack	Timeclock		40	4,015		None	No	5	LED - Fixtures: Wall Pack	Timeclock	40	4,015	0.0	0	0	$0	$0	$0	0.0
Exterior - Garage	24	LED - Fixtures: Wall Pack	Timeclock		40	4,015		None	No	24	LED - Fixtures: Wall Pack	Timeclock	40	4,015	0.0	0	0	$0	$0	$0	0.0
Gymnasium	1	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	52	5,236	1	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	37	5,236	0.0	86	0	$11	$25	$2	2.2
Gymnasium	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
Gymnasium	41	LED - Fixtures: High-Bay	Wall Switch	S	150	5,236	2	None	Yes	41	LED - Fixtures: High-Bay	Occupancy Sensor	150	3,613	1.4	10,981	-2	$1,350	$810	$105	0.5
Gymnasium	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.1	726	0	$89	$380	$65	3.5
Kitchen	27	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	52	5,236	1, 2	Relamp	Yes	27	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	37	3,613	0.5	4,116	-1	$506	$1,215	$124	2.2
Kitchen	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
Kitchen	13	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	40	5,236	2	None	Yes	13	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	3,613	0.1	928	0	$114	$270	$35	2.1
Kitchen	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.3	2,660	-1	$327	$672	$145	1.6
Kitchen	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.2	1,451	0	$178	$489	$95	2.2
Locker Room - Boys	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
Locker Room - Boys	22	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	22	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.7	5,321	-1	$654	$1,343	$290	1.6
Locker Room - Girls	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
Locker Room - Girls	21	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	21	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.6	5,079	-1	$624	$1,307	$280	1.6
Lounge Custodians 106	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.2	1,451	0	$178	$489	$95	2.2
Lounge Custodians 106	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	5,236	1, 2	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,613	0.1	852	0	$105	$262	$60	1.9
Main Entrance	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.1	967	0	$119	$416	$75	2.9
Main Lobby	10	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	52	5,236	1, 3	Relamp	Yes	10	LED Lamps: GX23 (Plug-In) Lamps	High/Low Control	37	3,613	0.2	1,525	0	$187	$700	$370	1.8
Main Lobby	24	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	52	5,236	1, 3	Relamp	Yes	24	LED Lamps: GX23 (Plug-In) Lamps	High/Low Control	37	3,613	0.5	3,659	-1	$450	$1,500	$888	1.4

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Main Lobby	6	Compact Fluorescent: (4) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	104	5,236	1, 3	Relamp	Yes	6	LED Lamps: GX23 (Plug-In) Lamps	High/Low Control	73	3,613	0.2	1,853	0	$228	$525	$234	1.3
Main Lobby	5	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Main Lobby	35	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 3	Relamp	Yes	35	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,613	1.1	8,465	-2	$1,040	$2,628	$1,575	1.0
Main Office	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.4	2,902	-1	$357	$708	$155	1.6
Main Office - Copy Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	5,236	1, 2	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,613	0.2	1,704	0	$210	$562	$115	2.1
Mechanical - Elevator 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,236	0.0	380	0	$47	$73	$20	1.1
Mechanical - Elevator 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,236	0.0	190	0	$23	$37	$10	1.1
Mechanical 106G	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
Mechanical 106G	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,236	0.3	2,281	0	$280	$438	$120	1.1
Office - 106A	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	5,236	1, 2	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,613	0.1	852	0	$105	$262	$60	1.9
Office - 106B	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	5,236	1, 2	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,613	0.1	852	0	$105	$262	$60	1.9
Office - Gym	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.2	1,451	0	$178	$489	$95	2.2
Office - Kitchen	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	5,236	1, 2	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,613	0.1	852	0	$105	$262	$60	1.9
Office - Nurse	11	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	5,236	1, 2	Relamp	Yes	11	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,613	0.6	4,687	-1	$576	$1,073	$255	1.4
Office - Stage	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	5,236	1, 2	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,613	0.1	852	0	$105	$262	$60	1.9
Principals Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	5,236	1, 2	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,613	0.1	852	0	$105	$262	$60	1.9
Restroom - 106 #1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,236	0.0	190	0	$23	$37	$10	1.1
Restroom - 106 #2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,236	0.0	190	0	$23	$37	$10	1.1
Restroom - Female 1st Floor	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.2	1,209	0	$149	$453	$85	2.5
Restroom - Female 1st Floor #2	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.2	1,451	0	$178	$489	$95	2.2
Restroom - Female Gym Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.1	484	0	$59	$189	$40	2.5
Restroom - Kitchen	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,236	0.0	190	0	$23	$37	$10	1.1
Restroom - Kitchen	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	5,236	1	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	5,236	0.0	323	0	$40	$73	$20	1.3
Restroom - Main 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,236	0.0	190	0	$23	$37	$10	1.1
Restroom - Main 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,236	0.0	190	0	$23	$37	$10	1.1

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Restroom - Male 1st Floor	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.2	1,209	0	$149	$453	$85	2.5
Restroom - Male 1st Floor #2	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.2	1,451	0	$178	$489	$95	2.2
Restroom - Male Gym Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.1	484	0	$59	$189	$40	2.5
Restroom - Nurse	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,236	0.0	190	0	$23	$37	$10	1.1
Restroom - Stage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,236	0.0	190	0	$23	$37	$10	1.1
Restroom - Teachers Lounge #1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,236	0.0	190	0	$23	$37	$10	1.1
Restroom - Teachers Lounge #2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,236	0.0	190	0	$23	$37	$10	1.1
Server Room 106c	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.2	1,451	0	$178	$489	$95	2.2
Stage	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
Stage	22	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	22	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.7	5,321	-1	$654	$1,343	$290	1.6
Stairs A	16	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Wall Switch		52	5,236	1, 3	Relamp	Yes	16	LED Lamps: GX23 (Plug-In) Lamps	High/Low Control	37	3,613	0.3	2,439	-1	$300	$1,075	$592	1.6
Stairs A	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Stairs B	6	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Wall Switch		52	5,236	1, 3	Relamp	Yes	6	LED Lamps: GX23 (Plug-In) Lamps	High/Low Control	37	3,613	0.1	915	0	$112	$375	$222	1.4
Stairs B	8	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch		32	5,236	1, 3	Relamp	Yes	8	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	3,613	0.1	1,013	0	$125	$596	$320	2.2
Stairs C	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Stairs C	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	5,236	1, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,613	0.1	484	0	$59	$73	$20	0.9
Stairs C	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	5,236	1, 3	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,613	0.3	2,418	-1	$297	$815	$450	1.2
Stairs D	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Stairs D	17	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	5,236	1, 3	Relamp	Yes	17	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,613	0.5	4,111	-1	$505	$1,296	$765	1.1
Stairs E	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 E	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	5,236	1, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,613	0.2	1,935	0	$238	$742	$360	1.6
Stairs G - Gym	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 G - Gym	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	5,236	1, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,613	0.1	484	0	$59	$298	$90	3.5
Stairs H - Gym	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	5,236	1, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,613	0.1	484	0	$59	$298	$90	3.5
Storage 102	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	924	1, 2	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	638	0.1	128	0	$16	$226	$30	12.4

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Storage 103	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	924	1	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	924	0.0	50	0	$6	$55	$15	6.4
Storage 106D	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	924	1, 2	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	638	0.2	301	0	$37	$562	$80	13.0
Storage 107H	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	924	1, 2	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	638	0.2	256	0	$31	$489	$60	13.6
Storage 110 #1	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	924	1, 2	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	638	0.1	192	0	$24	$434	$45	16.5
Storage 110 #2	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	924	1	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	924	0.0	50	0	$6	$55	$15	6.4
Storage 110 #3	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	924	1, 2	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	638	0.2	226	0	$28	$489	$60	15.5
Storage 110C	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	924	1, 2	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	638	0.2	213	0	$26	$453	$50	15.3
Storage 111	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	924	1, 2	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	638	0.2	226	0	$28	$489	$60	15.5
Storage Cafeteria	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	924	1, 2	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	638	0.3	384	0	$47	$599	$90	10.8
Storage Gym 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	924	1	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	924	0.0	57	0	$7	$73	$20	7.6
Storage Gym 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	924	1	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	924	0.0	57	0	$7	$73	$20	7.6
Storage Gym 3	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	924	1	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	924	0.0	57	0	$7	$73	$20	7.6
Storage Nurse	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	924	1, 2	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	638	0.1	150	0	$18	$262	$40	12.0
Storage Stage	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	924	1, 2	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	638	0.1	150	0	$18	$262	$40	12.0
Classroom 201	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.0	242	0	$30	$37	$10	0.9
Classroom 201	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.7	5,804	-1	$713	$1,416	$310	1.6
Classroom 202	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 203	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 204	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.7	5,804	-1	$713	$1,416	$310	1.6
Classroom 205	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 206	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.3	2,539	-1	$312	$653	$140	1.6
Classroom 207	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.3	2,539	-1	$312	$653	$140	1.6
Classroom 208	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 209	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 210	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 211	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 212	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 213	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.3	2,177	0	$268	$599	$125	1.8
Classroom 214	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.3	2,177	0	$268	$599	$125	1.8
Classroom 215	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 216	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.7	5,442	-1	$669	$1,092	$260	1.2
Classroom 217	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 218	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 219	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 220	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 221	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.3	2,539	-1	$312	$653	$140	1.6
Classroom 222	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.3	2,539	-1	$312	$653	$140	1.6
Classroom 223	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 224	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.3	2,539	-1	$312	$653	$140	1.6
Classroom 225	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.0	242	0	$30	$37	$10	0.9
Classroom 225	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.7	5,804	-1	$713	$1,416	$310	1.6
Classroom 226	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 227	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 228	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.0	242	0	$30	$37	$10	0.9
Classroom 228	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.7	5,804	-1	$713	$1,416	$310	1.6
Classroom 230	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.3	2,177	0	$268	$599	$125	1.8
Classroom 231	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.3	2,177	0	$268	$599	$125	1.8
Classroom 234	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.5	4,353	-1	$535	$927	$215	1.3
Classroom 235	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 238	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.5	4,353	-1	$535	$927	$215	1.3

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 238	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.0	242	0	$30	$37	$10	0.9
Classroom 238	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.7	5,804	-1	$713	$1,416	$310	1.6
Computer Lab 237	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.7	5,442	-1	$669	$1,092	$260	1.2
Corridor 2nd Floor	49	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	52	5,236	1, 3	Relamp	Yes	49	LED Lamps: GX23 (Plug-In) Lamps	High/Low Control	37	3,613	0.9	7,470	-2	$918	$3,250	$1,813	1.6
Corridor 2nd Floor	14	Compact Fluorescent: (4) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	104	5,236	1, 3	Relamp	Yes	14	LED Lamps: GX23 (Plug-In) Lamps	High/Low Control	73	3,613	0.5	4,324	-1	$532	$1,375	$546	1.6
Corridor 2nd Floor	18	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	18	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor 2nd Floor	146	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	5,236	1, 3	Relamp	Yes	146	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	3,613	2.3	18,496	-4	$2,274	$8,291	$5,840	1.1
Corridor Weight Room	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
Corridor Weight Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,613	0.1	726	0	$89	$335	$135	2.2
Electrical Room 2nd Floor #1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	924	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	638	0.1	85	0	$10	$189	$40	14.2
Electrical Room 2nd Floor #2	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	924	1, 2	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	638	0.1	128	0	$16	$226	$50	11.2
Electrical Room 2nd Floor #3	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	924	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	638	0.1	85	0	$10	$189	$40	14.2
Gymnasium - Weight Room	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
Gymnasium - Weight Room	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.7	5,804	-1	$713	$1,416	$310	1.6
Gymnasium - Weight Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.1	726	0	$89	$380	$65	3.5
Library	12	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	52	5,236	1, 2	Relamp	Yes	12	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	37	3,613	0.2	1,829	0	$225	$570	$59	2.3
Library	6	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	52	5,236	1, 2	Relamp	Yes	6	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	37	3,613	0.1	915	0	$112	$420	$47	3.3
Library	3	Compact Fluorescent: (4) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	104	5,236	1, 2	Relamp	Yes	3	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	73	3,613	0.1	927	0	$114	$420	$47	3.3
Library	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	60	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	60	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	1.8	14,511	-3	$1,784	$3,271	$740	1.4
Lounge 229	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.3	2,177	0	$268	$599	$125	1.8
Lounge Library	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.2	1,451	0	$178	$489	$95	2.2
Mechanical 201	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,236	0.1	950	0	$117	$183	$50	1.1
Office - 219a	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.1	1,088	0	$134	$434	$80	2.6
Office - 232	1	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	52	5,236	1, 2	Relamp	Yes	1	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	37	3,613	0.0	152	0	$19	$25	$2	1.2

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Office - 232	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.1	726	0	$89	$226	$50	2.0
Office - 232a	1	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	52	5,236	1, 2	Relamp	Yes	1	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	37	3,613	0.0	152	0	$19	$25	$2	1.2
Office - 232a	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.1	726	0	$89	$226	$50	2.0
Office - 233	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	5,236	1, 2	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,613	0.3	2,557	-1	$314	$708	$155	1.8
Office - Library	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.2	1,451	0	$178	$489	$95	2.2
Office - Testing Room	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	2,902	-1	$357	$708	$155	1.6
Office - Weight Room #1	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.2	1,451	0	$178	$489	$95	2.2
Restroom - 2nd Floor Teachers Lounge #1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,236	0.0	190	0	$23	$37	$10	1.1
Restroom - 2nd Floor Teachers Lounge #2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,236	0.0	190	0	$23	$37	$10	1.1
Restroom - Female 2nd Floor	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.1	967	0	$119	$416	$75	2.9
Restroom - Library	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,236	0.0	190	0	$23	$37	$10	1.1
Restroom - Male 2nd Floor	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.1	967	0	$119	$416	$75	2.9
Storage 204a	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	924	1, 2	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	638	0.2	301	0	$37	$562	$80	13.0
Storage 209a	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	924	1, 2	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	638	0.2	226	0	$28	$489	$60	15.5
Storage 234B	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	924	1, 2	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	638	0.4	512	0	$63	$708	$120	9.3
Storage Library 1	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	924	1, 2	Relamp	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	638	0.3	376	0	$46	$635	$100	11.6
Storage Library 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	924	1, 2	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	638	0.1	150	0	$18	$262	$40	12.0
Storage Theater / Catwalk	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	924	1, 2	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	638	0.3	427	0	$52	$635	$100	10.2
Storage Weight Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	924	1, 2	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	638	0.2	301	0	$37	$562	$80	13.0
Classroom 301	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.0	242	0	$30	$37	$10	0.9
Classroom 301	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.7	5,804	-1	$713	$1,416	$310	1.6
Classroom 302	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 303	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 304	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.7	5,804	-1	$713	$1,416	$310	1.6
Classroom 305	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 306	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.3	2,539	-1	$312	$653	$140	1.6
Classroom 307	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.3	2,539	-1	$312	$653	$140	1.6
Classroom 308	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 309	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 310	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 311	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 312	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 313	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.3	2,177	0	$268	$599	$125	1.8
Classroom 315	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 316	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.7	5,442	-1	$669	$1,092	$260	1.2
Classroom 317	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 318	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 319	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 319a	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.1	1,088	0	$134	$434	$80	2.6
Classroom 320	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 321	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.3	2,539	-1	$312	$653	$140	1.6
Classroom 322	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.3	2,177	0	$268	$599	$125	1.8
Classroom 323	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 324	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.3	2,539	-1	$312	$653	$140	1.6
Classroom 325	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.0	242	0	$30	$37	$10	0.9
Classroom 325	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.7	5,804	-1	$713	$1,416	$310	1.6
Classroom 326	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 327	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.4	3,265	-1	$401	$763	$170	1.5
Classroom 330	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.3	2,177	0	$268	$599	$125	1.8
Classroom 331	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,236	1, 2	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,613	0.3	2,177	0	$268	$599	$125	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 - Female 3rd Floor	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.2	1,209	0	$149	$453	$85	2.5
Restroom - Male 3rd Floor	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,613	0.1	967	0	$119	$416	$75	2.9
Restroom - Teachers Lounge #3	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,236	0.0	190	0	$23	$37	$10	1.1
Restroom - Teachers Lounge #4	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,236	0.0	190	0	$23	$37	$10	1.1
Storage 304a	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	924	1, 2	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	638	0.2	301	0	$37	$562	$80	13.0
Storage 309a	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	924	1, 2	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	638	0.2	226	0	$28	$489	$60	15.5
Mechanical Room - Boilers	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
Mechanical Room - Boilers	58	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1	Relamp	No	58	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,236	1.4	11,024	-2	$1,355	$2,118	$580	1.1
Mechanical Room - Chiller	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
Mechanical Room - Chiller	38	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	5,236	1	Relamp	No	38	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	5,236	0.5	3,830	-1	$471	$694	$190	1.1
Mechanical Room - Chiller	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,236	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,236	0.0	380	0	$47	$73	$20	1.1

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
Mechanical 201	Mechanical 201	1	Supply Fan	0.1	60.0%	No	Sterling		W	2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room - Boilers	Mechanical Room - Boilers	3	Supply Fan	0.1	60.0%	No	Sterling		W	2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room - Chiller	Mechanical Room - Chiller	3	Supply Fan	0.1	60.0%	No	Sterling		W	2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room - Boilers	Boilers	3	Heating Hot Water Pump	7.5	88.5%	No	US Motors		W	1,460	6	No	91.0%	Yes	3	2.4	10,897	0	$1,359	$14,215	$3,000	8.3
Mechanical Room - Chiller	Chiller - Primary Pumps	2	Chilled Water Pump	15.0	90.2%	No	US Motors		W	2,190		No	90.2%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room - Chiller	Chiller - Secondary Pumps	2	Chilled Water Pump	30.0	92.4%	Yes	US Motors		W	2,190		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room - Chiller	Chiller - Cooling Towers	2	Condenser Water Pump	40.0	93.0%	No	US Motors		W	2,190		No	93.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room - Boilers	Boilers	2	Combustion Air Fan	3.0	85.5%	No	Marathon		B	2,160		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Cooling Towers	2	Cooling Tower Fan	20.0	93.0%	No			W	2,190		No	93.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room - Boilers	Domestic Hot Water	1	DHW Circulation Pump	0.3	62.5%	No	Armstrong		B	8,760	4	Yes	69.5%	No		0.0	197	0	$25	$443	$0	18.0
Mechanical Room - Boilers	Domestic Hot Water	1	DHW Circulation Pump	0.3	62.5%	No	Armstrong		B	8,760	4	Yes	69.5%	No		0.0	197	0	$25	$443	$0	18.0
Mechanical Room - Boilers	Domestic Hot Water	1	DHW Circulation Pump	1.0	85.5%	No	Baldor		W	8,760		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room - Chiller	Glycol	2	Process Pump	0.3	62.5%	No	LMI		W	2,745		No	62.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical - Elevator 1	Main Elevator	1	Other	30.0	87.1%	No	US Motors		B	548		No	87.1%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical - Elevator 2	Gymnasium Elevator	1	Other	20.0	84.2%	No	US Motors		B	365		No	84.2%	No		0.0	0	0	$0	$0	$0	0.0
Kitchen	Roll Up Door	1	Other	0.5	75.0%	No			W	548		No	75.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior	Kitchen	1	Kitchen Hood Exhaust Fan	2.0	84.0%	No	Cook		W	5,250	7	No	86.5%	Yes	1	0.0	6,155	52	$1,217	$3,261	$100	2.6
Exterior	Kitchen	1	Kitchen Hood Exhaust Fan	2.0	84.0%	No	Cook		W	5,250	7	No	86.5%	Yes	1	0.0	6,155	52	$1,217	$3,261	$100	2.6
Exterior	Kitchen	1	Kitchen Hood Exhaust Fan	5.0	87.5%	No	Cook		W	5,250	7	No	89.5%	Yes	1	0.1	12,898	52	$2,058	$4,076	$900	1.5
Roof	School Building	5	Exhaust Fan	0.3	62.5%	No	Cook		W	2,196		No	62.5%	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
Roof	School Building	2	Exhaust Fan	0.5	85.0%	No	Cook		W	2,196		No	85.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	School Building	10	Exhaust Fan	0.8	78.0%	No	Cook		W	2,196		No	78.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room - Boilers	School Building	1	Exhaust Fan	0.8	78.0%	No	Cook		W	2,196		No	78.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room - Chiller	School Building	1	Exhaust Fan	0.8	78.0%	No	Cook		W	2,196		No	78.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	School Building	1	Exhaust Fan	1.5	84.0%	No	Cook		W	2,196		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	School Building	1	Exhaust Fan	2.0	84.0%	No	Cook		W	2,196		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room - Boilers	School Building	3	Exhaust Fan	25.0	91.7%	No	Cook		W	3,254	5	No	93.6%	Yes	3	22.9	77,163	0	$9,624	$32,536	$4,200	2.9
Mechanical Room - Chiller	School Building	1	Exhaust Fan	25.0	91.7%	No	Cook		W	3,254	5	No	93.6%	Yes	1	7.6	25,721	0	$3,208	$10,845	$1,400	2.9
Mechanical Room - Boilers	AHU1 - Library	1	Supply Fan	10.0	89.5%	Yes			B	2,262	4	Yes	91.7%	No		0.1	339	0	$42	$1,344	$0	31.8
Mechanical Room - Boilers	AHU2 - Auditorium	1	Supply Fan	15.0	91.0%	Yes			B	1,950	4	Yes	93.0%	No		0.1	387	0	$48	$1,847	$0	38.3
Mechanical Room - Boilers	AHU3 - Cafeteria	1	Supply Fan	10.0	89.5%	No			B	1,430	5	No	91.7%	Yes	1	3.0	4,663	0	$582	$5,152	$1,100	7.0
Mechanical Room - Chiller	AHU4- Main Office	1	Supply Fan	5.0	87.5%	Yes			B	2,405	4	Yes	89.5%	No		0.1	172	0	$21	$800	$0	37.3
Mechanical Room - Chiller	AHU5 - Main Lobby	1	Supply Fan	7.5	88.5%	No			B	2,340	5	No	91.0%	Yes	1	2.2	5,822	0	$726	$4,738	$1,000	5.1
Mechanical 201	AHU6 - Weight Room	1	Supply Fan	2.0	84.0%	No			B	1,950	5	No	86.5%	Yes	1	0.6	1,366	0	$170	$3,261	$100	18.5
Mechanical 106G	AHU7 - Kitchen	1	Supply Fan	5.0	87.5%	Yes			B	1,586	4	Yes	89.5%	No		0.1	113	0	$14	$800	$0	56.6
Mechanical 201	AHU8 - Gymnasium	1	Supply Fan	20.0	91.0%	No			B	2,860	5	No	93.0%	Yes	1	5.9	18,265	0	$2,278	$8,582	$1,300	3.2
Mechanical 201	AHU9 - Locker Rooms	1	Supply Fan	3.0	86.5%	No			B	2,405	5	No	89.5%	Yes	1	0.9	2,474	0	$309	$3,884	$200	11.9
Mechanical Room - Boilers	HRU1 - Hallways	1	Supply Fan	30.0	92.4%	Yes			B	2,210	4	Yes	94.1%	No		0.2	725	0	$90	$3,103	$0	34.3
Mechanical Room - Chiller	HRU2 - Hallways	1	Supply Fan	25.0	91.7%	Yes			B	2,210	4	Yes	93.6%	No		0.2	684	0	$85	$2,843	$0	33.3
Mechanical 106G	HV1	1	Supply Fan	5.0	87.5%	No			B	2,080	5	No	89.5%	Yes	1	1.5	3,459	0	$431	$4,076	$900	7.4

		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
Mechanical Room - Boilers	AHU1 - Library	1	Return Fan	5.0	89.5%	Yes			B	2,262		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room - Boilers	AHU2 - Auditorium	1	Return Fan	10.0	89.5%	Yes			B	1,950	4	Yes	91.7%	No		0.1	292	0	$36	$1,344	$0	36.8
Mechanical Room - Boilers	AHU3 - Cafeteria	1	Return Fan	5.0	87.5%	No			B	1,430	5	No	89.5%	Yes	1	1.5	2,378	0	$297	$4,076	$900	10.7
Mechanical Room - Chiller	AHU4- Main Office	1	Return Fan	2.0	84.0%	Yes			B	2,405	4	Yes	86.5%	No		0.0	93	0	$12	$532	$0	46.1
Mechanical Room - Chiller	AHU5 - Main Lobby	1	Return Fan	2.0	84.0%	No			B	2,340	5	No	86.5%	Yes	1	0.6	1,640	0	$205	$3,261	$100	15.5
Mechanical 106G	AHU7 - Kitchen	1	Return Fan	2.0	84.0%	Yes			B	1,586	4	Yes	86.5%	No		0.0	61	0	$8	$532	$0	69.9
Mechanical 201	AHU8 - Gymnasium	1	Return Fan	10.0	89.5%	No			B	2,860	5	No	91.7%	Yes	1	3.1	9,326	0	$1,163	$5,152	$1,100	3.5
Mechanical 201	AHU9 - Locker Rooms	1	Return Fan	1.0	82.5%	No			B	2,405	5	No	85.5%	Yes	1	0.3	867	0	$108	$3,010	$75	27.1
Mechanical Room - Boilers	HRU1 - Hallways	1	Return Fan	15.0	91.0%	Yes			B	2,210	4	Yes	93.0%	No		0.1	438	0	$55	$1,847	$0	33.8
Mechanical Room - Chiller	HRU2 - Hallways	1	Return Fan	15.0	91.0%	Yes			B	2,210	4	Yes	93.0%	No		0.1	438	0	$55	$1,847	$0	33.8

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
Roof	Server Room 106C	1	Ductless Mini-Split AC	2.00		10.60		Mitsubishi	PU24EK2	B	8	Yes	1	Ductless Mini-Split AC	2.00		18.00		0.5	745	0	$93	$5,642	$0	60.7
Exterior - Garage	Principal's Office / Conference Room	1	Ductless Mini-Split HP	2.95	36.00	19.20	11 HSPF	Mitsubishi	MXZ-4C36NA2	W		No							0.0	0	0	$0	$0	$0	0.0
Stairs C	Stairs C	1	Electric Resistance Heat		11.26		1 COP	TPI Corporation	G1GUH03003	W		No							0.0	0	0	$0	$0	$0	0.0

Electric Chiller Inventory & Recommendations

		Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Chiller Quantity	System Type	Cooling Capacity per Unit (Tons)	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency Chillers?	Chiller Quantity	System Type	Constant/ Variable Speed	Cooling Capacity (Tons)	Full Load Efficiency (kW/Ton)	IPLV Efficiency (kW/Ton)	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 Room - Chiller	Cooling System	1	Water-Cooled Centrifugal Chiller	351.00	York	YTJ1C1E2-CNJ	B	9	Yes	1	Water-Cooled Centrifugal Chiller	Variable	351.00	0.60	0.38	10.4	80,028	0	$9,982	$221,882	$7,020	21.5

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 Room - Boilers	Heating System	2	Non-Condensing Hot Water Boiler	3,330	Smith	28A-W-15	B	10	Yes	2	Condensing Hot Water Boiler	3,330	93.00%	Ec	0.0	0	628	$5,415	$123,935	$13,320	20.4

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
Mechanical 201	AHU8 - Gymnasium	11	2.00	52.98	0.00	968.73	0.0	1,818	33	$508	$2,719	$0	5.3
Mechanical Room - Boilers	AHU1 - Library	11	2.00	26.49	0.00	484.36	0.0	909	16	$254	$2,719	$0	10.7
Mechanical Room - Boilers	AHU2 - Auditorium	11	2.00	39.74	0.00	726.55	0.0	1,364	25	$381	$2,719	$0	7.1
Mechanical Room - Boilers	AHU3 - Cafeteria	11	2.00	26.49	0.00	484.36	0.0	909	16	$254	$2,719	$0	10.7

Pipe Insulation Recommendations

		Recommendation Inputs			Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	ECM #	Length of Uninsulated Pipe (ft)	Pipe Diameter (in)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical Room - Boilers	Domestic Hot Water	12	1	3.00	0.0	0	1	$11	$7	$2	0.5
Mechanical Room - Boilers	Domestic Hot Water	12	5	2.00	0.0	0	4	$34	$36	$10	0.8
Mechanical Room - Boilers	Domestic Hot Water	12	10	0.50	0.0	0	3	$24	$58	$10	2.0
Mechanical 201	AHU8 - Gymnasium	12	10	3.00	0.0	450	0	$56	$88	$20	1.2
Mechanical 201	AHU8 - Gymnasium	12	3	1.00	0.0	49	0	$6	$22	$6	2.6
Mechanical Room - Chiller	HRU2 - Hallways	12	12	4.00	0.0	642	0	$80	$105	$24	1.0

DHW Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions: System Quantity	System Type	Manufacturer	Model	Remaining Useful Life	Proposed Conditions: ECM #	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Energy Impact & Financial Analysis: 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 Room - Boilers	Domestic Hot Water	2	Boiler	Lochinvar	CFN401PM	B		No						0.0	0	0	$0	$0	$0	0.0

Low-Flow Device Recommendations

Location	Recommendation Inputs: ECM #	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Energy Impact & Financial Analysis: 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
West New York Middle School	13	51	Faucet Aerator (Lavatory)	2.20	0.50	0.0	0	24	$208	$366	$204	0.8

Walk-In Cooler/Freezer Inventory & Recommendations

Location	Existing Conditions: Cooler/ Freezer Quantity	Case Type/Temperature	Manufacturer	Model	Proposed Conditions: ECM #	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Evaporator Fan Control?	Energy Impact & Financial Analysis: 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	Cooler (35F to 55F)	Nor-Lake / Bohn	ADT104ANBK	14	Yes	No	No	0.1	524	0	$65	$607	$80	8.1
Kitchen	1	Medium Temp Freezer (0F to 30F)	Nor-Lake / Bohn		14	Yes	No	No	0.1	1,049	0	$131	$1,213	$160	8.1

Commercial Refrigerator/Freezer Inventory & Recommendations

Location	Existing Conditions: Quantity	Refrigerator/ Freezer Type	Manufacturer	Model	ENERGY STAR Qualified?	Proposed Conditions: ECM #	Install ENERGY STAR Equipment?	Energy Impact & Financial Analysis: Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Refrigerator Chest	Powers	780	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Stand-Up Refrigerator, Glass Door (16 - 30 cu. ft.)	Delfield		No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Stand-Up Refrigerator, Glass Door (16 - 30 cu. ft.)	Beverage Aire	MT12	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Delfield	MRR2-S	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Delfield	MRR1-S	No		No	0.0	0	0	$0	$0	$0	0.0

Cooking Equipment Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	Manufacturer	Model	High Efficiency Equipement?	ECM #	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Gas Combination Oven/Steam Cooker (15 - 28 Pans)	Alto Shaam		No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	2	Gas Convection Oven (Full Size)	Garland		No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Gas Conveyor Oven (<25")	Lincoln		No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Gas Fryer	Cleveland		No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Gas Griddle (≤2 Feet Width)	Garland		No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Gas Griddle (4 Feet Width)	US Range		No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Insulated Food Holding Cabinet (Full Size)	Winston		Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	3	Insulated Food Holding Cabinet (Full Size)	Alto Shaam		No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Gas Rack Oven (Single)	Garland		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
West New York Middle School	2	Clothes Washer	500	No		
West New York Middle School	16	Coffee Machine	500	No		
West New York Middle School	200	Desktop	120	No		
West New York Middle School	2	Dishwasher (Undercounter)	1,000	No		
West New York Middle School	1	Fan (Large)	200	No		
West New York Middle School	21	Microwave	1,000	No		
West New York Middle School	2	Mixer	325	No		
West New York Middle School	6	Residential Oven	1,000	No		
West New York Middle School	1	Deli Slicer	345	No		
West New York Middle School	3	Treadmill	2,000	No		
West New York Middle School	3	Paper Shredder	146	No		
West New York Middle School	93	Printer (Medium/Small)	450	No		
West New York Middle School	5	Printer/Copier (Large)	600	No		
West New York Middle School	1	Projector	240	No		
West New York Middle School	10	Refrigerator (Mini)	175	No		
West New York Middle School	8	Refrigerator (Residential)	340	No		
West New York Middle School	3	Serving Table (Chilled/Heated)	3,400	No		
West New York Middle School	76	Smart Board	215	Yes		
West New York Middle School	1	Television	224	No		
West New York Middle School	5	Toaster	600	No		
West New York Middle School	4	Water Cooler	192	Yes		
West New York Middle School	1	Server	3,000	No		

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
Cafeteria	1	Glass Fronted Refrigerated	15	Yes	0.1	1,209	0	$151	$230	$50	1.2
Cafeteria - Teachers Lounge	1	Glass Fronted Refrigerated	15	Yes	0.1	1,209	0	$151	$230	$50	1.2
Cafeteria	1	Non-Refrigerated	N/A	No	0.0	0	0	$0	$0	$0	0.0

APPENDIX B: ENERGY STAR® STATEMENT OF ENERGY PERFORMANCE

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

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ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

West New York Middle School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 172,827
Built: 2004

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

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
West New York Middle School 201 57th Street West New York, New Jersey 07093	West New York Board of Education 6028 Broadway West New York, NJ 07093 (201) 553-4000	Dean Austin 6028 Broadway West New York, NJ 07093 (201) 553-4000 x 30063 daustin@wnyschools.net

Property ID: 15545702

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
67.7 kBtu/ft²

Source EUI
135.6 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	5,015,248 (43%)
Electric - Grid (kBtu)	6,377,389 (54%)
Electric - Solar (kBtu)	311,276 (3%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	54.2
National Median Source EUI (kBtu/ft²)	108.4
% Diff from National Median Source EUI	25%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	887

Signature & Stamp of Verifying Professional

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

LP Signature: ______________________Date: ___________

Licensed Professional

____ ________
,
(____)____-______
____

Professional Engineer or Registered Architect Stamp
(if applicable)

APPENDIX C: GLOSSARY

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

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

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