Local Government Energy Audit Report

High School South

February 14, 2024

Prepared for:
Middletown Township Public Schools
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Middletown, New Jersey 07748

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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 on 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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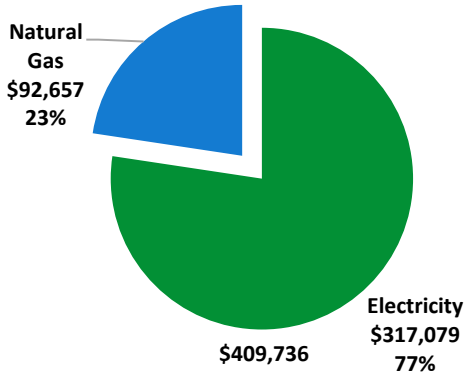
1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for High School South. 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: $409,736 Electricity: 3,237,921 kWh Natural Gas: 56,369 Therms	
ENERGY STAR® Benchmarking Score	61 *(1-100 scale)*	Congratulations, your building performs better than the national average. This report has suggestions about how to keep your building running efficiently, further improve performance, and lower your energy bills even more.

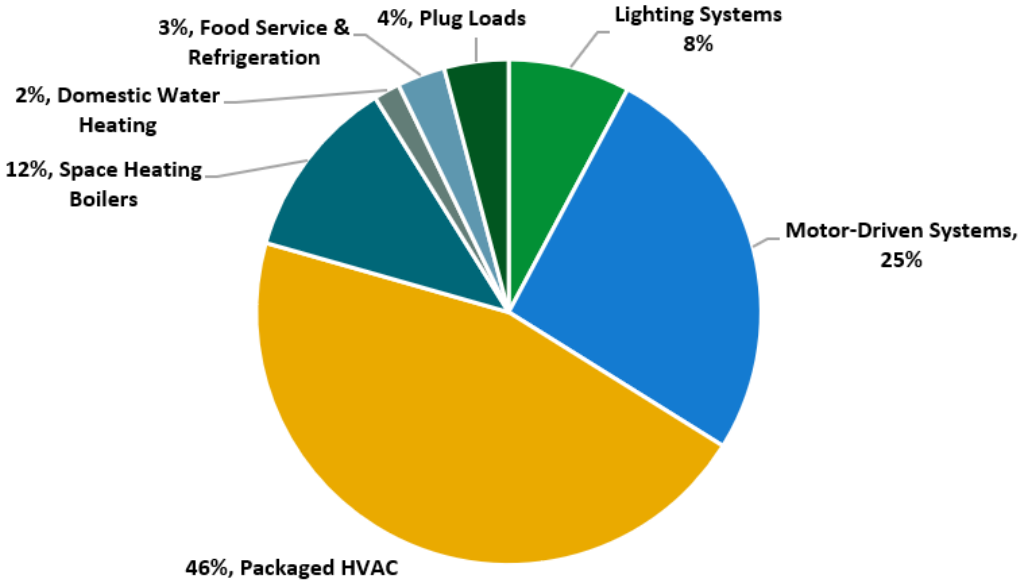


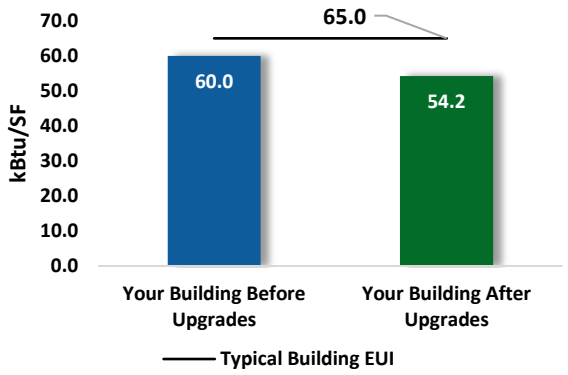
Figure 1 - Energy Use by System

POTENTIAL IMPROVEMENTS

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

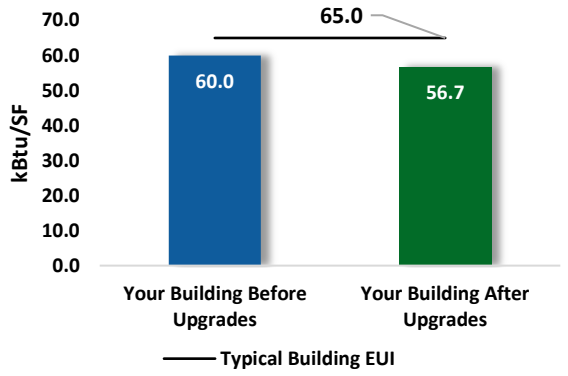
Scenario 1: Full Package (All Evaluated Measures)

Installation Cost	$1,667,494
Potential Rebates & Incentives[1]	$55,362
Annual Cost Savings	$40,782
Annual Energy Savings	Electricity: 343,963 kWh Natural Gas: 4,319 Therms
Greenhouse Gas Emission Savings	198 Tons
Simple Payback	39.5 Years
Site Energy Savings (All Utilities)	10%



Scenario 2: Cost Effective Package[2]

Installation Cost	$155,762
Potential Rebates & Incentives	$8,238
Annual Cost Savings	$21,880
Annual Energy Savings	Electricity: 168,109 kWh Natural Gas: 3,296 Therms
Greenhouse Gas Emission Savings	104 Tons
Simple Payback	6.7 Years
Site Energy Savings (all utilities)	5%



On-site Generation Potential

Photovoltaic	None
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			**20,492**	**0.8**	**-1**	**$1,994**	**$13,705**	**$2,655**	**$11,050**	**5.5**	**20,548**
ECM 1	Install LED Fixtures	Yes	16,924	0.0	0	$1,657	$11,749	$2,400	$9,349	5.6	17,043
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	697	0.1	0	$66	$389	$36	$353	5.4	685
ECM 3	Retrofit Fixtures with LED Lamps	Yes	2,870	0.6	-1	$271	$1,568	$219	$1,349	5.0	2,820
Lighting Control Measures			**10,113**	**2.1**	**-2**	**$956**	**$16,398**	**$4,000**	**$12,398**	**13.0**	**9,936**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	9,109	1.9	-2	$861	$13,698	$1,865	$11,833	13.7	8,949
ECM 5	Install High/Low Lighting Controls	Yes	1,004	0.2	0	$95	$2,700	$2,135	$565	6.0	986
Variable Frequency Drive (VFD) Measures			**8,430**	**0.0**	**26**	**$1,254**	**$5,028**	**$900**	**$4,128**	**3.3**	**11,541**
ECM 6	Install VFDs on Kitchen Hood Fan Motors	Yes	8,430	0.0	26	$1,254	$5,028	$900	$4,128	3.3	11,541
Unitary HVAC Measures			**160,036**	**84.3**	**0**	**$15,672**	**$1,458,715**	**$47,124**	**$1,411,591**	**90.1**	**161,155**
ECM 7	Install High Efficiency Heat Pumps	No	160,036	84.3	0	$15,672	$1,458,715	$47,124	$1,411,591	90.1	161,155
HVAC System Improvements			**15,818**	**0.0**	**129**	**$3,674**	**$53,570**	**$90**	**$53,480**	**14.6**	**31,062**
ECM 8	Implement Demand Control Ventilation (DCV)	No	15,818	0.0	102	$3,231	$53,017	$0	$53,017	16.4	27,911
ECM 9	Install Pipe Insulation	Yes	0	0.0	27	$442	$552	$90	$462	1.0	3,151
Domestic Water Heating Upgrade			**0**	**0.0**	**10**	**$165**	**$86**	**$43**	**$43**	**0.3**	**1,176**
ECM 10	Install Low-Flow DHW Devices	Yes	0	0.0	10	$165	$86	$43	$43	0.3	1,176
Food Service & Refrigeration Measures			**4,708**	**0.3**	**0**	**$461**	**$8,731**	**$550**	**$8,181**	**17.7**	**4,741**
ECM 11	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	1,114	0.1	0	$109	$1,517	$200	$1,317	12.1	1,122
ECM 12	Refrigeration Controls	Yes	2,870	0.0	0	$281	$5,541	$275	$5,266	18.7	2,890
ECM 13	Replace Refrigeration Equipment	Yes	723	0.1	0	$71	$1,674	$75	$1,599	22.6	728
Custom Measures			**124,367**	**0.0**	**269**	**$16,607**	**$111,262**	**$0**	**$111,262**	**6.7**	**156,781**
ECM 14	Retro-Commissioning Study	Yes	124,367	0.0	269	$16,607	$111,262	$0	$111,262	6.7	156,781
TOTALS (COST EFFECTIVE MEASURES)			**168,109**	**3.1**	**330**	**$21,880**	**$155,762**	**$8,238**	**$147,524**	**6.7**	**207,874**
TOTALS (ALL MEASURES)			**343,963**	**87.4**	**432**	**$40,782**	**$1,667,494**	**$55,362**	**$1,612,133**	**39.5**	**396,940**

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

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

Figure 2 – Evaluated Energy Improvements

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

1.1 Planning Your Project

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

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

Pick Your Installation Approach

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

Options from Your Utility Company

Prescriptive and Custom Rebates

For facilities wishing to pursue only selected individual measures (or planning to phase implementation of selected measures over multiple years), incentives are available through the Prescriptive and Custom Rebates program. To participate, you can use internal resources or an outside firm or contractor to perform the final design of the ECM(s) and install the equipment. Program pre-approval may be required for some incentives. Contact your utility company for more details prior to project installation.

Direct Install

The Direct Install program provides turnkey installation of multiple measures through an authorized contractor. This program can provide incentives up to 70% or 80% of the cost of selected measures. A Direct Install contractor will assess and verify individual measure eligibility and perform the installation work. The Direct Install program is available to sites with an average peak demand of less than 200 kW.

Engineered Solutions

The Engineered Solutions program provides tailored energy-efficiency assistance and turnkey engineering services to municipalities, universities, schools, hospitals, and healthcare facilities (MUSH), non-profit entities, and multifamily buildings. The program provides all professional services from audit, design, construction administration, to commissioning and measurement and verification for custom whole-building energy-efficiency projects. Engineered Solutions allows you to install as many measures as possible under a single project as well as address measures that may not qualify for other programs.

For more details on these programs please contact your utility provider.

Options from New Jersey's Clean Energy Program

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

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

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

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

Successor Solar Incentive Program (SuSI)

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

Ongoing Electric Savings with Demand Response

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

Large Energy User Program (LEUP)

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

For more details on these programs please visit New Jersey's Clean Energy Program website .

2 Existing Conditions

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for High school south. 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 May 23, 2023, TRC performed an energy audit at High School South located in Middletown, New Jersey. TRC met with facility staff to review the facility operations and help focus our investigation on specific energy-using systems.

High School South, located at 900 Nut Swamp Road, is a four-year comprehensive public high school serving students in ninth through twelfth grades. The facility is comprised of a school building that includes typical educational, administrative, assembly and recreation spaces. The school building is a two-story, 258,156 square foot building built in 1974. Additionally, a 20,000 square foot gymnasium bubble has been built to accommodate extra sport activities. Spaces include classrooms, gymnasium, locker rooms, auditorium, library, TV studio, offices, kitchen, cafeteria, corridors, stairwells, conference rooms, offices, storage, and basement mechanical spaces.

Facility lighting systems consist mostly of linear LED tubes and LED lamps. The building is 100% heated and cooled by geothermal water source heat pumps (WSHPs) and packaged units supplemented by three condensing hot water boilers. The building has two passenger elevators and a gas-fired backup generator. Solar photovoltaic arrays with 835-kW capacity were installed on the flat roof section of the building in 2017 through a power purchase agreement (PPA).

Recent Improvements and Facility Concerns

Facility concerns include the geothermal system (underground system) and aging water source heat pumps that are near their useful life and require high maintenance.

In 2017, the facility implemented interior and exterior lighting retrofits through ESIP and performed a substantial mechanical HVAC system upgrade. Three condensing boilers and a cooling tower were installed as part of the HVAC mechanical upgrade, Additionally, seven RTUs and sixteen heat recovery units (HRUs) were installed in 2022. Additionally, all the building electric transformers have been replaced with energy efficient transformers. Water source heat pump replacement was underway on the second floor of the building during the audit.

It should be noted that since the time of the site visits many improvements have been made, which has resulted in better facility performance and higher ENERGY STAR scores.

Geothermal System & Auditorium

2.2 Building Occupancy

High School South operates on a ten-month schedule. During a typical weekday, the high school is occupied by 1,544 students and 215 staff. There are some Saturday activities and after school programs in summer. High School North is shut down around 11:00 PM after the cleaning process.

It should be noted that the energy and economic analysis for the facilities is based on the use of the building during the utility billing period, and that results will vary based on changes to building.

Building Name	Weekday/Weekend	Operating Schedule
High School South - General Operating Hours	Weekday	6:00 AM - 11:00 PM
	Saturday	7:00 AM - 3:00 PM
High School South - Classes Hours	Weekday	7:00 AM - 2:00 PM
	Weekend	Varies

Figure 3 - Building Occupancy Schedule

2.3 Building Envelope

Building walls are concrete masonry units (CMU) block over structural steel with a brick veneer façade; the interior finish is mostly gypsum drywall or painted CMU. The level of exterior wall insulation is unknown. The building has a flat roof finished with grey membranes. The roof was replaced in 2015 and is in good condition. A section of the building has aluminum-framed elevated walls. This section has a pitched roof covered with asphalt shingles that are in good condition.

Windows are comprised of a mix of double and single paned units with aluminum frames. Some operable and fixed window weather seals are in fair condition, showing signs of wear. The facility is planning to replace these windows. The main entrance doors are glass with aluminum frames. Exit doors are mostly FRP (fiberglass-reinforced polymers) rated doors and are new and in good condition. Degraded window and door seals increase drafts and outside air infiltration.


Building Walls

Asphalt Shingles

Flat Roof Sections

Window

Exterior Doors

Outside Bubble

2.4 Lighting Systems

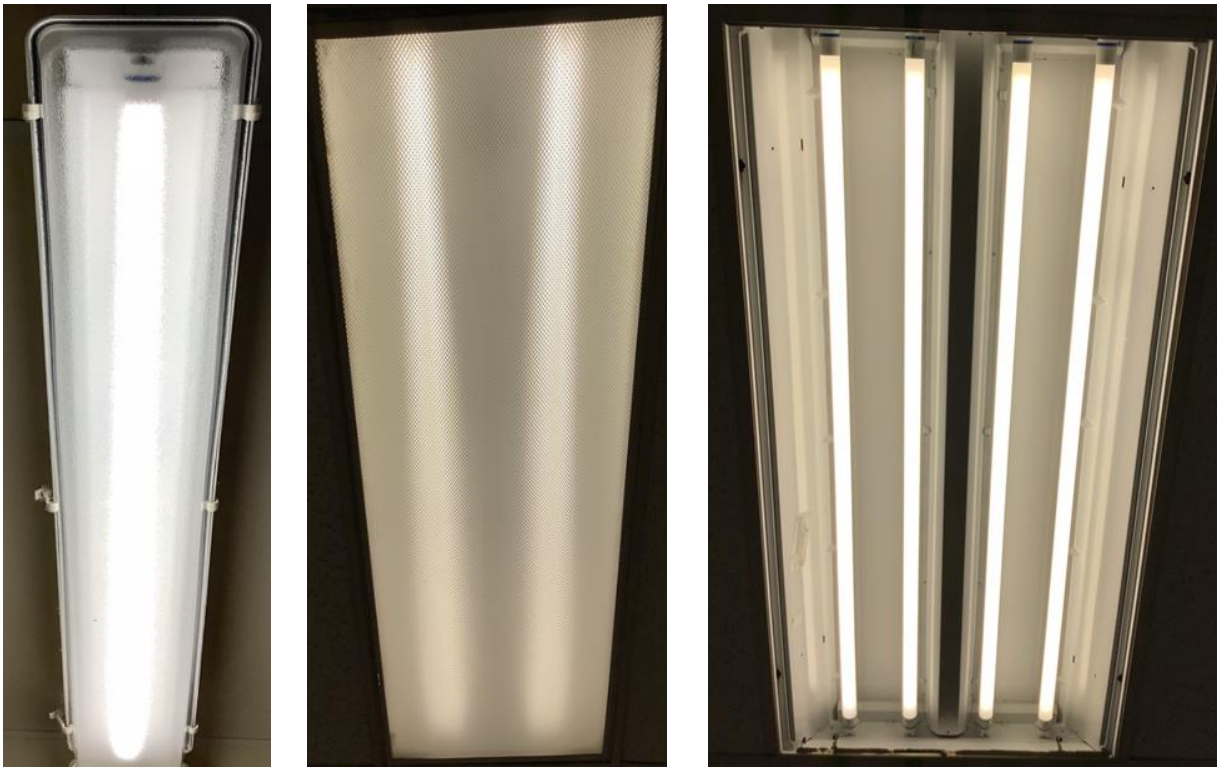
Lighting systems throughout the building have been retrofitted with LED sources, primarily with linear LED tubes. A small number of linear fluorescent T8 lamps are found in spaces including classrooms 101 and 253, and the pump house. Some compact fluorescent lamps (CFLs) in recessed cans are used in the boiler room, library, and penthouses. The gymnasium corridor display cases are lit with linear fluorescent T12 fixtures.

Linear LED tubes fixture types include 1-lamp, 2-lamp, 3-lamp, or 4-lamp, 2-foot or 4-foot-long troffer, recessed, and surfaced mounted fixtures and 2-foot-long fixtures with U-bend tube lamps. Larger spaces including the gymnasiums, auditorium, cafeteria, main lobby, and the outside bubble are lit with LED fixtures. A small number of LED lamps are used in conjunction with linear LED tubes in restrooms, locker rooms, and corridors while a substantial quantity are used in conjunction with linear LED tubes for the stage, boy's locker room office, and in the stage storage room.

Most fixtures are in good condition. Interior lighting levels were generally sufficient. All exit signs are LED. Light fixtures in spaces are primarily controlled by occupancy sensors that are either ceiling or wall mounted except for spaces including storage rooms, kitchen, restrooms, stairwells, and some small offices which are controlled by manual switches.

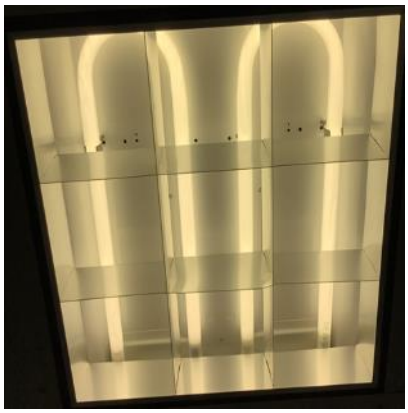
Exterior perimeter and entrance fixtures have been replaced with LED fixtures which are controlled by photocells. These include wall and recess mounted fixtures.

The parking lot is illuminated by high pressure sodium lamps that are controlled by photocells. The facility has a football field that is illuminated when needed by thirty-six 1500-Watt pole mounted fixtures that are controlled by a circuit breaker.



Linear LED Tubes Fixtures


Linear LED Fixtures



T8 U-Bend Fixtures

LED Fixtures

CFL Fixtures

LED Exit Sign


Occupancy Sensors

Wall & Recessed Mounted LED Fixtures

Parking Lot HID Lamps

Football Field HID Lamps

2.5 Air Handling Systems

Water Source Heat Pumps (WSHPs)

Various building spaces including classrooms, offices, restrooms, boys', and girls' gymnasiums (rooms 1235 and 1236), rooms C16A and B and 108 (mini gym), and other small spaces are heated and cooled by 220 Tetco water source heat pumps (WSHPs) of various sizes. The units are mainly above-ceiling mounted except some wall mounted units that are in the style of typical classroom vertical unit ventilators. Larger units, 10 tons and 15 tons, located in the penthouse are floor mounted and serve larger spaces, including the gymnasiums.

WSHPs vary in heating and cooling capacities between 5.20 MBh and 229 MBh and 0.75 tons and 15 tons, respectively. The WSHPs have passed the extent of their useful lives and appear in poor condition. They have been evaluated for replacement.

The distribution system is a standard closed loop where the loop piping runs inside the building and includes a heat adder (condensing boilers), a cooling tower (heat rejecter), pumps, heat exchangers, and controls. The WSHPs are equipped with fractional hp supply fans to condition the respective spaces. The system is controlled by the building automation system (BAS).

- Cooling Mode (Summer Operation):

Each refrigerant to water heat exchanger transfers the heat from the cooling tower load plus the heat of compression into the common water loop. This process raises the temperature of the loop. When the loop temperature approaches the upper temperature limit, the heat rejector (cooling tower) is staged to remove heat from the loop. It will maintain a maximum desired water temperature. Individual WSHP units will cycle on and off to satisfy their respective zone temperatures.

- Heating Mode (Winter Operation):

Each refrigerant to water heat exchanger acts as an evaporator and absorbs heat from the water loop. This lowers the temperature of the loop. When loop temperature approaches the lower limit of about 60˚F, the heat adder is staged to add heat to the loop, maintaining a minimum loop water temperature of 60˚F. Individual WSHP units' cycle on and off to satisfy their respective zone temperatures.

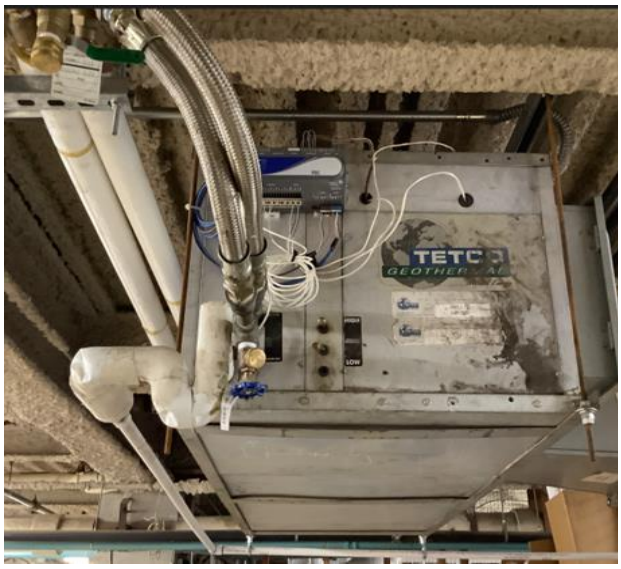
- Intermediate Season:

Some units may be in the cooling mode (adding heat to the common water loop) while others are in the heating mode (absorbing heat from the loop). During this condition, the loop may be in equilibrium and not require heat to be added or rejected. The loop water temperature is allowed to vary within the approximate desired range.

The following table provides summary information about the WSHPs:

Location	Areas Served	Cooling Capacity (Ton)	Heating Capacity (MBh)	Quantity	Condition
Girls Restrooms	Girls Restrooms	0.75	5.60	2	Poor
Women Restroom	Women Restroom	1.25	11.60	1	Poor
Various Spaces	Various Spaces	1.50	15.40	15	Poor
Various Spaces	Various Spaces	0.67	5.20	17	Poor
Various Spaces	Various Spaces	1.00	9.40	16	Poor
Various Spaces	Various Spaces	1.50	21.70	17	Poor
Penthouse	Mini-Gym 108	10.00	99.40	1	Poor
Penthouse	Auditorium, Boys & Girls Gymnasiums	15.00	149.00	5	Poor
Various Spaces	Various Spaces	2.00	26.00	24	Poor
Various Spaces	Various Spaces	2.50	30.10	46	Poor
Various Spaces	Various Spaces	3.00	32.60	22	Poor
Various Spaces	Various Spaces	3.50	43.60	24	Poor
Various Spaces	Various Spaces	4.00	45.70	20	Poor
Classrooms 167 & 177	Classrooms 167 & 177	4.50	47.40	2	Poor
Rooms C16A, B, C11A	Room C16A, B, & C11A	5.00	53.70	2	Poor
Classroom 171 & 173	Classroom 171 & 173	6.00	62.80	1	Poor
Penthouse	Room 1242	10.00	152.80	1	Poor
Penthouse	Room 1236 - Girls Gymnasium	15.00	229.20	1	Poor
Penthouse	Room 1235 - Boys Gymnasium	15.00	229.20	3	Poor

Tetco Unit Ventilator WSHP

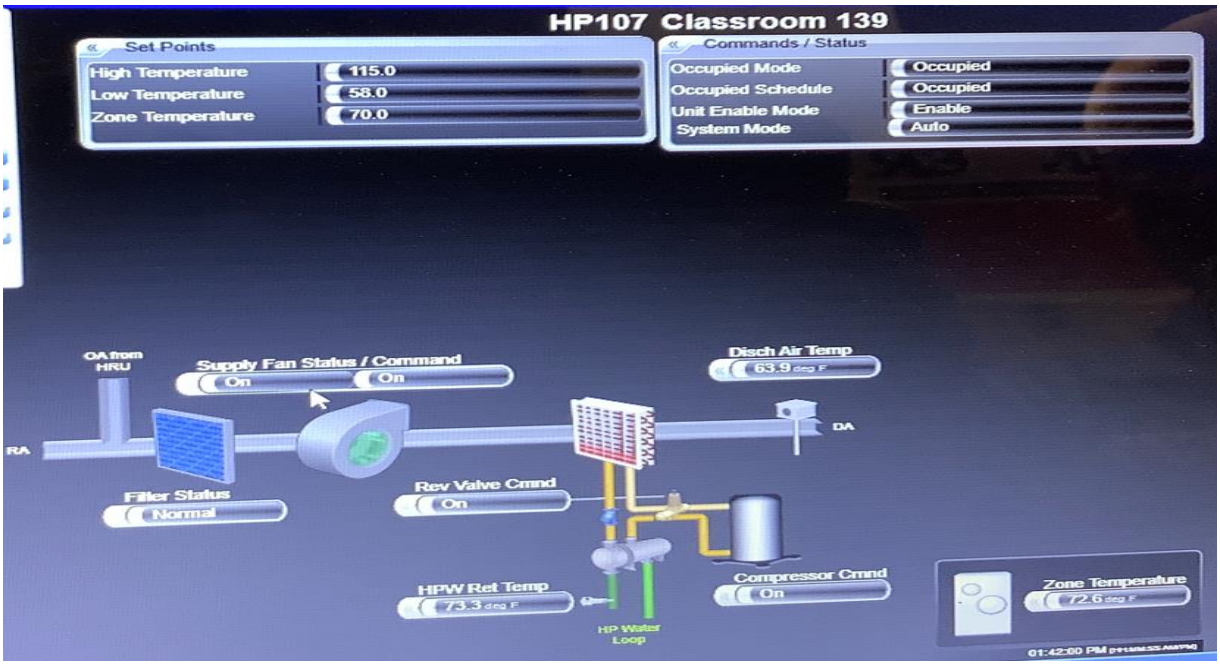


Tetco Ceiling Mounted WSHP

Tetco Ground Mounted WSHP

Old & Removed Tetco WSHPs

New, ready to be installed Water Furnace WSHP



BMS Screenshot - WSHP

Packaged Units

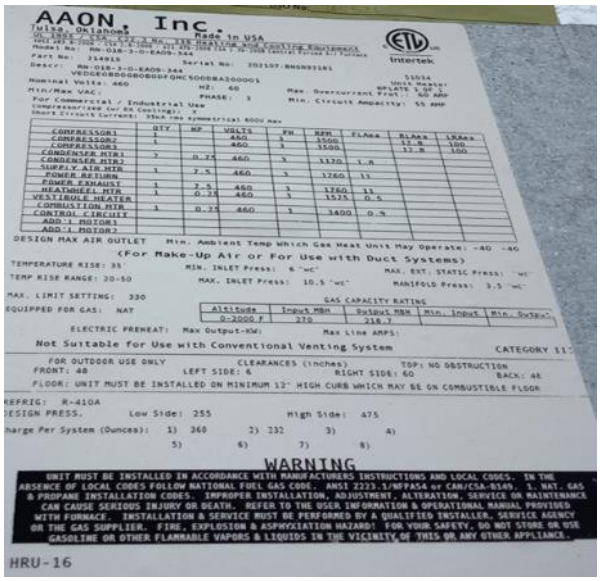
Larger building spaces including main gymnasiums, library, auditorium, locker rooms, cafeteria, outside bubbles, and first and second floor offices are conditioned by seven AAON packaged roof top units labelled as RTU and sixteen AAON heat recovery units labelled "HRU". They provide cooling through direct expansion coils and are equipped with gas-fired furnace sections, except six HRUs that provide heating only.

These units vary in cooling capacities between 7 tons and 70 tons with heating capacities between 72.9 MBh to 864 MBh. The units are equipped with economizers, and with supply fan and return fan motors that are controlled by variable frequency drives (VFDs). The HRUs are equipped with heat wheel that transfers heat and humidity between the return and supply air. This brings the supply air closer in temperature and humidity to the return air, reducing the load on the heating and cooling systems.

Air distribution is provided to supply air registers by ducts concealed above the ceilings. The RTUs are in good condition and controlled by the BAS. The building air distribution setpoints are 72°F for cooling and 68°F for heating when occupied, and 65°F for cooling and 78°F for heating when unoccupied.

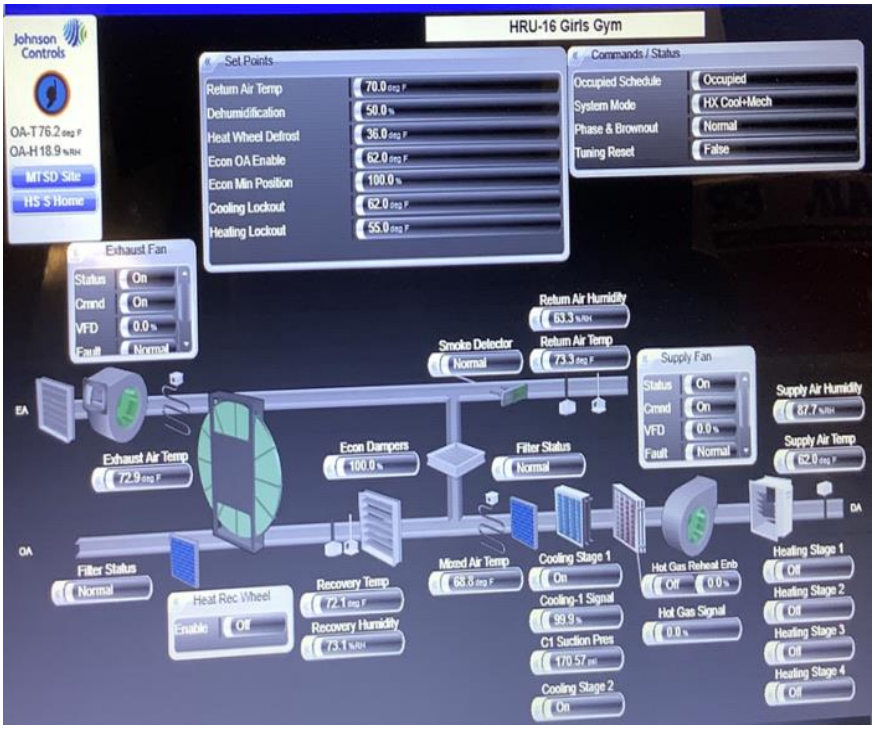
Refer to Appendix A for detailed information about each unit.

Location	Unit (ID)	Area Served	Cooling Capacity (Ton)	Heating Capacity (MBh)	Condition
Exterior Ground	RTU-S1	Outside Bubble	30.00	432.00	New
Exterior Ground	RTU-S2	Outside Bubble	30.00	433.00	New
Roof	RTU-1	Boys Locker Room	20.00	218.70	New
Exterior Ground	RTU-2	Girls Locker Room	20.00	218.7	New
Roof	RTU-3	TV Production	11.00	156.00	New
Roof	RTU-4	Cafeteria	70.00	864.00	New
Roof	RTU-5	Football Locker Room	13.00	156.00	New
Roof	HRU-1	First Floor Classrooms	N/A	648.00	New
Roof	HRU-2	First Floor Classrooms	N/A	218.70	New
Roof	HRU-3	First Floor Classrooms	N/A	218.70	New
Roof	HRU-4	Guidance Offices	N/A	72.90	New
Roof	HRU-5	First Floor Classrooms	N/A	432.00	New
Roof	HRU-6	Second Floor Classrooms	N/A	218.70	New
Roof	HRU-7	Media Center	8.00	72.9	New
Roof	HRU-8	Second Floor Classrooms	16.00	218.70	New
Roof	HRU-10	Second Floor Classrooms	N/A	648.00	New
Roof	HRU-11	Media Center Rooms	16.00	218.70	New
Roof	HRU-12	Art, Music & Stage Craft	N/A	218.70	New
Roof	HRU-13	Aux Gymnasium	8.00	72.90	New
Roof	HRU-15	Auditorium	20.00	218.70	New
Roof	HRU-16	Girls Gymnasium	18.00	218.70	New
Roof	HRU-19	Boys Gymnasium	25.00	328.10	New
Roof	HRU-20	Offices	7.00	72.90	New

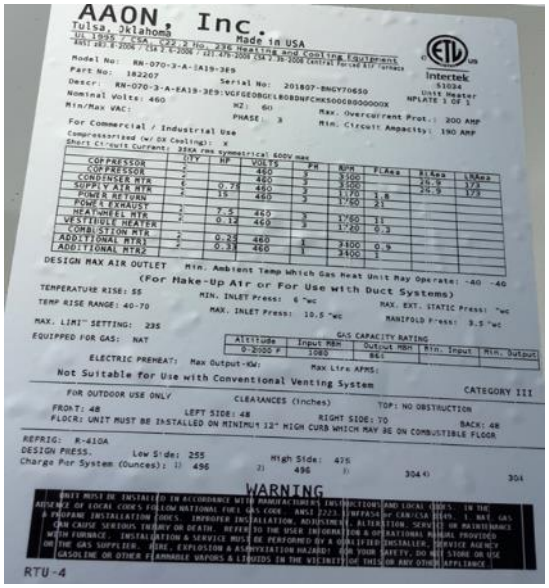


HRU-16 – Girls Gymnasium

VFDs



BMS Screenshot - HRU-16



RTU-4 – Cafeteria

BMS Screenshot - RTU-2 – Girls Locker Room

2.6 General Building Exhaust Air Systems

Various building spaces are exhausted by motor driven exhaust fans. Science classrooms have specialty exhaust fans. The kitchen has a 5 hp exhaust fan which serves all kitchen hoods. Equipment is in good condition and controlled by manual switches.

Kitchen Hood Exhaust Fan

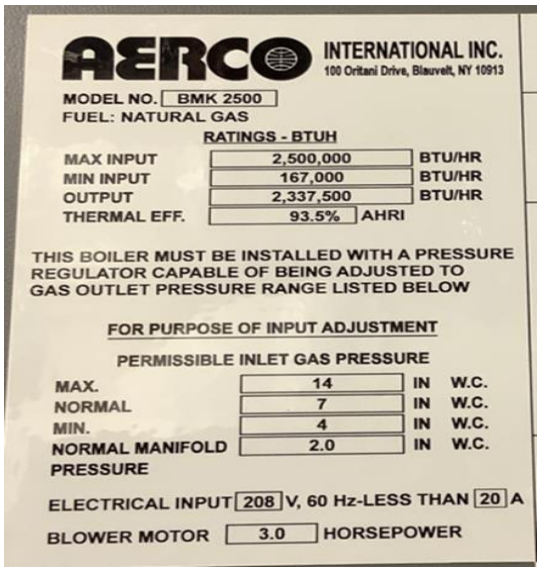
Science Classrooms Fume Hood Exhaust Fan

2.7 Heating Hot Water Systems

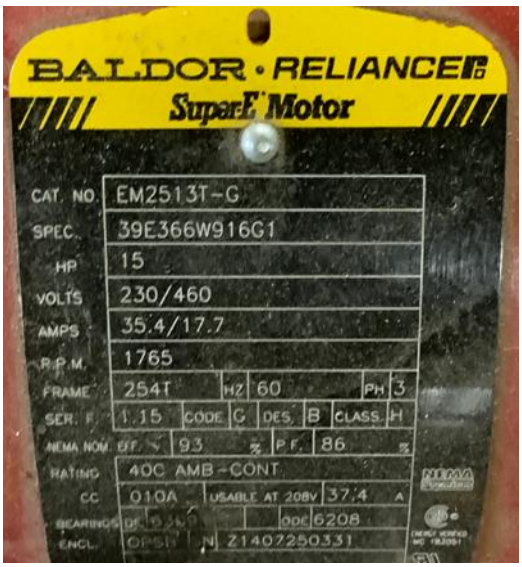
Three AERCO 2337 MBh output condensing hot water boilers are used as heat adders to supplement the WSHP heating loop when the loop temperature approaches the lower limit. The burners are fully modulating with a nominal efficiency of 93.5%. The boilers are configured in an automated lead-lag control scheme. Installed in 2015, the boilers are in good condition.

The hydronic distribution system is a two-pipe heating and cooling system with a hot water loop connected to a heat exchanger. Two, 15 hp based mounted variable speed pumps (P5 and P6) distribute heating hot water to WSHPs. The heating hot water loop is controlled by the BMS. The building occupied cooling and heating temperature setpoints are 68°F and 72°F, respectively. Unoccupied cooling and heating setpoints are 78°F and 65°F, respectively.

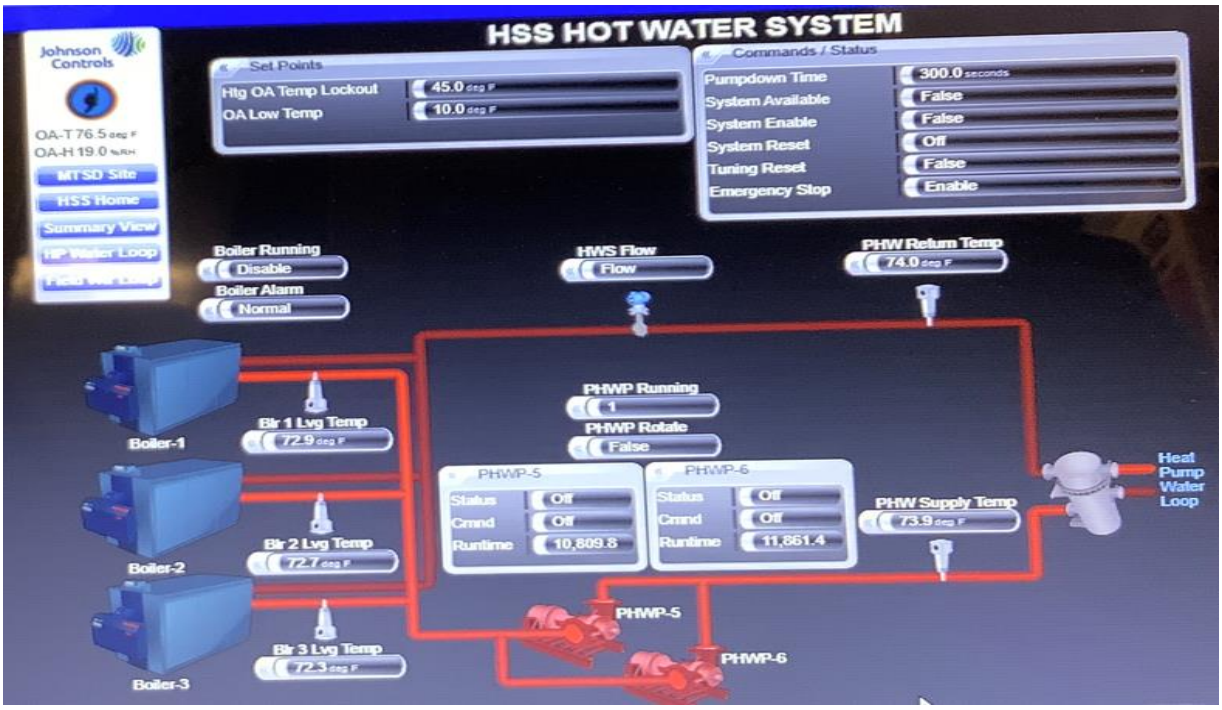
Overall water circulation and distribution details are provided in the following section.



AERCO Condensing Boilers



Hot Water Pumps - P5 and P6



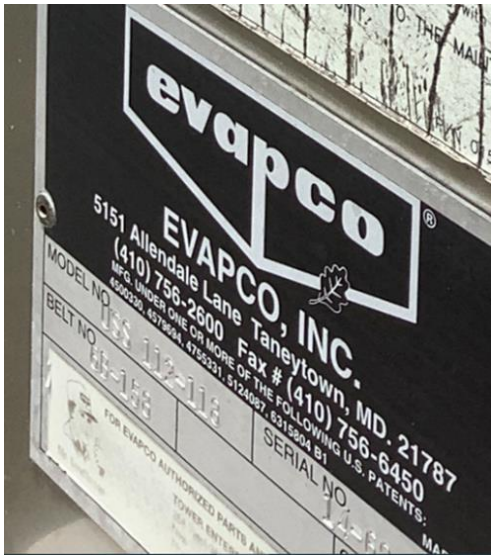
BMS Screenshot - Hot Water Loop

2.8 Condenser Water Systems

The condenser water system consists of a one-cell cooling tower equipped with a 50 hp variable speed drive fan. Installed in 2015, the cooling tower is in good condition. There are two, 25 hp variable flow condenser water pumps (P7 and P8) and a plate heat exchanger system, all located in the boiler room. The plate heat exchanger separates the hot medium from the cold. It transfers heat energy from one fluid to another and these fluids (hot water and condenser water) never encounter each other due to being separated by the heat exchanger.

WSHP units are connected to a water distribution loop which circulates water throughout the building to transfer heat from one area to another. This common water loop provides what is essentially a heat-recovery system. Depending on zone temperature requirements; units that are providing heating, extract heat from loop water while units providing cooling reject heat to the loop.

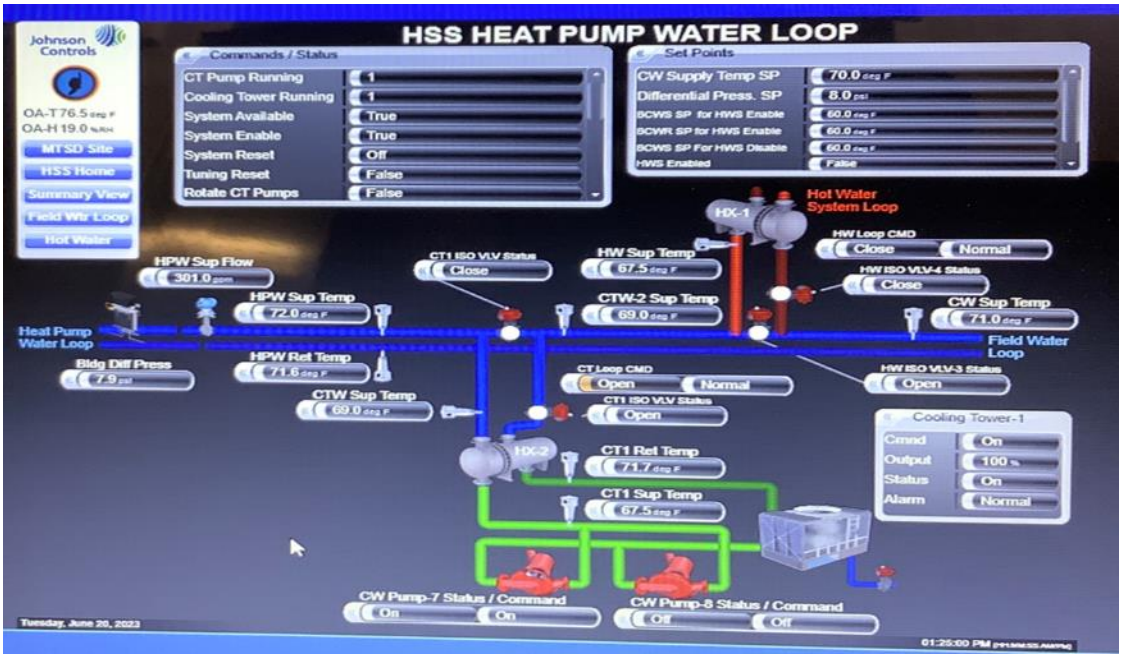
The geothermal water circulation system is comprised of two sets of base mounted pumps. There are two 40 hp variable flow pumps (P1 and P2) that supply water from the field and two, 30 hp variable flow pumps (P3 and P4) that circulate water to WSHP units. The pumps are configured in an automated lead-lag control scheme. The condenser water loop and geothermal water loop are controlled by the BMS.



EVAPCO One-Cell Cooling Tower

25 hp Condenser Water Pumps (P7 and P8)

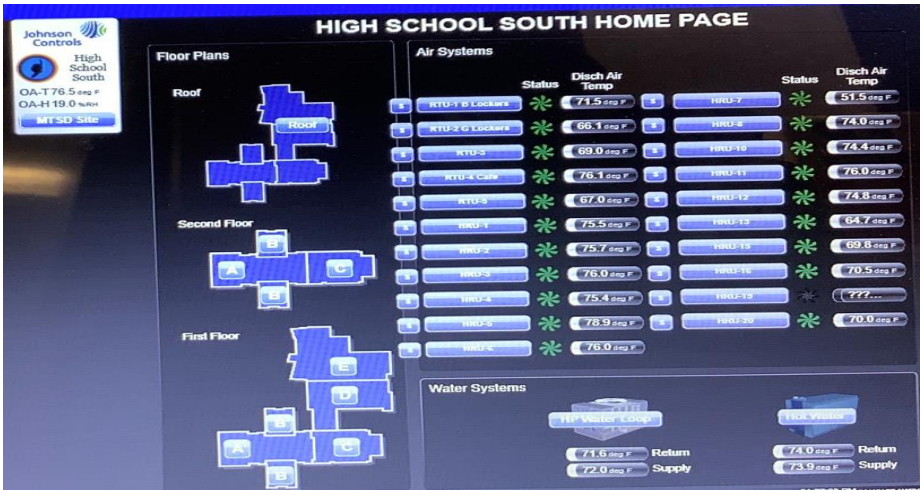
40 hp Water Circulation Pump (P2)



WSHPs Water Loop

2.9 Building Automation System (BAS)

A Johnson Metasys BAS controls the HVAC equipment, hot water loop, condenser, and geothermal water loops, WSHPs and package units. The BAS provides equipment scheduling control and monitors and controls space temperatures, supply air temperatures, and humidity.

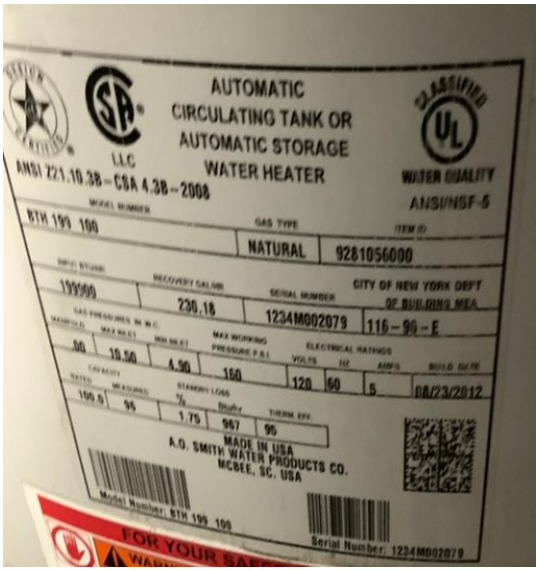


BMS Screenshot - Main Page

2.10 Domestic Hot Water

Hot water is produced by three, 100 gallon, 199.9 MBh gas-fired condensing storage water heaters with an efficiency of 95%. The water heaters are in good condition.

The domestic hot water pipes are partially insulated, and the insulation is in good condition. Pipe insulation measure has been evaluated for the uninsulated sections. A fractional horsepower circulation pump distributes water to end uses.



Condensing Water Heaters

2.11 Food Service Equipment

The facility houses a commercial kitchen and cafeteria. The cooking system consists of a mix of gas and electric equipment that is used to prepare breakfast and lunch for students. Some of the bulk prepared foods are held in two full-size electric holding cabinets. The cooking equipment is in good condition and well maintained.

The dishwasher is an ENERGY STAR® high temperature, door-type unit. It is in good condition as well.

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

Cooking Equipment

ENERGY STAR High Temperature Dishwasher

2.12 Refrigeration

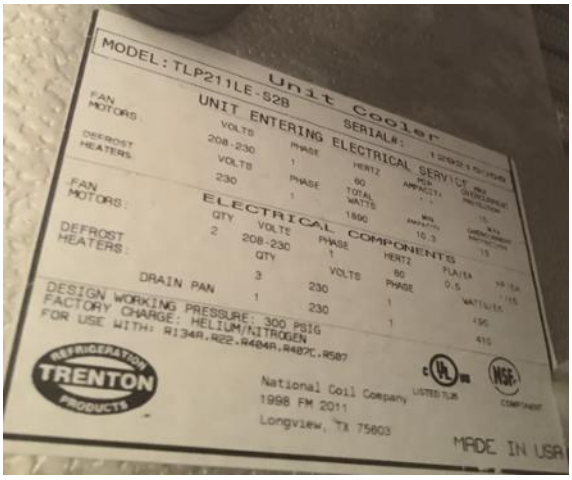
The kitchen has five stand-up refrigerators with either solid or glass doors, and a stand-up freezer with solid doors. There are two small size refrigerator chests. All equipment is either standard or high efficiency and in good condition. There are two commercial ice machines including in the kitchen and in the athletic training office.

The kitchen has three walk-in boxes that include one medium temperature freezer and two coolers. The walk-in boxes have no evaporator fan control system.

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

Solid Door Stand-Up Refrigerators

Glass Doors Stand-Up Refrigerators



Evaporators - Medium Temperature Walk-In Freezer

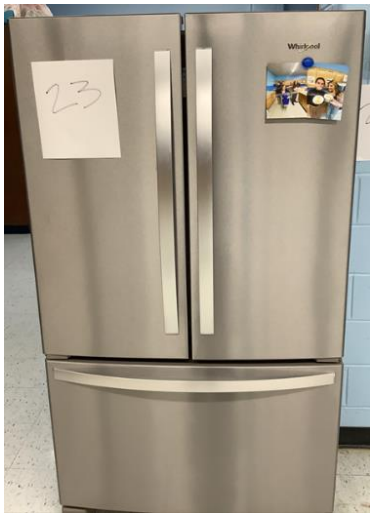
2.13 Plug Load and Vending Machines

There are 381 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 projectors. Additional loads typically associated with secondary schools include library and TV studio equipment.

There are also typical office loads such as scanner/copiers, small printers, microwaves, and mini fridges; the site also has server closets. There are fifteen residential-style refrigerators throughout the facility that are in good condition.

There are two glass fronted refrigerated beverage vending machines and a non-refrigerated vending machine in the cafeteria and refrigerated vending machine in teacher cafeteria. Vending machines are equipped with occupancy-based controls.

Scanner/Copier



Residential-Style Refrigerator

Refrigerated Vending Machine

Non-Refrigerated Vending Machine

2.14 Water-Using Systems

There are several restrooms with toilets, urinals, and sinks. Faucet flows have usage that is relatively low, except some units with faucet flows rated as 2.0 gallons per minute (gpm). Toilets are rated at 2.5 gallons per flush (gpf) and urinals are rated at 2.0 gpf.

There are restrooms for the training offices and locker rooms with showerheads that are equipped with low flow devices.

Typical Restroom Sink Flow

2.15 On-Site Generation

High School South has roof mounted photovoltaic (PV) arrays with 835 kW capacity that provided 917,399 kWh of electricity from August 2021 to July 2022. The panels cover over 90% of the flat roof area. The solar PV provides approximately 28% of the electricity used at the facility in this analysis period.

The facility has two gas fired backup generators that are used to power the servers and the building emergency lights during power outages.

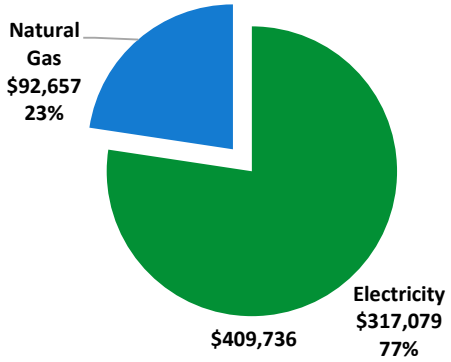
Solar PV Arrays

Inverter

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	3,237,921 kWh	$317,079
Natural Gas	56,369 Therms	$92,657
Total		**$409,736**



An energy balance identifies and quantifies energy use in your various building systems. This can highlight areas with the most potential for improvement. This energy balance was developed using calculated energy use for each of the end uses noted in the figure.

The energy auditor collects information regarding equipment operating hours, capacity, efficiency, and other operational parameters from facility staff, drawings, and on-site observations. This information is used as the inputs to calculate the existing conditions energy use for the site. The calculated energy use is then compared to the historical energy use and the initial inputs are revised, as necessary, to balance the calculated energy use to the historical energy use.

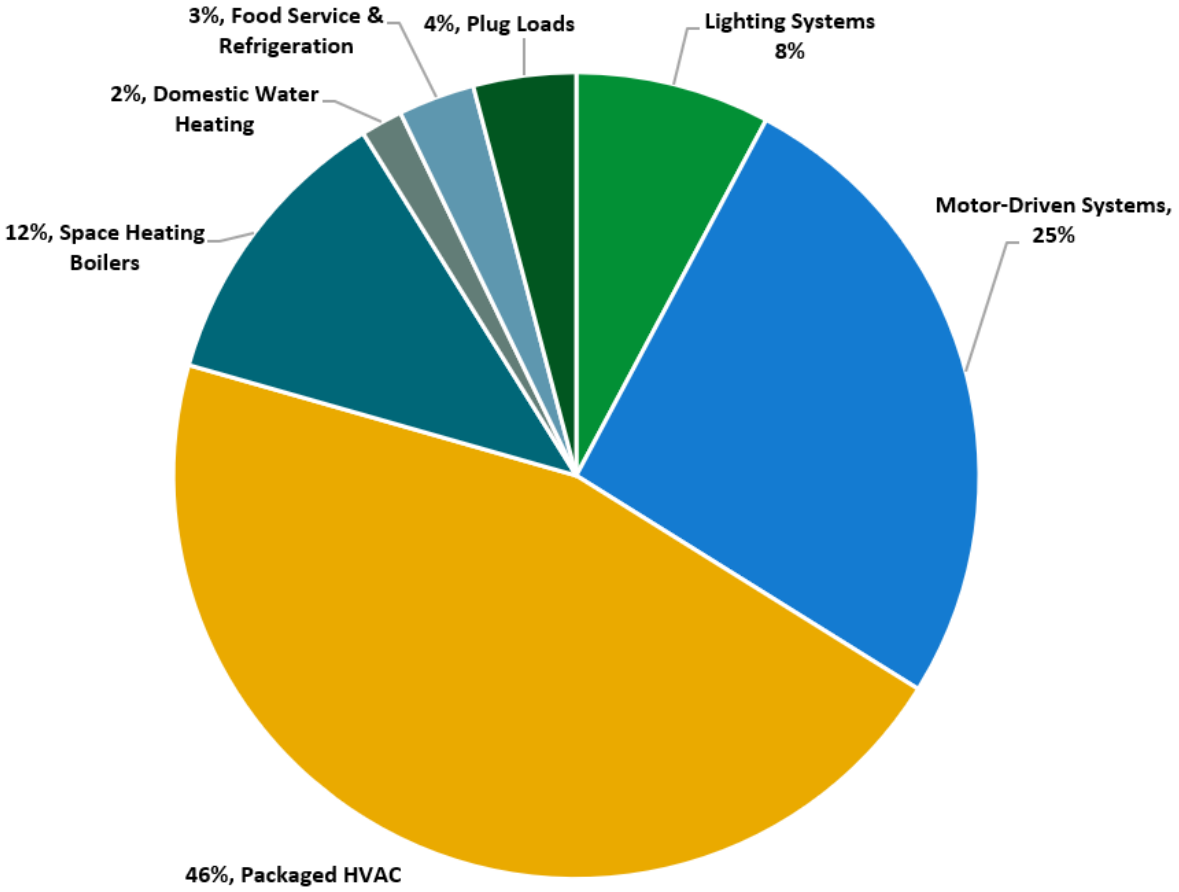
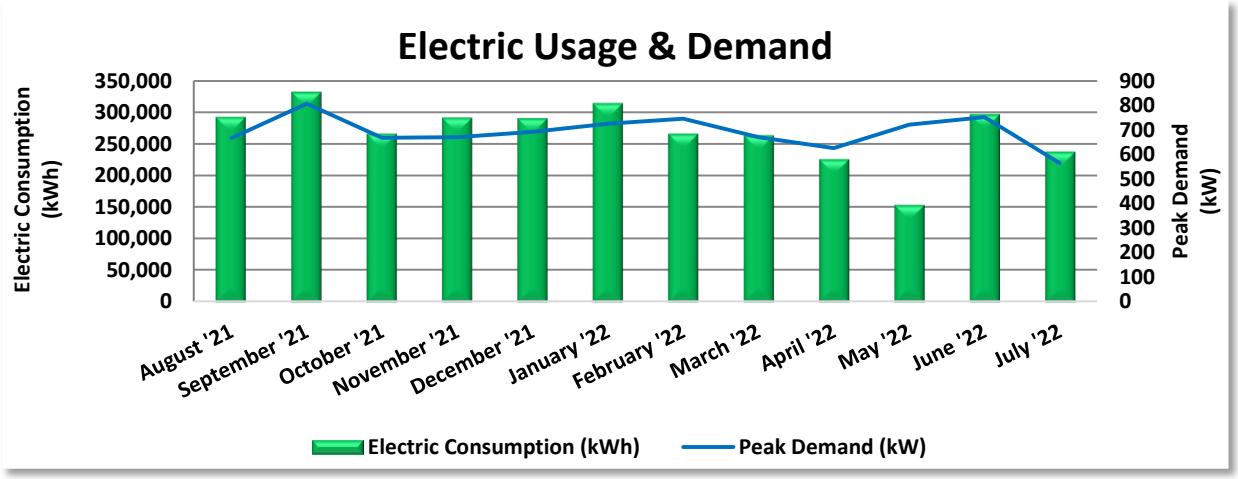


Figure 4 - Energy Balance

3.1 Electricity

JCP&L delivers electricity under rate class General Service Secondary Time of Day 3 Phase, with electric production provided by EDF, a third-party supplier.



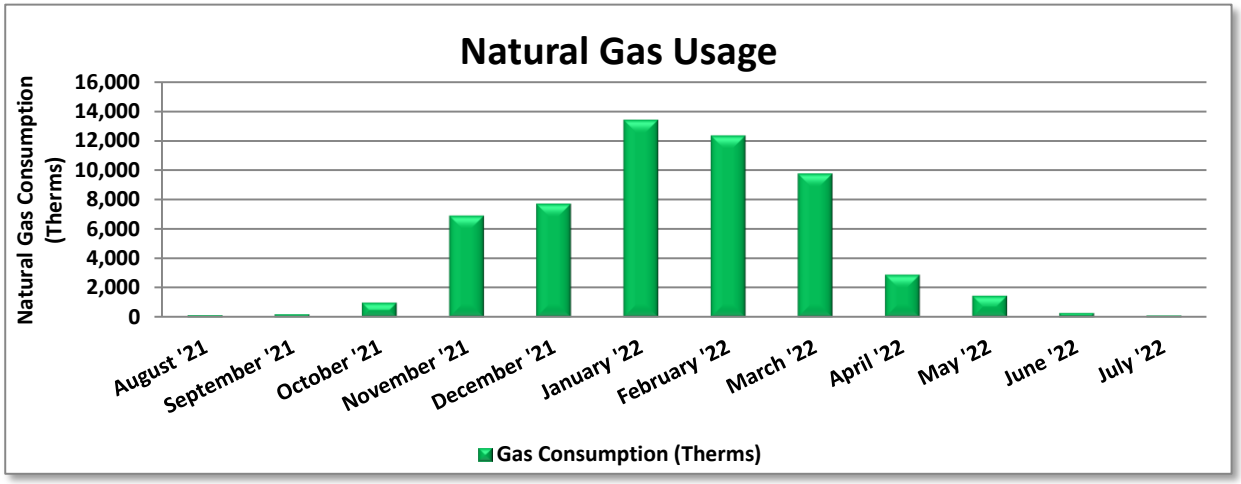
Electric Billing Data					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
9/9/21	30	292,242	667	$4,680	$26,865
10/8/21	29	332,092	808	$5,299	$31,372
11/8/21	31	266,005	667	$4,523	$26,091
12/8/21	30	291,503	671	$5,247	$29,687
1/10/22	33	290,088	692	$5,411	$30,475
2/8/22	29	314,222	725	$5,670	$32,839
3/9/22	29	266,013	746	$5,833	$27,753
4/8/22	30	263,215	671	$5,247	$25,620
5/11/22	33	225,774	626	$4,893	$21,777
6/8/22	28	153,385	721	$5,641	$15,075
7/9/22	31	296,745	752	$5,884	$28,415
8/9/22	31	237,766	564	$3,958	$20,243
Totals	**364**	**3,229,050**	**808**	**$62,286**	**$316,211**
Annual	**365**	**3,237,921**	**808**	**$62,457**	**$317,079**

Notes:

- Peak demand of 808 kW occurred in September '21.
- Average demand over the past 12 months was 693 kW.
- The average electric cost over the past 12 months was $0.098/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 all of the electricity generated on-site is used on-site.

3.2 Natural Gas

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



Gas Billing Data			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
8/24/21	29	162	$1,701
9/23/21	30	222	$1,758
10/27/21	34	1,001	$2,430
11/29/21	33	6,907	$7,755
12/23/21	24	7,734	$8,856
1/27/22	35	13,412	$21,497
2/24/22	28	12,351	$18,588
3/30/22	34	9,781	$15,242
4/26/22	27	2,901	$5,929
5/26/22	30	1,472	$4,200
6/27/22	32	299	$2,497
7/26/22	29	128	$2,202
Totals	**365**	**56,369**	**$92,657**
Annual	**365**	**56,369**	**$92,657**

Notes:

- The average gas cost for the past 12 months is $1.644/therm, which is the blended rate used throughout the analysis.
- Natural gas usage profile reflects that the main usage is during the heating season.

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	61

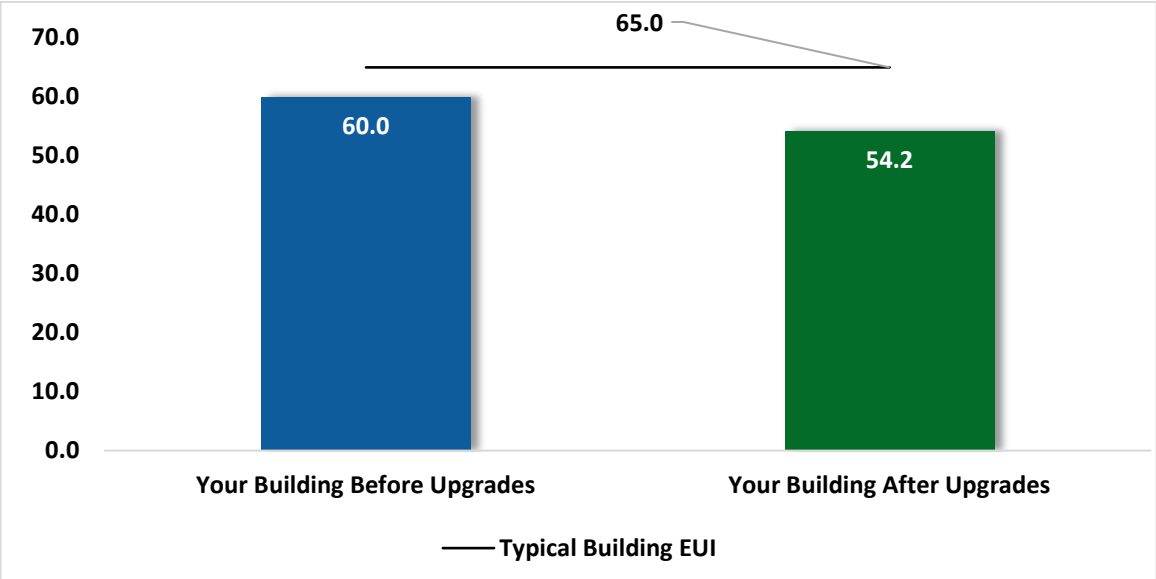


Figure 5 - Energy Use Intensity Comparison[3]

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

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

[3] Based on all evaluated ECMs

Tracking Your Energy Performance

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

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

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

For more information on ENERGY STAR and Portfolio Manager, visit their website.

4 Energy Conservation Measures

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

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

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

Financial incentives in this report are based on the previously run state rebate program SmartStart, which has been retired. Now, all investor-owned gas and electric utility companies are offering complementary energy efficiency programs directly to their customers. Some measures and proposed upgrades may be eligible for higher incentives than those shown below. The incentives in the summary tables should be used for high-level planning purposes. To verify incentives, reach out to your utility provider or visit the NJCEP website for more information.

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			**20,492**	**0.8**	**-1**	**$1,994**	**$13,705**	**$2,655**	**$11,050**	**5.5**	**20,548**
ECM 1	Install LED Fixtures	Yes	16,924	0.0	0	$1,657	$11,749	$2,400	$9,349	5.6	17,043
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	697	0.1	0	$66	$389	$36	$353	5.4	685
ECM 3	Retrofit Fixtures with LED Lamps	Yes	2,870	0.6	-1	$271	$1,568	$219	$1,349	5.0	2,820
Lighting Control Measures			**10,113**	**2.1**	**-2**	**$956**	**$16,398**	**$4,000**	**$12,398**	**13.0**	**9,936**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	9,109	1.9	-2	$861	$13,698	$1,865	$11,833	13.7	8,949
ECM 5	Install High/Low Lighting Controls	Yes	1,004	0.2	0	$95	$2,700	$2,135	$565	6.0	986
Variable Frequency Drive (VFD) Measures			**8,430**	**0.0**	**26**	**$1,254**	**$5,028**	**$900**	**$4,128**	**3.3**	**11,541**
ECM 6	Install VFDs on Kitchen Hood Fan Motors	Yes	8,430	0.0	26	$1,254	$5,028	$900	$4,128	3.3	11,541
Unitary HVAC Measures			**160,036**	**84.3**	**0**	**$15,672**	**$1,458,715**	**$47,124**	**$1,411,591**	**90.1**	**161,155**
ECM 7	Install High Efficiency Heat Pumps	No	160,036	84.3	0	$15,672	$1,458,715	$47,124	$1,411,591	90.1	161,155
HVAC System Improvements			**15,818**	**0.0**	**129**	**$3,674**	**$53,570**	**$90**	**$53,480**	**14.6**	**31,062**
ECM 8	Implement Demand Control Ventilation (DCV)	No	15,818	0.0	102	$3,231	$53,017	$0	$53,017	16.4	27,911
ECM 9	Install Pipe Insulation	Yes	0	0.0	27	$442	$552	$90	$462	1.0	3,151
Domestic Water Heating Upgrade			**0**	**0.0**	**10**	**$165**	**$86**	**$43**	**$43**	**0.3**	**1,176**
ECM 10	Install Low-Flow DHW Devices	Yes	0	0.0	10	$165	$86	$43	$43	0.3	1,176
Food Service & Refrigeration Measures			**4,708**	**0.3**	**0**	**$461**	**$8,731**	**$550**	**$8,181**	**17.7**	**4,741**
ECM 11	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	1,114	0.1	0	$109	$1,517	$200	$1,317	12.1	1,122
ECM 12	Refrigeration Controls	Yes	2,870	0.0	0	$281	$5,541	$275	$5,266	18.7	2,890
ECM 13	Replace Refrigeration Equipment	Yes	723	0.1	0	$71	$1,674	$75	$1,599	22.6	728
Custom Measures			**124,367**	**0.0**	**269**	**$16,607**	**$111,262**	**$0**	**$111,262**	**6.7**	**156,781**
ECM 14	Retro-Commissioning Study	Yes	124,367	0.0	269	$16,607	$111,262	$0	$111,262	6.7	156,781
TOTALS			**343,963**	**87.4**	**432**	**$40,782**	**$1,667,494**	**$55,362**	**$1,612,133**	**39.5**	**396,940**

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

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

Figure 6 – All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**20,492**	**0.8**	**-1**	**$1,994**	**$13,705**	**$2,655**	**$11,050**	**5.5**	**20,548**
ECM 1	Install LED Fixtures	16,924	0.0	0	$1,657	$11,749	$2,400	$9,349	5.6	17,043
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	697	0.1	0	$66	$389	$36	$353	5.4	685
ECM 3	Retrofit Fixtures with LED Lamps	2,870	0.6	-1	$271	$1,568	$219	$1,349	5.0	2,820
Lighting Control Measures		**10,113**	**2.1**	**-2**	**$956**	**$16,398**	**$4,000**	**$12,398**	**13.0**	**9,936**
ECM 4	Install Occupancy Sensor Lighting Controls	9,109	1.9	-2	$861	$13,698	$1,865	$11,833	13.7	8,949
ECM 5	Install High/Low Lighting Controls	1,004	0.2	0	$95	$2,700	$2,135	$565	6.0	986
Variable Frequency Drive (VFD) Measures		**8,430**	**0.0**	**26**	**$1,254**	**$5,028**	**$900**	**$4,128**	**3.3**	**11,541**
ECM 6	Install VFDs on Kitchen Hood Fan Motors	8,430	0.0	26	$1,254	$5,028	$900	$4,128	3.3	11,541
HVAC System Improvements		**0**	**0.0**	**27**	**$442**	**$552**	**$90**	**$462**	**1.0**	**3,151**
ECM 9	Install Pipe Insulation	0	0.0	27	$442	$552	$90	$462	1.0	3,151
Domestic Water Heating Upgrade		**0**	**0.0**	**10**	**$165**	**$86**	**$43**	**$43**	**0.3**	**1,176**
ECM 10	Install Low-Flow DHW Devices	0	0.0	10	$165	$86	$43	$43	0.3	1,176
Food Service & Refrigeration Measures		**4,708**	**0.3**	**0**	**$461**	**$8,731**	**$550**	**$8,181**	**17.7**	**4,741**
ECM 11	Refrigerator/Freezer Case Electrically Commutated Motors	1,114	0.1	0	$109	$1,517	$200	$1,317	12.1	1,122
ECM 12	Refrigeration Controls	2,870	0.0	0	$281	$5,541	$275	$5,266	18.7	2,890
ECM 13	Replace Refrigeration Equipment	723	0.1	0	$71	$1,674	$75	$1,599	22.6	728
Custom Measures		**124,367**	**0.0**	**269**	**$16,607**	**$111,262**	**$0**	**$111,262**	**6.7**	**156,781**
ECM 14	Retro-Commissioning Study	124,367	0.0	269	$16,607	$111,262	$0	$111,262	6.7	156,781
TOTALS		**168,109**	**3.1**	**330**	**$21,880**	**$155,762**	**$8,238**	**$147,524**	**6.7**	**207,874**

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

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

Figure 7 – Cost Effective ECMs

4.1 Lighting

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**20,492**	**0.8**	**-1**	**$1,994**	**$13,705**	**$2,655**	**$11,050**	**5.5**	**20,548**
ECM 1	Install LED Fixtures	16,924	0.0	0	$1,657	$11,749	$2,400	$9,349	5.6	17,043
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	697	0.1	0	$66	$389	$36	$353	5.4	685
ECM 3	Retrofit Fixtures with LED Lamps	2,870	0.6	-1	$271	$1,568	$219	$1,349	5.0	2,820

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

ECM 1: Install LED Fixtures

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

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

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

Affected Building Areas: exterior parking lot fixtures

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Retrofit fluorescent fixtures by removing the fluorescent tubes and ballasts and replacing them with LED tubes and LED drivers (if necessary), which are designed to be used in retrofitted fluorescent fixtures.

The measure uses the existing fixture housing but replaces the electric components with more efficient lighting technology, which use less power than other lighting technologies but provides equivalent lighting output. Maintenance savings may also be achieved since LED tubes last longer than fluorescent tubes and, therefore, do not need to be replaced as often.

Affected Building Areas: display lamps in the gym corridor

ECM 3: Retrofit Fixtures with LED Lamps

Replace fluorescent T8 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. Be sure to specify replacement lamps that are compatible with existing dimming controls, where applicable. In some circumstances, you may need to upgrade your dimming system for optimum performance.

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

Affected Building Areas: fluorescent T8 in classroom 101 and 283, and CFLs in the boiler room, library, and penthouses

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		**10,113**	**2.1**	**-2**	**$956**	**$16,398**	**$4,000**	**$12,398**	**13.0**	**9,936**
ECM 4	Install Occupancy Sensor Lighting Controls	9,109	1.9	-2	$861	$13,698	$1,865	$11,833	13.7	8,949
ECM 5	Install High/Low Lighting Controls	1,004	0.2	0	$95	$2,700	$2,135	$565	6.0	986

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

ECM 4: Install Occupancy Sensor Lighting Controls

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

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

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

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

Affected Building Areas: restrooms, offices, conference room, classrooms, penthouses, library, and storage rooms

ECM 5: Install High/Low Lighting Controls

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

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

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

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

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

Affected Building Areas: main lobby, entrances, and exit spaces

4.3 Variable Frequency Drives (VFD)

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**8,430**	**0.0**	**26**	**$1,254**	**$5,028**	**$900**	**$4,128**	**3.3**	**11,541**
ECM 6	Install VFDs on Kitchen Hood Fan Motors	8,430	0.0	26	$1,254	$5,028	$900	$4,128	3.3	11,541

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

ECM 6: Install VFDs on Kitchen Hood Fan Motors

Install VFDs and sensors to control the kitchen hood fan motor. 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.

4.4 Unitary HVAC

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Unitary HVAC Measures		**160,036**	**84.3**	**0**	**$15,672**	**$1,458,715**	**$47,124**	**$1,411,591**	**90.1**	**161,155**
ECM 7	Install High Efficiency Heat Pumps	160,036	84.3	0	$15,672	$1,458,715	$47,124	$1,411,591	90.1	161,155

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 unitary HVAC units are eventually replaced, consider purchasing equipment that exceeds the minimum efficiency required by building codes.

ECM 7: Install High Efficiency Heat Pumps

We evaluated replacing old and standard efficiency water source heat pumps with high efficiency water source heat pumps. A higher EER or SEER rating indicates a more efficient cooling system, and a higher HSPF rating indicates more efficient heating mode. The magnitude of energy savings for this measure depends on the relative efficiency of the older unit versus the new high efficiency unit, the average heating and cooling loads, and the estimated annual operating hours.

Affected Units: all Tetco WSHPs. Please note that replacement of the aging heat pumps was in process at the time of the site visit.

4.5 HVAC Improvements

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
HVAC System Improvements		**15,818**	**0.0**	**129**	**$3,674**	**$53,570**	**$90**	**$53,480**	**14.6**	**31,062**
ECM 8	Implement Demand Control Ventilation (DCV)	15,818	0.0	102	$3,231	$53,017	$0	$53,017	16.4	27,911
ECM 9	Install Pipe Insulation	0	0.0	27	$442	$552	$90	$462	1.0	3,151

ECM 8: Implement Demand Control Ventilation (DCV)

We evaluated demand control ventilation (DCV) control strategy to monitor the indoor air's carbon dioxide (CO_2) content to measure room occupancy in larger spaces. 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. Implementation of this measure is dependent upon having a building automation system (BAS) or other smart building control system connected to the space conditioning equipment serving the noted areas.

Affected Building Areas: gymnasiums, cafeteria, media center, locker rooms, and outside bubble

ECM 9: Install Pipe Insulation

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

Affected Systems: domestic hot water piping

4.6 Domestic Water Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**10**	**$165**	**$86**	**$43**	**$43**	**0.3**	**1,176**
ECM 10	Install Low-Flow DHW Devices	0	0.0	10	$165	$86	$43	$43	0.3	1,176

ECM 10: Install Low-Flow DHW Devices

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

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

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

4.7 Food Service & Refrigeration Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Food Service & Refrigeration Measures		**4,708**	**0.3**	**0**	**$461**	**$8,731**	**$550**	**$8,181**	**17.7**	**4,741**
ECM 11	Refrigerator/Freezer Case Electrically Commutated Motors	1,114	0.1	0	$109	$1,517	$200	$1,317	12.1	1,122
ECM 12	Refrigeration Controls	2,870	0.0	0	$281	$5,541	$275	$5,266	18.7	2,890
ECM 13	Replace Refrigeration Equipment	723	0.1	0	$71	$1,674	$75	$1,599	22.6	728

ECM 11: Refrigerator/Freezer Case Electrically Commutated Motors

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

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

ECM 12: Refrigeration Controls

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

Many walk-in coolers and freezers have continuously operating electric heaters on the doors to prevent condensation formation. This measure adds a control system feature to shut off the door heaters when the humidity level is low enough that condensation will not occur if the heaters are off. This is done by measuring the ambient humidity and temperature of the store, comparing that to the dewpoint, and using pulse width modulation to control the anti-sweat door heaters.

Defrost controllers can be used to override defrost of evaporator fans when the defrost operation is not necessary, which reduces annual energy consumption. This measure is applicable to existing evaporator fans with a traditional electric de-frost mechanism.

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

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

ECM 13: Replace Refrigeration Equipment

Replace the Habco commercial glass door stand-up refrigerator with new ENERGY STAR rated equipment. The energy savings associated with this measure come from reduced energy usage, due to more efficient technology, and reduced run times.

4.8 Custom Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Custom Measures		**124,367**	**0.0**	**269**	**$16,607**	**$111,262**	**$0**	**$111,262**	**6.7**	**156,781**
ECM 14	Retro-Commissioning Study	124,367	0.0	269	$16,607	$111,262	$0	$111,262	6.7	156,781

ECM 14: 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.

A high-level evaluation of potential savings and costs is provided for demonstration purposes only. It is a screening evaluation for the potential in HVAC control improvements. Based on industry standards and previous project experience, the potential energy savings may be up to 15% of existing HVAC energy use. We estimate the cost of retro-commissioning studies and control improvements of $0.40 per square foot. Actual savings and costs will need to be outlined by the specific contractor engaged to perform the study. For the purposes of this report, we have conservatively estimated savings to be 5.0% of the HVAC energy consumption baseline.

5 Energy Efficient Best Practices

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

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

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

Energy Tracking with ENERGY STAR Portfolio Manager

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

Lighting Maintenance

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

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

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.

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

Motor Maintenance

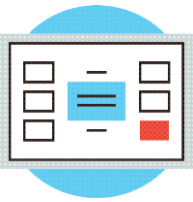
Motors have many moving parts. As these parts degrade over time, the efficiency of the motor is reduced. Routine maintenance prevents damage to motor components. Routine maintenance should include cleaning surfaces and ventilation openings on motors to prevent overheating, lubricating moving parts to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

Destratification Fans

For areas with high ceilings, destratification fans balance the air temperature from floor to ceiling. They help reduce the recovery time needed to warm the space after nightly temperature setbacks, and they will increase occupants' the comfort level.

Areas with high ceilings require the heating system to heat a larger volume of space than that which is occupied. As the warm air rises, the warmest space is at the ceiling level, rather than floor level. Higher temperatures at the ceiling accelerate heat loss through the roof, which requires additional energy consumption by the heating equipment to compensate for this accelerated heat transfer.

Thermostat Schedules and Temperature Resets



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

AC System Evaporator/Condenser Coil Cleaning

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

HVAC Filter Cleaning and Replacement

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

Boiler Maintenance

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

Water Heater Maintenance

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

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

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

Refrigeration Equipment Maintenance

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

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

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

Water Conservation

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

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

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

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

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

Procurement Strategies

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

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

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

6 On-site Generation

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

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

6.1 Solar Photovoltaic

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

A preliminary screening based on the facility's electric demand, size and location of free area, and shading elements shows that the facility has no potential for installing a PV array.

This facility does not appear to meet the minimum criteria for an additional cost-effective solar PV installation. To be cost-effective, a solar PV array needs certain minimum criteria, such as sufficient and sustained electric demand and sufficient flat or south-facing rooftop or other unshaded space on which to place the PV panels.

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.

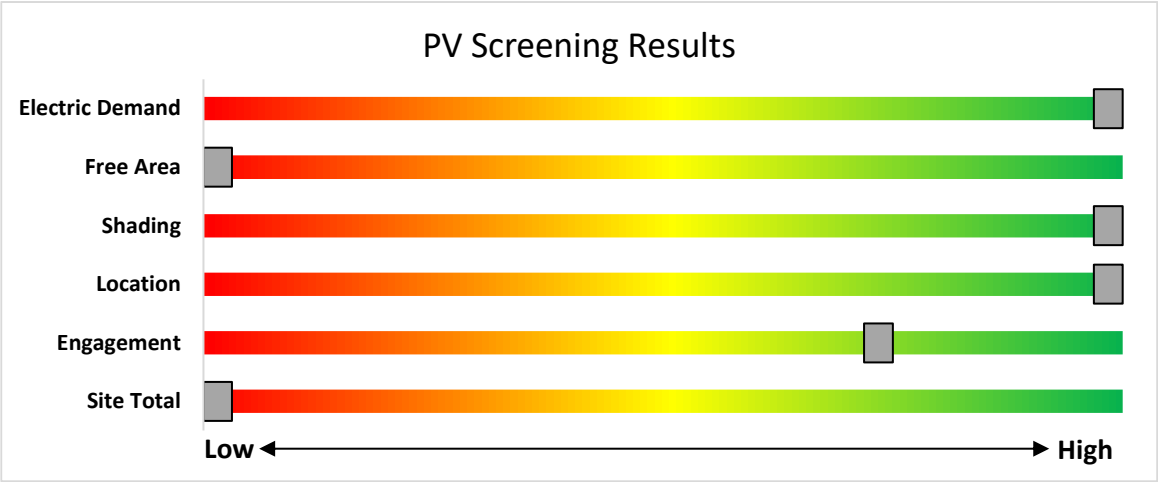


Figure 8 - Photovoltaic Screening

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 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.

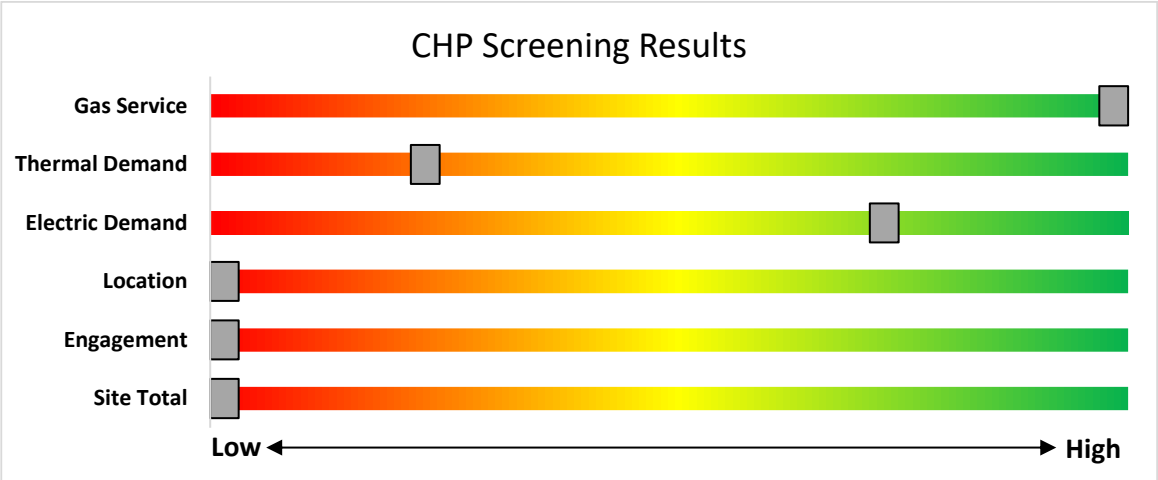


Figure 9 - Combined Heat and Power Screening

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 Electric Vehicles (EV)

All electric vehicles (EVs) have an electric motor instead of an internal combustion engine. EVs function by plugging into a charge point, taking electricity from the grid, and then storing it in rechargeable batteries. Although electricity production may contribute to air pollution, the U.S. EPA categorizes all-electric vehicles as zero-emission vehicles because they produce no direct exhaust or tailpipe emissions.

EVs are typically more expensive than similar conventional and hybrid vehicles, although some cost can be recovered through fuel savings, federal tax credit, or state incentives.

7.1 Electric Vehicle Charging

EV charging stations provide a means for electric vehicle operators to recharge their batteries at a facility. While many EV drivers charge at home, others do not have access to regular home charging, and the ability to charge at work or in public locations is critical to making EVs practical for more drivers. Charging can also be used for electric fleet vehicles, which can reduce fuel and maintenance costs for fleets that replace gas or diesel vehicles with EVs.

EV charging comes in three main types. For this assessment, the screening considers addition of Level 2 charging, which is most common at workplaces and other public locations. Depending on the site type and usage, other levels of charging power may be more appropriate.

The preliminary assessment of EV charging at the facility shows that there is medium potential for adding EV chargers to the facility's parking, based on potential costs of installation and other site factors.

The primary costs associated with installing EV charging are the charger hardware and the cost to extend power from the facility to parking spaces. This may include upgrades to electric panels to serve increased loads.

The type and size of the parking area impact the costs and feasibility of adding EV charging. Parking structure installations can be less costly than surface lot installations as power may be readily available, and equipment and wiring can be surface mounted. Parking lot installations often require trenching through concrete or asphalt surface. Large parking areas provide greater flexibility in charger siting than smaller lots.

The location and capacity of facility electric panels also impact charger installation costs. A Level 2 charger generally requires a dedicated 208-240V, 40 Amp circuit. The electric panel nearest the planned installation may not have available capacity and may need to be upgraded to serve new EV charging loads. Alternatively, chargers could be powered from a more distant panel. The distance from the panel to the location of charging stations ties directly to costs, as conduits, cables, and potential trenching costs all increase on a per-foot basis. The more charging stations planned, the more likely it is that additional electrical capacity will be needed.

Other factors to consider when planning for EV charging at a facility include who the intended users are, how long they park vehicles at the site, and whether they will need to pay for the electricity they use.

The graphic below displays the results of the EV charging assessment conducted as part of this audit. The position of each slider indicates the impact each factor has on the feasibility of installing EV charging at the site.

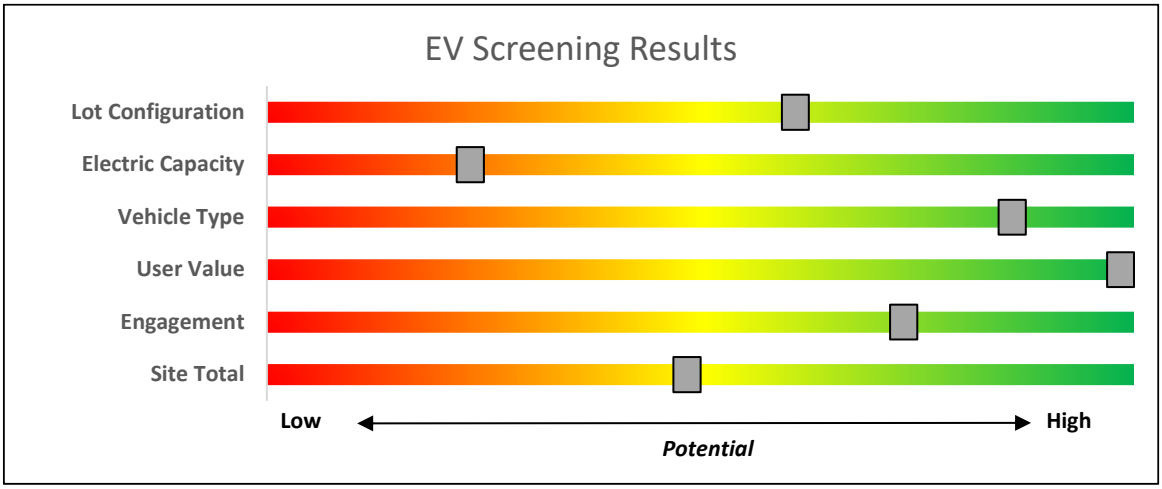


Figure 10 – EV Charger Screening

Electric Vehicle Programs Available

New Jersey is leading the way on electric vehicle (EV) adoption on the East Coast. There are several programs designed to encourage EV adoption in New Jersey, which is crucial to reaching a 100% clean energy future.

NJCEP offers a variety of EV programs for vehicles, charging stations, and fleets. Certain EV charging stations that receive electric utility service from Atlantic City Electric Company (ACE) or Public Service Electric & Gas Company (PSE&G), may be eligible for additional electric vehicle charging incentives directly from the utility. Projects may be eligible for both the incentives offered by this BPU program and incentives offered by ACE or PSE&G, up to 90% of the combined charger purchase and installation costs. Please check ACE or PSE&G program eligibility requirements before purchasing EV charging equipment, as additional conditions on types of eligible chargers may apply for utility incentives.

Both Jersey Central Power & Light (JCP&L) and Rockland Electric (RECO) have filed proposals for EV charging programs. BPU staff is currently reviewing those proposals.

For more information and to keep up to date on all EV programs please visit https://www.njcleanenergy.com/commercial-industrial/programs/electric-vehicle-programs

8 Project Funding and Incentives

Ready to improve your building's performance? New Jersey's Clean Energy Programs and Utility Energy Efficiency Programs can help. Pick the program that works best for you. This section provides an overview of currently available incentive programs in.

8.1 Utility Energy Efficiency Programs

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

Prescriptive and Custom

The Prescriptive and Custom rebate program through your utility provider offers incentives for installing prescriptive and custom energy efficiency measures at your facility. This program provides an effective mechanism for securing incentives for energy efficiency measures installed individually or as part of a package of energy upgrades. This program serves most common equipment types and sizes.

Equipment Examples

Lighting
Lighting Controls
HVAC Equipment
Refrigeration
Gas Heating
Gas Cooling
Commercial Kitchen Equipment
Food Service Equipment
Variable Frequency Drives
Electronically Commutate Motors
Variable Frequency Drives
Plug Loads Controls
Washers and Dryers
Agricultural
Water Heating

The Prescriptive program provides fixed incentives for specific energy efficiency measures. Prescriptive incentives vary by equipment type. The Custom program provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentives.

Direct Install

Direct Install is a turnkey program available to existing small to medium-sized facilities with an average peak electric demand that does not exceed 200 kW or less over the recent 12-month period. You work directly with a pre-approved contractor who will perform a free energy assessment at your facility, identify specific eligible measures, and provide a clear scope of work for installation of selected measures. Energy efficiency measures may include lighting and lighting controls, refrigeration, HVAC, motors, variable speed drives, and controls

Incentives

The program pays up to 70% of the total installed cost of eligible measures.

How to Participate

To participate in Direct Install, you will work with a participating contractor. The contractor will be paid the measure incentives directly by the program, which will pass on to you in the form of reduced material and implementation costs. This means up to 70% of eligible costs are covered by the Direct Install program, subject to program rules and eligibility, while the remaining percent of the cost is paid to the contractor by the customer.

Engineered Solutions

The Engineered Solutions Program provides tailored energy-efficiency assistance and services to municipalities, universities, schools, hospitals and healthcare facilities (MUSH), non-profit entities, and multifamily buildings. Customers receive expert guided services, including investment-grade energy auditing, engineering design, installation assistance, construction administration, commissioning, and measurement and verification (M&V) services to support the implementation of cost-effective and comprehensive efficiency projects. Engineered Solutions is generally a good option for medium to large sized facilities with a peak demand over 200 kW looking to implement as many measures as possible under a single project to achieve deep energy savings. Engineered Solutions has an added benefit of addressing measures that may not qualify for other programs. Many facilities pursuing an Energy Savings Improvement Program loan also use this program. Incentives for this program are based on project scope and energy savings achieved.

For more information on any of these programs, contact your local utility provider or visit https://www.njcleanenergy.com/transition.

8.2 New Jersey's Clean Energy Programs

Save money while saving the planet! New Jersey's Clean Energy Program is a statewide program that offers incentives, programs, and services that benefit New Jersey residents, businesses, educational, non-profit, and government entities to help them save energy, money, and the environment.

Large Energy Users

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

Incentives

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

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

How to Participate

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

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

Combined Heat and Power

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

Incentives

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

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

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

How to Participate

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

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.

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 (dc). The program is currently under development. 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.

Energy Savings Improvement Program

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

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

How to Participate

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

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

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

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

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

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

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

9 Project Development

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

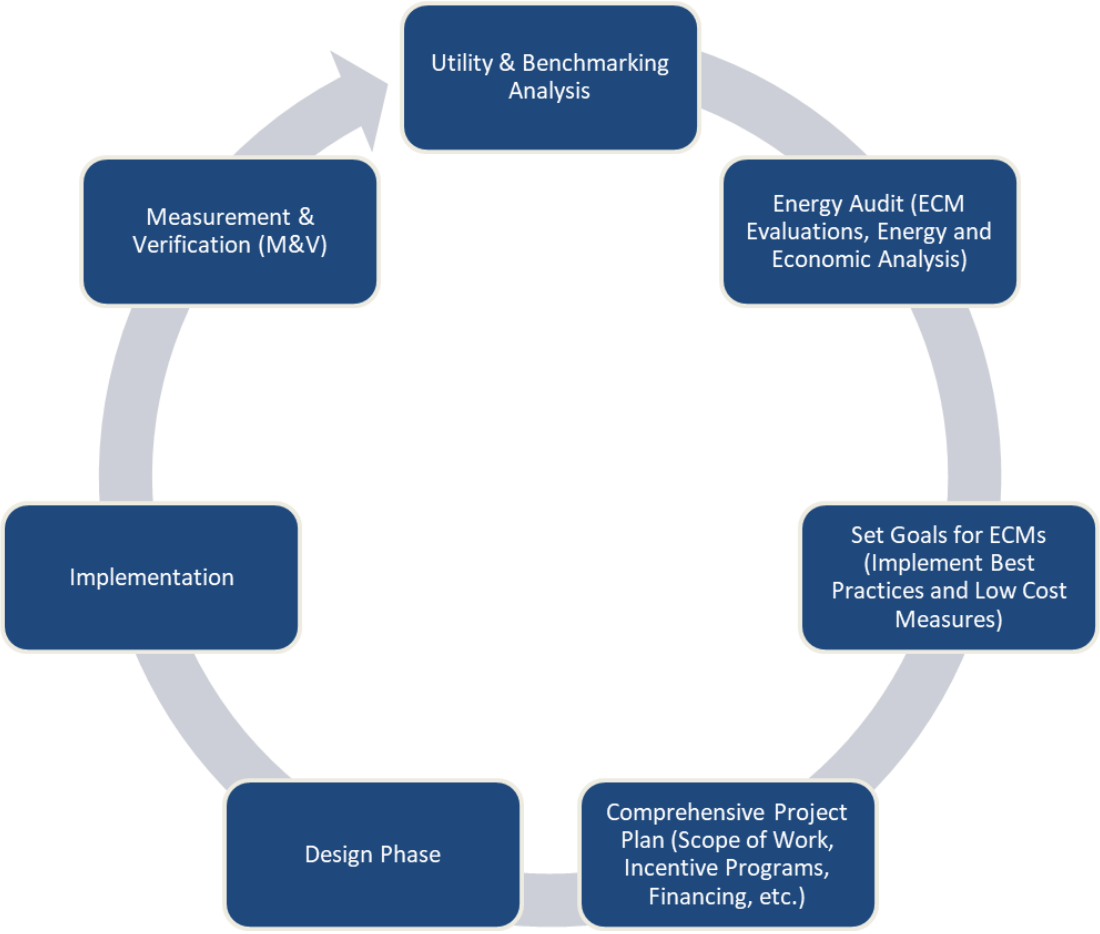


Figure 11 – Project Development Cycle

10 Energy Purchasing and Procurement Strategies

10.1 Retail Electric Supply Options

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

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

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

10.2 Retail Natural Gas Supply Options

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

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

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

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

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

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

APPENDIX A: EQUIPMENT INVENTORY & RECOMMENDATIONS

Lighting Inventory & Recommendations

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Storage Boys Locker Room	6	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200	4	None	Yes	6	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,208	0.0	95	0	$9	$116	$20	10.7
AP Office	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
AP Office	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Athletic Trainer Office	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
Athletic Trainer Office	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
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	27	LED - Fixtures: High-Bay	Wall Switch	S	45	3,200	4	None	Yes	27	LED - Fixtures: High-Bay	Occupancy Sensor	45	2,208	0.3	1,326	0	$125	$540	$70	3.8
Baseball Locker Room	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	S	58	2,823		None	No	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,823	0.0	0	0	$0	$0	$0	0.0
Boiler Room	3	Compact Fluorescent: (1) 42W A23 Screw-In Lamp	Wall Switch	S	42	3,200	3	Relamp	No	3	LED Lamps: LED Lamps	Wall Switch	30	3,200	0.0	127	0	$12	$52	$3	4.1
Boiler Room	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Boiler Room	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200		None	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,200	0.0	0	0	$0	$0	$0	0.0
Boiler Room	42	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200		None	No	42	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,200	0.0	0	0	$0	$0	$0	0.0
Book Storage	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Book Storage 230	15	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200	4	None	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,208	0.1	475	0	$45	$270	$35	5.2
Boys Gymnasium - Room 114	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
Boys Gymnasium - Room 114	42	LED - Fixtures: High-Bay	Occupancy Sensor	S	220	2,823		None	No	42	LED - Fixtures: High-Bay	Occupancy Sensor	220	2,823	0.0	0	0	$0	$0	$0	0.0
Boys Locker Room	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
Boys Locker Room	6	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	S	10	2,823		None	No	6	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	2,823	0.0	0	0	$0	$0	$0	0.0
Boys Locker Room	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Boys Locker Room	3	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	S	26	2,823		None	No	3	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	2,823	0.0	0	0	$0	$0	$0	0.0
Boys Locker Room	18	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	S	34	2,823		None	No	18	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,823	0.0	0	0	$0	$0	$0	0.0
Break Room Main Office	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Cafeteria	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
Cafeteria	46	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	S	72	2,823		None	No	46	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	72	2,823	0.0	0	0	$0	$0	$0	0.0
Cafeteria	9	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	2,823		None	No	9	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,823	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Cafeteria	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	3,200	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,208	0.0	150	0	$14	$181	$32	10.5
Cafeteria Teachers	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 100	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	S	58	2,823		None	No	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 101	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Classroom 101	18	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	S	58	2,823		None	No	18	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 101	9	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	2,823	3	Relamp	No	9	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,823	0.2	811	0	$77	$652	$90	7.3
Classroom 102	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	S	58	2,823		None	No	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 103	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	S	58	2,823		None	No	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 104	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	S	58	2,823		None	No	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 122	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 123	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 124	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 125	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 126	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 127	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 128	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 129	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 130	17	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	17	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 131	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 132	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 134	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 135	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 136	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 137	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 138	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 139	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 140	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 141	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 142	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 143	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 144	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 145	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 146	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 147	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 148	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 149	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 150	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 151	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 152	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 153	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 154	23	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	23	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 155	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 156	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 157	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 158	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 159	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 160	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 161	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 162	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 163	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 164	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 165	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 167	30	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	30	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 168	37	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	37	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 169	11	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	11	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 170	9	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	9	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 172	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 173	18	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	18	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 173	25	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	25	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 176	22	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	22	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 177	30	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	30	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 178	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Classroom 178	16	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	16	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 178	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	S	44	2,823		None	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 201	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 203	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 204	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 205	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 206	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 208	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 209	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 210	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 211	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 212	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 213	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 214	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 215	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 216	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 217	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 218	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 219	17	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	17	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 220	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 221	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 223	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 226	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 228	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 229	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 231	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 232	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 233	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 234	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 235	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 236	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 237	19	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	19	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 238	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 239	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 240	22	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	22	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 243	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 244	21	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	21	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 245	22	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	22	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 247	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 248	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 249	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 252	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 253	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 253	5	Linear Fluorescent - T8: 3' T8 (25W) - 1L	Wall Switch	S	27	3,200	3, 4	Relamp	Yes	5	LED - Linear Tubes: (1) 3' Lamp	Occupancy Sensor	11	2,208	0.1	348	0	$33	$361	$60	9.2
Classroom 254	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Classroom 255	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Closet	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Closet	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Closet	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Closet	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Closet	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Closet	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Closet	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	2,823		None	No	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,823	0.0	0	0	$0	$0	$0	0.0
Closet	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Closet	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Closet	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Closet	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Closet	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Closet Nurse Office	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	3,200		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	3,200	0.0	0	0	$0	$0	$0	0.0
Closet Nurse Office	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	3,200		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	3,200	0.0	0	0	$0	$0	$0	0.0
Closet Nurse Office	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	3,200		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	3,200	0.0	0	0	$0	$0	$0	0.0
Conference Room 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
Conference Room Library	23	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	23	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Corridor 100 Wing	5	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor 100 Wing	38	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	2,823		None	No	38	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,823	0.0	0	0	$0	$0	$0	0.0
Corridor 100 Wing	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	None	S	32	3,200	3	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	None	15	3,200	0.0	123	0	$12	$37	$10	2.3
Corridor 2nd Floor High 200 Pod	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 2nd Floor High 200 Pod	13	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	2,823		None	No	13	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,823	0.0	0	0	$0	$0	$0	0.0
Corridor 2nd Floor Low 200 Pod	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor 2nd Floor Low 200 Pod	13	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	2,823		None	No	13	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,823	0.0	0	0	$0	$0	$0	0.0
Corridor 2nd Floor Section	12	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	12	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor 2nd Floor Section	120	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	2,823		None	No	120	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,823	0.0	0	0	$0	$0	$0	0.0
Corridor 2nd Floor Section 201-215	5	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor 2nd Floor Section 201-215	67	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	2,823		None	No	67	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,823	0.0	0	0	$0	$0	$0	0.0
Corridor 2nd Floor Section 216-235	5	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor 2nd Floor Section 216-235	59	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	2,823		None	No	59	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,823	0.0	0	0	$0	$0	$0	0.0
Corridor Cafeteria Section	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor Cafeteria Section	3	LED Lamps: (2) 15W G25 Screw-In Lamps	Occupancy Sensor	S	30	2,823		None	No	3	LED Lamps: (2) 15W G25 Screw-In Lamps	Occupancy Sensor	30	2,823	0.0	0	0	$0	$0	$0	0.0
Corridor Cafeteria Section	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Corridor Cafeteria Section	32	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	2,823		None	No	32	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,823	0.0	0	0	$0	$0	$0	0.0
Corridor Cooking Section	5	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor Cooking Section	5	LED - Fixtures: Architectural Flood/Spot Luminaire	None	S	11	3,200		None	No	5	LED - Fixtures: Architectural Flood/Spot Luminaire	None	11	3,200	0.0	0	0	$0	$0	$0	0.0
Corridor Cooking Section	2	LED Lamps: (2) 15W G25 Screw-In Lamps	Occupancy Sensor	S	30	2,823		None	No	2	LED Lamps: (2) 15W G25 Screw-In Lamps	Occupancy Sensor	30	2,823	0.0	0	0	$0	$0	$0	0.0
Corridor Cooking Section	35	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	2,823		None	No	35	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,823	0.0	0	0	$0	$0	$0	0.0
Corridor Gym Section	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor Gym Section	22	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	22	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Corridor Gym Section	6	Linear Fluorescent - T12: 2' T12 (20W) - 2L	None	S	50	3,200	2	Relamp & Reballast	No	6	LED - Linear Tubes: (2) 2' Lamps	None	17	3,200	0.1	697	0	$66	$389	$36	5.4
Corridor Lower Section North	9	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	9	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Entrance/Exit 33	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
Entrance/Exit 33	2	LED Lamps: (2) 15W G25 Screw-In Lamps	Wall Switch	S	30	3,200		None	No	2	LED Lamps: (2) 15W G25 Screw-In Lamps	Wall Switch	30	3,200	0.0	0	0	$0	$0	$0	0.0
Entrance/Exit 35	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
Entrance/Exit 35	6	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,200	5	None	Yes	6	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	2,208	0.0	111	0	$11	$225	$210	1.4
Entrance/Exit 36	2	Compact Fluorescent: (2) 13W G25 Screw-In Lamps	Wall Switch	S	26	3,200	3	Relamp	No	2	LED Lamps: G25 Lamps	Wall Switch	18	3,200	0.0	56	0	$5	$101	$8	17.5
Entrance/Exit 7	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,200		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,200	0.0	0	0	$0	$0	$0	0.0
Exterior Field Pole Light	36	Metal Halide: (1) 1500W Lamp	Breaker Panel		1,610	150		None	No	36	Metal Halide: (1) 1500W Lamp	Breaker Panel	1,610	150	0.0	0	0	$0	$0	$0	0.0
Exterior Parking Lot pole	24	High-Pressure Sodium: (1) 200W Lamp	Photocell		250	4,380	1	Fixture Replacement	No	24	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Photocell	89	4,380	0.0	16,924	0	$1,657	$11,749	$2,400	5.6
Exterior Recessed	21	LED - Fixtures: Downlight Recessed	Photocell		13	4,380		None	No	21	LED - Fixtures: Downlight Recessed	Photocell	13	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Wall Pack	21	LED - Fixtures: Wall Pack	Timeclock		21	4,380		None	No	21	LED - Fixtures: Wall Pack	Timeclock	21	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Wall Pack	1	LED - Fixtures: Wall Pack	Photocell		55	4,380		None	No	1	LED - Fixtures: Wall Pack	Photocell	55	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Wall Pack	22	LED - Fixtures: High-Bay	Photocell		45	4,380		None	No	22	LED - Fixtures: High-Bay	Photocell	45	4,380	0.0	0	0	$0	$0	$0	0.0
Fire Sprinkler	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Foyer - Boys Locker 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
Foyer - Boys Locker Room	5	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	S	34	2,823		None	No	5	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,823	0.0	0	0	$0	$0	$0	0.0
Foyer -Restroom	1	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	S	34	2,823		None	No	1	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,823	0.0	0	0	$0	$0	$0	0.0
Foyer -Restroom	1	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	S	34	2,823		None	No	1	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,823	0.0	0	0	$0	$0	$0	0.0
Girls Gymnasium - Room 112	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
Girls Gymnasium - Room 112	36	LED - Fixtures: High-Bay	Occupancy Sensor	S	220	2,823		None	No	36	LED - Fixtures: High-Bay	Occupancy Sensor	220	2,823	0.0	0	0	$0	$0	$0	0.0
Girls Locker Room	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
Girls Locker Room	6	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	S	10	2,823		None	No	6	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	2,823	0.0	0	0	$0	$0	$0	0.0
Girls Locker Room	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Girls Locker Room	20	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	S	26	2,823		None	No	20	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	2,823	0.0	0	0	$0	$0	$0	0.0
Guidance	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
Guidance	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Guidance	5	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	2,823		None	No	5	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,823	0.0	0	0	$0	$0	$0	0.0
Gymnasium - Wrestling	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Gymnasium - Wrestling	12	LED - Fixtures: High-Bay	Occupancy Sensor	S	220	2,823		None	No	12	LED - Fixtures: High-Bay	Occupancy Sensor	220	2,823	0.0	0	0	$0	$0	$0	0.0
IT Office 224	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200	4	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,208	0.0	127	0	$12	$270	$35	19.6
IT Room	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200	4	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,208	0.0	127	0	$12	$270	$35	19.6
Janitorial	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,200	0.0	0	0	$0	$0	$0	0.0
Janitorial	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,200	0.0	0	0	$0	$0	$0	0.0
Janitorial	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,200	0.0	0	0	$0	$0	$0	0.0
Janitorial	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,200	0.0	0	0	$0	$0	$0	0.0
Janitorial	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,200	0.0	0	0	$0	$0	$0	0.0
Janitorial	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,200	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,200	0.0	0	0	$0	$0	$0	0.0
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	51	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200	4	None	Yes	51	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,208	0.2	807	0	$76	$1,080	$140	12.3
Kitchen Office	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200	4	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,208	0.0	63	0	$6	$116	$20	16.1
Kitchen Locker Room	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200		None	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,200	0.0	0	0	$0	$0	$0	0.0
Kitchen Restroom	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,200		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,200	0.0	0	0	$0	$0	$0	0.0
Kitchen Storage	10	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200	4	None	Yes	10	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,208	0.0	158	0	$15	$270	$35	15.7
Kitchen Storage 2	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200		None	No	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,200	0.0	0	0	$0	$0	$0	0.0
Library	5	Compact Fluorescent: (1) 32W G25 Screw-In Lamp	Occupancy Sensor	S	32	2,823	3	Relamp	No	5	LED Lamps: G25 Lamps	Occupancy Sensor	9	2,823	0.1	357	0	$34	$126	$10	3.4
Library	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
Library	135	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	135	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Library Break Room	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	2,823		None	No	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,823	0.0	0	0	$0	$0	$0	0.0
Library Bridge	12	LED - Linear Tubes: (2) 4' Lamps	None	S	29	3,200		None	No	12	LED - Linear Tubes: (2) 4' Lamps	None	29	3,200	0.0	0	0	$0	$0	$0	0.0
Library Bridge	8	LED - Linear Tubes: (2) 2' Lamps	None	S	17	3,200		None	No	8	LED - Linear Tubes: (2) 2' Lamps	None	17	3,200	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Library Meeting Room	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	2,823		None	No	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,823	0.0	0	0	$0	$0	$0	0.0
Main Corridor	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 Corridor	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Main Corridor	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Main Corridor	22	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	2,823		None	No	22	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,823	0.0	0	0	$0	$0	$0	0.0
Main Lobby	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
Main Lobby	20	LED - Fixtures: Architectural Flood/Spot Luminaire	None	S	11	3,200	5	None	Yes	20	LED - Fixtures: Architectural Flood/Spot Luminaire	High/Low Control	11	2,208	0.0	240	0	$23	$900	$700	8.8
Main Lobby	12	LED - Fixtures: Architectural Flood/Spot Luminaire	None	S	13	3,200	5	None	Yes	12	LED - Fixtures: Architectural Flood/Spot Luminaire	High/Low Control	13	2,208	0.0	170	0	$16	$450	$420	1.9
Main Lobby	16	LED - Linear Tubes: (1) 4' Lamp	None	S	15	3,200	5	None	Yes	16	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	2,208	0.1	253	0	$24	$675	$560	4.8
Main Lobby	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Main Office	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
Main Office	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Main Office	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	2,823		None	No	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,823	0.0	0	0	$0	$0	$0	0.0
Main Office Conference Room	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Nurse Office	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,200	4	None	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,208	0.0	127	0	$12	$116	$20	8.0
Nurse Office Main Area	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Office	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	S	58	2,823		None	No	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,823	0.0	0	0	$0	$0	$0	0.0
Office	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,200		None	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,200	0.0	0	0	$0	$0	$0	0.0
Office	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Office Classroom 127	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	2,823		None	No	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,823	0.0	0	0	$0	$0	$0	0.0
Office Classroom 160	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	2,823		None	No	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,823	0.0	0	0	$0	$0	$0	0.0
Office CST	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Office CST	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Office CST	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Office CST	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Office CST	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Office CST	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Office CST	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Office Guidance	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Office Guidance	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Office Guidance	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Office Guidance	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Office Guidance	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Office Guidance	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Office Guidance	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Office Guidance	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Office Guidance	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Office Navy	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200	4	None	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,208	0.0	95	0	$9	$116	$20	10.7
Penthouse	3	Compact Fluorescent: (1) 42W A19 Screw-In Lamp	Wall Switch	S	42	3,200	3, 4	Relamp	Yes	3	LED Lamps: A19 Lamps	Occupancy Sensor	30	2,208	0.0	225	0	$21	$322	$38	13.3
Penthouse 2	4	Compact Fluorescent: (1) 42W A19 Screw-In Lamp	Wall Switch	S	42	3,200	3, 4	Relamp	Yes	4	LED Lamps: A19 Lamps	Occupancy Sensor	30	2,208	0.1	300	0	$28	$339	$39	10.6
Penthouse 3	4	Compact Fluorescent: (1) 42W A19 Screw-In Lamp	Wall Switch	S	42	3,200	3, 4	Relamp	Yes	4	LED Lamps: A19 Lamps	Occupancy Sensor	30	2,208	0.1	300	0	$28	$339	$39	10.6
Prep Room 237A	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Prep Room 241	1	LED Lamps: (2) 15W G25 Screw-In Lamps	Occupancy Sensor	S	30	2,823		None	No	1	LED Lamps: (2) 15W G25 Screw-In Lamps	Occupancy Sensor	30	2,823	0.0	0	0	$0	$0	$0	0.0
Prep Room 241	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Prep Room 242	6	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	6	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Prep Room 246	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Prep Room 250	1	LED Lamps: (2) 15W G25 Screw-In Lamps	Occupancy Sensor	S	30	2,823		None	No	1	LED Lamps: (2) 15W G25 Screw-In Lamps	Occupancy Sensor	30	2,823	0.0	0	0	$0	$0	$0	0.0
Prep Room 250	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Prep Room 254A	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Principal Office	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0

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Pump House	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,200	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,208	0.1	443	0	$42	$380	$65	7.5
Restroom	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Restroom	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Restroom	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,200	0.0	0	0	$0	$0	$0	0.0
Restroom	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,200		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,200	0.0	0	0	$0	$0	$0	0.0
Restroom	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Restroom	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Restroom - Boys	3	LED Lamps: (2) 15W G25 Screw-In Lamps	Wall Switch	S	30	3,200	4	None	Yes	3	LED Lamps: (2) 15W G25 Screw-In Lamps	Occupancy Sensor	30	2,208	0.0	98	0	$9	$270	$35	25.3
Restroom - Boys	4	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200	4	None	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,208	0.0	63	0	$6	$0	$0	0.0
Restroom - Boys	2	LED Lamps: (2) 15W G25 Screw-In Lamps	Wall Switch	S	30	3,200	4	None	Yes	2	LED Lamps: (2) 15W G25 Screw-In Lamps	Occupancy Sensor	30	2,208	0.0	65	0	$6	$116	$20	15.5
Restroom - Boys	4	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200	4	None	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,208	0.0	63	0	$6	$0	$0	0.0
Restroom - Boys	3	LED Lamps: (2) 15W G25 Screw-In Lamps	Wall Switch	S	30	3,200	4	None	Yes	3	LED Lamps: (2) 15W G25 Screw-In Lamps	Occupancy Sensor	30	2,208	0.0	98	0	$9	$270	$35	25.3
Restroom - Boys	4	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200		None	No	4	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,200	0.0	0	0	$0	$0	$0	0.0
Restroom - Boys	2	LED Lamps: (2) 15W G25 Screw-In Lamps	Wall Switch	S	30	3,200		None	No	2	LED Lamps: (2) 15W G25 Screw-In Lamps	Wall Switch	30	3,200	0.0	0	0	$0	$0	$0	0.0
Restroom - Boys	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200		None	No	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,200	0.0	0	0	$0	$0	$0	0.0
Restroom - Boys	2	LED Lamps: (2) 15W G25 Screw-In Lamps	Wall Switch	S	30	3,200		None	No	2	LED Lamps: (2) 15W G25 Screw-In Lamps	Wall Switch	30	3,200	0.0	0	0	$0	$0	$0	0.0
Restroom - Boys	4	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200		None	No	4	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,200	0.0	0	0	$0	$0	$0	0.0
Restroom - Boys	2	LED Lamps: (2) 15W G25 Screw-In Lamps	Wall Switch	S	30	3,200		None	No	2	LED Lamps: (2) 15W G25 Screw-In Lamps	Wall Switch	30	3,200	0.0	0	0	$0	$0	$0	0.0
Restroom - Boys	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200		None	No	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,200	0.0	0	0	$0	$0	$0	0.0
Restroom - Faculty	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,200		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,200	0.0	0	0	$0	$0	$0	0.0
Restroom - Faculty	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200		None	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,200	0.0	0	0	$0	$0	$0	0.0
Restroom - Faculty	1	LED Lamps: (2) 15W G25 Screw-In Lamps	Wall Switch	S	30	3,200		None	No	1	LED Lamps: (2) 15W G25 Screw-In Lamps	Wall Switch	30	3,200	0.0	0	0	$0	$0	$0	0.0
Restroom - Faculty	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200		None	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,200	0.0	0	0	$0	$0	$0	0.0
Restroom - Faculty	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200		None	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,200	0.0	0	0	$0	$0	$0	0.0
Restroom - Faculty	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200		None	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,200	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Restroom - Girls	5	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200	4	None	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,208	0.0	79	0	$7	$0	$0	0.0
Restroom - Men's	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200	4	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,208	0.0	63	0	$6	$116	$20	16.1
Restroom - Nurse Office	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	2,823		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,823	0.0	0	0	$0	$0	$0	0.0
Restroom - Nurse Office	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	2,823		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,823	0.0	0	0	$0	$0	$0	0.0
Restroom - Womens	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200	4	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,208	0.0	63	0	$6	$116	$20	16.1
Restroom Athletic Trainer Office	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Restroom Boys Locker Room Office	10	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	3,200	4	None	Yes	10	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	2,208	0.0	109	0	$10	$270	$35	22.8
Restroom Boys Locker Room Office	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,200	0.0	0	0	$0	$0	$0	0.0
Restroom Boys Locker Room Office	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Restroom Boys Wrestling Gym	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	S	58	2,823		None	No	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,823	0.0	0	0	$0	$0	$0	0.0
Restroom Classroom 167	1	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	38	2,823		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	38	2,823	0.0	0	0	$0	$0	$0	0.0
Restroom Girls Locker Room Office	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,200	0.0	0	0	$0	$0	$0	0.0
Restroom Girls Locker Room Office	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Room 101A	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,200	4	None	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,208	0.0	127	0	$12	$116	$20	8.0
Room 105	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
Room 105	28	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	28	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Room 112E Girls Locker Room Office	4	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,200	4	None	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,208	0.1	253	0	$24	$270	$35	9.8
Room 116E Boys Locker Room Office	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	S	58	2,823		None	No	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,823	0.0	0	0	$0	$0	$0	0.0
Room 171	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Room 202	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Room 207	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Room 213A	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Schools Store	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Server Closet	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,200	0.0	0	0	$0	$0	$0	0.0
Server Closet	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,200	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Server Closet	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,200	0.0	0	0	$0	$0	$0	0.0
Server Closet	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200		None	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,200	0.0	0	0	$0	$0	$0	0.0
South Bubble	7	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	7	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
South Bubble	45	LED - Fixtures: High-Bay	Occupancy Sensor	S	220	2,823		None	No	45	LED - Fixtures: High-Bay	Occupancy Sensor	220	2,823	0.0	0	0	$0	$0	$0	0.0
South Field Hockey Locker Room (Girls)	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Stage	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
Stage	18	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	3,200		None	No	18	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	3,200	0.0	0	0	$0	$0	$0	0.0
Stairs Exit 22	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 Exit 22	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200	4	None	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,208	0.0	158	0	$15	$270	$35	15.7
Stairs Exit 22	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,200	4	None	Yes	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,208	0.0	56	0	$5	$0	$0	0.0
Stairs Exit 27	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 Exit 27	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200	4	None	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,208	0.0	190	0	$18	$270	$35	13.1
Stairs Exit 27	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,200	4	None	Yes	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,208	0.0	56	0	$5	$0	$0	0.0
Stairs Exit 30	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200	4	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,208	0.0	127	0	$12	$270	$35	19.6
Stairs Exit 30	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,200	4	None	Yes	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,208	0.0	56	0	$5	$0	$0	0.0
Stairs Exit 31	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200	4	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,208	0.0	127	0	$12	$270	$35	19.6
Stairs Exit 31	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,200	4	None	Yes	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,208	0.0	56	0	$5	$0	$0	0.0
Stairs Exit 32	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200	4	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,208	0.0	127	0	$12	$270	$35	19.6
Stairs Exit 32	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,200	4	None	Yes	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,208	0.0	56	0	$5	$0	$0	0.0
Stairs Exit 33	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200	4	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,208	0.0	127	0	$12	$270	$35	19.6
Stairs Exit 33	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,200	4	None	Yes	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,208	0.0	56	0	$5	$0	$0	0.0
Stairs Exit 34	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 Exit 34	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200	4	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,208	0.0	63	0	$6	$116	$20	16.1
Stairs Exit 34	4	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,200		None	No	4	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,200	0.0	0	0	$0	$0	$0	0.0
Stairs Exit 35	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200	4	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,208	0.0	63	0	$6	$116	$20	16.1

	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
Stairs Exit 35	8	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,200	4	None	Yes	8	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,208	0.0	148	0	$14	$270	$35	16.8
Stairs Stage Boot	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200		None	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,200	0.0	0	0	$0	$0	$0	0.0
Storage	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	S	58	2,823		None	No	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,823	0.0	0	0	$0	$0	$0	0.0
Storage	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,200	0.0	0	0	$0	$0	$0	0.0
Storage	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Storage	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200	4	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,208	0.0	63	0	$6	$116	$20	16.1
Storage	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200	4	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,208	0.0	63	0	$6	$116	$20	16.1
Storage	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0
Storage	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200	4	None	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,208	0.0	95	0	$9	$270	$35	26.2
Storage	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200	4	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,208	0.0	63	0	$6	$116	$20	16.1
Storage	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,200		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,200	0.0	0	0	$0	$0	$0	0.0
Storage	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	S	9	3,200		None	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	3,200	0.0	0	0	$0	$0	$0	0.0
Storage	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200	4	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,208	0.0	127	0	$12	$116	$20	8.0
Storage 227	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200		None	No	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,200	0.0	0	0	$0	$0	$0	0.0
Storage Bubble	2	LED - Fixtures: High-Bay	Occupancy Sensor	S	13	2,823		None	No	2	LED - Fixtures: High-Bay	Occupancy Sensor	13	2,823	0.0	0	0	$0	$0	$0	0.0
Storage Girls Gym	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200	4	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,208	0.0	127	0	$12	$116	$20	8.0
Storage Girls Lockrr Room	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,200	0.0	0	0	$0	$0	$0	0.0
Storage Room 251	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	2,823		None	No	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,823	0.0	0	0	$0	$0	$0	0.0
Storage Room 251	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200	4	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,208	0.0	63	0	$6	$116	$20	16.1
Storage Stage	17	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	3,200	4	None	Yes	17	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	2,208	0.0	186	0	$18	$540	$70	26.8
Storage Stage	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,200		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,200	0.0	0	0	$0	$0	$0	0.0
The Cage	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
The Cage	12	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,200	4	None	Yes	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,208	0.0	190	0	$18	$270	$35	13.1
Vault	4	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	S	9	3,200		None	No	4	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	3,200	0.0	0	0	$0	$0	$0	0.0
VP Office	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,823		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,823	0.0	0	0	$0	$0	$0	0.0

Motor Inventory & Recommendations

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Exterior Ground	HRU-15 - Auditorium	1	Supply Fan	7.5	91.0%	Yes	Weg	00718OT3E213T-S	W	3,650		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Ground	HRU-15 - Auditorium	1	Exhaust Fan	7.5	91.0%	Yes			W	3,650		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Ground	HRU-15 - Auditorium	1	Other	0.3	65.0%	No			W	3,650		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Ground	HRU-15 - Auditorium	1	Combustion Air Fan	0.3	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Ground	HRU-16 - Girls Gym	1	Supply Fan	7.5	91.0%	Yes			W	3,650		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Ground	HRU-16 - Girls Gym	1	Exhaust Fan	7.5	91.0%	Yes			W	3,650		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Ground	HRU-16 - Girls Gym	1	Other	0.3	65.0%	No			W	3,650		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Ground	HRU-16 - Girls Gym	1	Combustion Air Fan	0.3	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Ground	RTU-S-1 - Outside Bubble	1	Supply Fan	15.0	92.4%	Yes			W	3,650		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Ground	RTU-S-1 - Outside Bubble	2	Combustion Air Fan	0.3	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Ground	RTU-S- 2- Outside Bubble	1	Supply Fan	15.0	92.4%	Yes			W	3,650		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Ground	RTU-S- 2- Outside Bubble	2	Combustion Air Fan	0.3	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior Ground	RTU-3 - TV Production	1	Supply Fan	3.0	90.2%	Yes			W	3,650		No	90.2%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU-5 - Football Locker Room	1	Supply Fan	3.0	89.5%	Yes			W	3,650		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-7 - Media Center	1	Supply Fan	2.0	86.5%	Yes			W	3,650		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-7 - Media Center	1	Exhaust Fan	2.0	86.5%	Yes			W	3,650		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-20 - Offices	1	Supply Fan	2.0	86.5%	Yes			W	3,650		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-20 - Offices	1	Exhaust Fan	1.0	85.5%	Yes			W	3,650		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-13 - Aux Gym	1	Supply Fan	2.0	86.5%	Yes			W	3,650		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-13 - Aux Gym	1	Exhaust Fan	1.0	85.5%	Yes			W	3,650		No	85.5%	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	HRU-11 - 2nd Floor Media Center Rooms	1	Supply Fan	7.5	91.0%	Yes			W	3,650		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-11 - 2nd Floor Media Center Rooms	1	Exhaust Fan	5.0	89.5%	Yes			W	3,650		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-11 - 2nd Floor Media Center Rooms	1	Other	0.3	65.0%	No			W	3,650		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-11 - 2nd Floor Media Center Rooms	1	Combustion Air Fan	0.3	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-8 - 2nd Floor Classrooms	1	Supply Fan	5.0	89.5%	Yes			W	3,650		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-8 - 2nd Floor Classrooms	1	Exhaust Fan	3.0	89.5%	Yes			W	3,650		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-8 - 2nd Floor Classrooms	1	Other	0.3	65.0%	No			W	3,650		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-8 - 2nd Floor Classrooms	1	Combustion Air Fan	0.3	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU-2 - Girls Locker Room	1	Supply Fan	7.5	91.0%	Yes			W	3,650		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU-2 - Girls Locker Room	1	Exhaust Fan	3.0	90.2%	Yes			W	3,650		No	90.2%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU-2 - Girls Locker Room	1	Combustion Air Fan	0.3	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU-4 - Cafeteria	2	Supply Fan	15.0	92.4%	Yes			W	3,650		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU-4 - Cafeteria	2	Exhaust Fan	7.5	91.0%	Yes			W	3,650		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU-4 - Cafeteria	2	Other	0.1	65.0%	No			W	3,650		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU-4 - Cafeteria	2	Combustion Air Fan	0.3	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-3 - 1st Floor Classrooms	1	Supply Fan	5.0	89.5%	Yes			W	3,650		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-3 - 1st Floor Classrooms	1	Exhaust Fan	3.0	89.5%	Yes			W	3,650		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-3 - 1st Floor Classrooms	1	Other	0.3	65.0%	No			W	3,650		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-3 - 1st Floor Classrooms	1	Combustion Air Fan	0.3	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-2 - 1st Floor Classrooms	1	Supply Fan	5.0	89.5%	Yes			W	3,650		No	89.5%	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	HRU-2 - 1st Floor Classrooms	1	Exhaust Fan	3.0	89.5%	Yes			W	3,650		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-2 - 1st Floor Classrooms	1	Other	0.3	65.0%	No			W	3,650		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-2 - 1st Floor Classrooms	1	Combustion Air Fan	0.3	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-19 - Boys Gym	1	Supply Fan	15.0	92.4%	Yes			W	3,650		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-19 - Boys Gym	1	Exhaust Fan	10.0	91.7%	Yes			W	3,650		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-19 - Boys Gym	1	Other	0.3	65.0%	No			W	3,650		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-19 - Boys Gym	2	Combustion Air Fan	0.3	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU-1 - Boys Locker Room	1	Supply Fan	7.5	91.0%	Yes			W	3,650		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU-1 - Boys Locker Room	1	Exhaust Fan	5.0	89.5%	Yes			W	3,650		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU-1 - Boys Locker Room	1	Combustion Air Fan	0.3	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-5 - 1st Floor Classrooms	1	Supply Fan	10.0	91.7%	Yes			W	3,650		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-5 - 1st Floor Classrooms	1	Exhaust Fan	10.0	91.7%	Yes			W	3,650		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-5 - 1st Floor Classrooms	1	Other	0.3	65.0%	No			W	3,650		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-5 - 1st Floor Classrooms	2	Combustion Air Fan	0.3	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-4 - Guidance Offices	1	Supply Fan	2.0	86.5%	Yes			W	3,650		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-4 - Guidance Offices	1	Exhaust Fan	1.0	85.5%	Yes			W	3,650		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-1 - 1st Floor Classrooms	1	Supply Fan	20.0	93.0%	Yes			W	3,650		No	93.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-1 - 1st Floor Classrooms	2	Exhaust Fan	5.0	89.5%	Yes			W	3,650		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-1 - 1st Floor Classrooms	2	Other	0.3	65.0%	No			W	3,650		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-1 - 1st Floor Classrooms	3	Combustion Air Fan	0.3	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Roof	HRU-10 - 2nd Floor Classrooms	1	Supply Fan	20.0	93.0%	Yes			W	3,650		No	93.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-10 - 2nd Floor Classrooms	2	Exhaust Fan	5.0	89.5%	Yes			W	3,650		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-10 - 2nd Floor Classrooms	2	Other	0.3	65.0%	No			W	3,650		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-10 - 2nd Floor Classrooms	3	Combustion Air Fan	0.3	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-12 - Art, Music & Stagecarft	1	Supply Fan	5.0	89.5%	Yes			W	3,650		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-12 - Art, Music & Stagecarft	1	Exhaust Fan	1.0	85.5%	Yes			W	3,650		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-12 - Art, Music & Stagecarft	1	Other	0.3	65.0%	No			W	3,650		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-12 - Art, Music & Stagecarft	1	Combustion Air Fan	0.3	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-6 - 2nd Floor Classrooms	1	Supply Fan	5.0	89.5%	Yes			W	3,650		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-6 - 2nd Floor Classrooms	1	Exhaust Fan	3.0	89.5%	Yes			W	3,650		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-6 - 2nd Floor Classrooms	1	Other	0.3	65.0%	No			W	3,650		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-6 - 2nd Floor Classrooms	1	Combustion Air Fan	0.3	65.0%	No			W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
The Cage	Domestic Hot Water	2	DHW Circulation Pump	0.1	65.0%	No			W	3,650		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Condenser Water Pumps P7P8	2	Condenser Water Pump	25.0	93.6%	Yes	Baldor-Reliance	EM2531T-G	W	3,650		No	93.6%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Condenser Water Pumps P1P2	2	Water-Source Heat Pump Circulation Pump	40.0	94.1%	Yes	Baldor-Reliance	EM2539T-G	W	3,650		No	94.1%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Condenser Water Pumps P3P4	2	Water-Source Heat Pump Circulation Pump	30.0	92.4%	Yes	Baldor Industrial	M2535T	W	3,650		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
Ground Floor	Cooling Tower	1	Cooling Tower Fan	50.0	94.5%	Yes			W	2,500		No	94.5%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Heating Hot Warer Pump P5P6	2	Heating Hot Water Pump	15.0	93.0%	Yes	Baldor-Reliance	EM2513T-G	W	3,650		No	93.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Water Filtration Pump	1	Other	5.0	89.5%	No	Baldor-Reliance	VEJMM361ST	W	3,650		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Elevator Room	Hydraulic Elevator	1	Other	30.0	80.0%	No			W	200		No	80.0%	No		0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
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Roof	EF-16 - Kitchenhood Fan	1	Kitchen Hood Exhaust Fan	5.0	89.5%	No			W	3,650	6	No	89.5%	Yes	1	0.0	8,430	26	$1,254	$5,028	$900	3.3
Roof	Science Classrooms	7	Exhaust Fan	1.0	84.0%	No	SWB-10-5-CW-UB		W	3,650		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Restrooms	10	Exhaust Fan	0.3	65.0%	No			W	3,650		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Various Spaces	Various Spaces - WSHP	35	Supply Fan	0.1	65.0%	No			W	3,650		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Various Spaces	Various Spaces - WSHP	33	Supply Fan	0.3	65.0%	No			W	3,650		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Various Spaces	Various Spaces - WSHP	112	Supply Fan	0.3	65.0%	No			W	3,650		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Various Spaces	Various Spaces - WSHP	22	Supply Fan	0.5	70.0%	No			W	3,650		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Various Spaces	Various Spaces - WSHP	9	Supply Fan	0.8	70.0%	No			W	3,650		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Elevator Room2	Hydraulic Elevator 2	1	Other	15.0	80.0%	No			W	200		No	80.0%	No		0.0	0	0	$0	$0	$0	0.0

Packaged HVAC Inventory & Recommendations

		Existing Conditions									Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/ EER)	Heating Mode Efficiency	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/ EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Various Spaces	Various Spaces	7	Electric Resistance Heat		11.94		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Exterior Ground	HRU-15 - Auditorium	1	Package Unit	20.00	218.70	12.00	0.81 AFUE	AAON	RN-020-3-0	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior Ground	HRU-16 - Girls Gym	1	Package Unit	18.00	218.70	12.00	0.81 AFUE	AAON	RN-018-3-0	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior Ground	RTU-S-1 - Outside Bubble	1	Package Unit	30.00	432.00	12.00	0.8 AFUE	AAON	RNA-030-C-0	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior Ground	RTU-S-2 - Outside Bubble	1	Package Unit	30.00	433.00	12.00	0.8 AFUE	AAON	RNA-030-C-1	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior Ground	RTU-3 - TV Production	1	Package Unit	11.00	156.00	12.00	0.8 AFUE	AAON	RN-011-3-0	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	RTU-5 - Football Locker Room	1	Package Unit	13.00	156.00	12.00	0.8 AFUE	AAON	RN-013-3-0	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	HRU-7 - Media Center	1	Package Unit	8.00	72.90	12.00	0.81 AFUE	AAON	RN-008-3-0	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	HRU-20 - Offices	1	Package Unit	7.00	72.90	12.00	0.81 AFUE	AAON	RN-007-3-0	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	HRU-13 - Aux Gym	1	Package Unit	8.00	72.90	12.00	0.81 AFUE	AAON	RN-008-3-0	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	HRU-11 - 2nd Floor Media Center Rooms	1	Package Unit	16.00	218.70	12.00	0.81 AFUE	AAON	RN-016-3-0	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	HRU-8 - 2nd Floor Classrooms	1	Package Unit	16.00	218.70	12.00	0.81 AFUE	AAON	RN-016-3-0	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	RTU-2 - Girls Locker Room	1	Package Unit	20.00	218.70	12.00	0.81 AFUE	AAON	RN-020-3-0	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	RTU-4 - Cafeteria	1	Package Unit	70.00	864.00	12.00	0.8 AFUE	AAON	RN-070-3-0	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	HRU-3 - 1st Floor Classrooms	1	Package Unit		218.70		0.81 AFUE	AAON	RN-016-3-0	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	HRU-2 - 1st Floor Classrooms	1	Package Unit		218.70		0.81 AFUE	AAON	RN-016-3-1	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	HRU-19 - Boys Gym	1	Package Unit	25.00	328.10	12.00	0.810123456790124 AFUE	AAON	RN-025-3-0	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	RTU-1 - Boys Locker Room	1	Package Unit	20.00	218.70	12.00	0.81 AFUE	AAON	RN-020-3-A	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	HRU-5 - 1st Floor Classrooms	1	Package Unit		432.00		0.8 AFUE	AAON	RN-016-3-0	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	HRU-4 - Guidance Offices	1	Package Unit		72.90		0.81 AFUE	AAON	RN-006-3-0	W		No							0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/ EER)	Heating Mode Efficiency	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Roof	HRU-1 - 1st Floor Classrooms	1	Package Unit		648.00		0.8 AFUE	AAON	RN-031-3-0	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	HRU-10 - 2nd Floor Classrooms	1	Package Unit		648.00		0.8 AFUE	AAON	RN-031-3-0	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	HRU-12 - Art, Music & Stagecarft	1	Package Unit		218.70		0.81 AFUE	AAON	RN-016-3-0	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	HRU-6 - 2nd Floor Classrooms	1	Package Unit		218.70		0.81 AFUE	AAON	RN-016-3-0	W		No							0.0	0	0	$0	$0	$0	0.0
Girls Restrooms	Girls Restrooms	2	Water Source HP	0.75	5.60	13.50	3.7 COP	Tetco	CW009	B	7	Yes	2	Water Source HP	0.75	5.60	14.00	4.8 COP	0.0	118	0	$12	$6,029	$68	515.4
Women Restroom	Women Restroom	1	Water Source HP	1.25	11.60	13.50	4.1 COP	Tetco	CW015	B	7	Yes	1	Water Source HP	1.25	11.60	14.00	4.8 COP	0.0	82	0	$8	$3,640	$56	445.3
Various Spaces	Various Spaces	15	Water Source HP	1.50	15.40	13.50	4 COP	Tetco	CW018	B	7	Yes	15	Water Source HP	1.50	15.40	15.00	4.5 COP	1.0	2,730	0	$267	$59,282	$1,530	216.0
Various Spaces	Various Spaces	17	Water Source HP	0.67	5.20	11.50	3.3 COP	Tetco	ESII-0.8-H RS40	B	7	Yes	17	Water Source HP	0.67	5.20	14.00	4.8 COP	1.1	3,039	0	$298	$49,473	$510	164.5
Various Spaces	Various Spaces	16	Water Source HP	1.00	9.40	12.20	3.5 COP	Tetco	ESII-1.0-H LS40	B	7	Yes	16	Water Source HP	1.00	9.40	14.00	4.8 COP	1.0	3,267	0	$320	$53,231	$720	164.1
Various Spaces	Various Spaces	17	Water Source HP	1.50	21.70	12.20	3.5 COP	Tetco	ESII-1.5-H LS40	B	7	Yes	17	Water Source HP	1.50	21.70	15.00	4.5 COP	5.2	7,216	0	$707	$67,187	$1,734	92.6
Penthouse	Mini-Gym 108	1	Water Source HP	10.00	99.40	13.50	4 COP	Tetco	Tetco ESII-10-VT	B	7	Yes	1	Water Source HP	10.00	99.40	15.00	4.5 COP	0.4	1,204	0	$118	$11,850	$900	92.8
Penthouse	Auditorium, Boys & Girls Gymnasiums	5	Water Source HP	15.00	149.00	13.50	4 COP	Tetco	Tetco ESII-15-VT	B	7	Yes	5	Water Source HP	15.00	149.00	15.00	4.5 COP	3.3	9,032	0	$884	$116,521	$6,750	124.1
Various Spaces	Various Spaces	24	Water Source HP	2.00	26.00	12.30	3.5 COP	Tetco	ESII-2.0-H RS/LS40	B	7	Yes	24	Water Source HP	2.00	26.00	15.00	4.5 COP	6.9	12,741	0	$1,248	$109,856	$3,264	85.4
Various Spaces	Various Spaces	46	Water Source HP	2.50	30.10	12.30	3.4 COP	Tetco	ESII-2.5-H RS/LS40	B	7	Yes	46	Water Source HP	2.50	30.10	15.00	4.5 COP	13.7	30,979	0	$3,034	$302,218	$7,820	97.0
Various Spaces	Various Spaces	22	Water Source HP	3.00	32.60	12.30	2.7 COP	Tetco	ESII-3.0-H LS54	B	7	Yes	22	Water Source HP	3.00	32.60	15.00	4.5 COP	12.5	22,602	0	$2,213	$161,966	$4,488	71.1
Various Spaces	Various Spaces	24	Water Source HP	3.50	43.60	12.30	3.3 COP	Tetco	ESII-3.5-H RS/LS40	B	7	Yes	24	Water Source HP	3.50	43.60	15.00	4.5 COP	12.9	23,791	0	$2,330	$191,695	$5,712	79.8
Various Spaces	Various Spaces	20	Water Source HP	4.00	45.70	12.30	2.9 COP	Tetco	ESII-4.0-H RE/LE42	B	7	Yes	20	Water Source HP	4.00	45.70	15.00	4.5 COP	14.2	25,754	0	$2,522	$172,249	$5,440	66.1
Classrooms 167 & 177	Classrooms 167 & 177	2	Water Source HP	4.50	47.40	12.30	2.9 COP	Tetco	ESII-4.5-H LS68	B	7	Yes	2	Water Source HP	4.50	47.40	15.00	4.5 COP	1.2	2,801	0	$274	$18,475	$612	65.1
Rooms C16A,B, Classroom C11A	Room C16A,B, Classroom C11A	2	Water Source HP	5.00	53.70	13.40	3.2 COP	Tetco	ESII-5.0-H LS/RS68	B	7	Yes	2	Water Source HP	5.00	53.70	15.00	4.5 COP	0.9	1,955	0	$191	$19,726	$680	99.5
Classroom 171, Cooking 173	Classroom 171, Cooking 173	1	Water Source HP	6.00	62.80	13.40	3.1 COP	Tetco	ESII-6.0-H LS/RS68	B	7	Yes	1	Water Source HP	6.00	62.80	15.00	4.5 COP	0.6	1,221	0	$120	$10,251	$540	81.2

		Existing Conditions									Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/ EER)	Heating Mode Efficiency	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
IT Room	Portable ACs	2	Split-System	1.13		12.00		Friedrich	PH14B	W		No							0.0	0	0	$0	$0	$0	0.0
Penthouse	Room 1242	1	Water Source HP	10.00	152.80	12.85	4.2 COP	Tetco	ES-10-VT-460	B	7	Yes	1	Water Source HP	10.00	152.80	15.00	4.5 COP	1.3	1,644	0	$161	$11,850	$900	68.0
Penthouse	Room 1236 - Girls Gymnasium	1	Water Source HP	15.00	229.20	12.85	4.2 COP	Tetco	ES-15-VT-460	B	7	Yes	1	Water Source HP	15.00	229.20	15.00	4.5 COP	2.0	2,465	0	$241	$23,304	$1,350	90.9
Penthouse	Room 1235 - Boys Gymnasium	3	Water Source HP	15.00	229.20	12.85	4.2 COP	Tetco	ES-15-VT-461	B	7	Yes	3	Water Source HP	15.00	229.20	15.00	4.5 COP	6.0	7,396	0	$724	$69,913	$4,050	90.9

Space Heating Boiler Inventory & Recommendations

		Existing Conditions						Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Hydronic Heating System	3	Condensing Hot Water Boiler	2,337	AERCO	BMK 2500	W		No						0.0	0	0	$0	$0	$0	0.0

Demand Control Ventilation Recommendations

		Recommendation Inputs					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	ECM #	Number of Zones	Cooling Capacity of Controlled System (Tons)	Electric Heating Capacity of Controlled System (kBtu/hr)	Output Heating Capacity of Controlled System (MBh)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Exterior Ground	HRU-15 - Auditorium	8	4.00	20.00	0.00	218.70	0.0	1,208	5	$193	$5,438	$0	28.2
Exterior Ground	HRU-16 - Girls Gym	8	4.00	18.00	0.00	218.70	0.0	1,087	5	$181	$5,438	$0	30.1
Roof	HRU-19 - Boys Gym	8	4.00	25.00	0.00	328.10	0.0	1,509	7	$259	$5,438	$0	21.0
Roof	RTU-4 - Cafeteria	8	4.00	70.00	0.00	864.00	0.0	4,226	18	$711	$5,438	$0	7.6
Roof	HRU-7 - Media Center	8	2.00	8.00	0.00	72.90	0.0	483	2	$72	$2,719	$0	37.7
Roof	HRU-13 - Aux Gym	8	2.00	8.00	0.00	72.90	0.0	483	2	$72	$2,719	$0	37.7
Roof	RTU-2 - Girls Locker Room	8	4.00	20.00	0.00	218.70	0.0	1,208	5	$193	$5,438	$0	28.2
Roof	RTU-1 - Boys Locker Room	8	4.00	20.00	0.00	218.70	0.0	1,208	5	$193	$5,438	$0	28.2
Roof	RTU-5 - Football Locker Room	8	3.00	13.00	0.00	156.00	0.0	785	3	$131	$4,078	$0	31.2
Exterior Ground	RTU-S-1 & 2 - Outside Bubble	8	8.00	60.00	0.00	865.00	0.0	3,623	53	$1,227	$10,875	$0	8.9

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
The Cage	Domestic Hot Water System	9	34	1.25	0.0	0	18	$299	$406	$68	1.1
The Cage	Domestic Hot Water System	9	11	2.00	0.0	0	9	$143	$147	$22	0.9

DHW Inventory & Recommendations

		Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Manufacturer	Model	Remaining Useful Life	ECM #	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
The Cage	Domestic Hot Water	3	Storage Tank Water Heater (> 50 Gal)	A O Smith	BTH 199 100	W		No						0.0	0	0	$0	$0	$0	0.0

Low-Flow Device Recommendations

	Recommedation Inputs					Energy Impact & Financial Analysis						
Location	ECM #	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Restrooms	10	12	Faucet Aerator (Lavatory)	2.00	0.50	0.0	0	10	$165	$86	$43	0.3

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions				Proposed Conditions				Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	Manufacturer	Model	ECM #	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Evaporator Fan Control?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Cooler (35F to 55F)	Bohn		11, 12	Yes	No	Yes	0.0	444	0	$43	$1,977	$115	42.8
Kitchen	1	Cooler (35F to 55F)	Bohn	ADT090AJ	11, 12	Yes	No	Yes	0.1	1,004	0	$98	$2,281	$155	21.6
Kitchen	1	Medium Temp Freezer (0F to 30F)	Trenton	TLP211LE-S2B	11, 12	Yes	Yes	Yes	0.1	2,537	0	$248	$2,799	$205	10.4

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	Manufacturer	Model	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Stand-Up Freezer, Solid Door (16 - 30 cu. ft.)	TRUE	T-23F	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Stand-Up Refrigerator, Glass Door (≤15 cu. ft.)	Habco	ESM12	No	13	Yes	0.1	723	0	$71	$1,674	$75	22.6
Kitchen	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	TRUE	T-49	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Traulsen	G20010	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	2	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Turbo Air	TOM-48DXB	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	2	Refrigerator Chest			No		No	0.0	0	0	$0	$0	$0	0.0

Commercial Ice Maker Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Ice Maker Type	Manufacturer	Model	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Athletic Trainer Office	1	Ice Making Head (≥450 lbs/day), Batch	HOSHIZAKI	KM-515MWH	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Self-Contained Unit (≥175 lbs/day), Continuous	Manitowoc	ID0602A-161	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	6	Electric Convection Oven (Full Size)	Blodgett		Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Electric Combination Oven/Steam Cooker (<15 Pans)	Vulcan		Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Electric Fryer	Vulcan		Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Insulated Food Holding Cabinet (Full Size)	Crescor	H135WUA11	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Insulated Food Holding Cabinet (Full Size)			Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Electric Kettle	Vulcan	K12ETT	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	2	Commercial Coffee Brewers	Fetco	CBS-2052e	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	2	Steam Tables	Delfield	N8759-D	Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	6	Misc Plug Load			Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Electric Combination Oven/Steam Cooker (15 - 28 Pans)	Rational	LM100GE AXXXX	Yes		No	0.0	0	0	$0	$0	$0	0.0

Dishwasher Inventory & Recommendations

	Existing Conditions							Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Dishwasher Type	Manufacturer	Model	Water Heater Fuel Type	Booster Heater Fuel Type	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Payback w/ Incentives in Years
Kitchen	1	Door Type (High Temp)	Hobart	AM16VLT-BASX	Electric	N/A	Yes		No	0.0	0	0	$0	$0	$0	0.0

Plug Load Inventory

	Existing Conditions					
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?	Manufacturer	Model
Classroom 173	1	Clothes Dryer	1,500	No		
Classroom 173	1	Clothes Washer	1,300	No		
Various Spaces	18	Coffee Machine	600	No		
Various Spaces	3	Dehumidifier	440	No		
Various Spaces	381	Desktop	270	No		
Various Spaces	50	Microwave	1,000	No		
Various Spaces	10	Other Misc Plug Load	500	No		
Various Spaces	3	Paper Shredder	224	No		
Various Spaces	52	Printer (Medium/Small)	125	No		
Various Spaces	14	Printer/Copier (Large)	600	No		
Various Spaces	91	Projector	224	No		
Various Spaces	25	Refrigerator (Mini)	200	No		
Various Spaces	15	Refrigerator (Residential)	450	No		
Various Spaces	70	Smart Board	124	No		
Various Spaces	9	Television	125	No		
Various Spaces	5	Toaster	800	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	2	Glass Fronted Refrigerated	N/A	No	0.0	0	0	$0	$0	$0	0.0
Cafeteria	2	Non-Refrigerated	N/A	No	0.0	0	0	$0	$0	$0	0.0
Cafeteria Teachers	1	Refrigerated	N/A	No	0.0	0	0	$0	$0	$0	0.0

Custom (High Level) Measure Analysis

Retro-Commissioning Study

Building Square Footage	278,156	Fuel Utility Rate	$16.438	MMBtu
Percent of Conditioned Area Impacted	100%	Blended Electric Utility Rate	$0.098	kWh

Existing Conditions						Proposed Conditions					Energy Impact & Financial Analysis										
Description	Area(s)/System(s) Served	Remaining Useful Life	Total HVAC Motor Usage kWh	Total HVAC Electric Usage kWh	Total HVAC Fuel Usage MMBtu	Description	% Savings HVAC Motor Usage kWh	% Savings HVAC Electric Usage kWh	% Savings HVAC Fuel Usage MMBtu	Estimated Cost per Sqft	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Base Incentives	Enhanced Incentives	Total Incentives	Total Net Cost	Payback w/o Incentives in Years	Simple Payback w/ Incentives in Years
HVAC Controls Not Currently Optimized	HVAC Equipment & Systems	3	1,272,192	1,215,149	5,388	Retro-Commissioning Study	5%	5%	5%	$0.40	0.00	124,367	269	$16,607	$111,262	$0	$0	$0	$111,262	6.70	6.70

APPENDIX B: ENERGY STAR STATEMENT OF ENERGY PERFORMANCE

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

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ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Middletown High School South (Campus)

Primary Property Type: K-12 School
Gross Floor Area (ft²): 278,156
Built: 1974

For Year Ending: June 30, 2022
Date Generated: July 30, 2023

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
Middletown High School South (Campus) 900 Nut Swamp Road Middletown, New Jersey 07748	Middletown Township Public Schools 63 Tindall Road Middletown, NJ 07748 (732) 706-6061	Adam Nasr 63 Tindall Road Middletown, NJ 07748 (732) 706-6061 X 1362 nasra@middletownk12.org

Property ID: 28017570

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
59.6 kBtu/ft²

Source EUI
111.3 kBtu/ft²

Annual Energy by Fuel	
Electric - Solar (kBtu)	3,089,979 (19%)
Electric - Grid (kBtu)	7,842,476 (47%)
Natural Gas (kBtu)	5,639,281 (34%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	66.9
National Median Source EUI (kBtu/ft²)	125
% Diff from National Median Source EUI	-11%
Annual Emissions	
Total (Location-Based) GHG Emissions (Metric Tons CO2e/year)	1,252

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 (II)	*Solar renewable energy credit*: a credit 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.