Local Government Energy Audit Report

Vernon High School

February 14, 2025

Prepared for:
Vernon Township School District
1832 Route 565
Vernon, New Jersey 07418

Prepared by:
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Disclaimer

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

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

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

Incentive values provided in this report are estimated based 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.

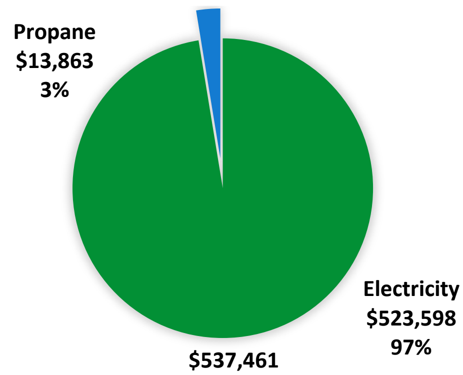
The customer and their respective contractor(s) are responsible to implement energy conservation measures in complete conformance with all applicable local, state, and federal requirements.

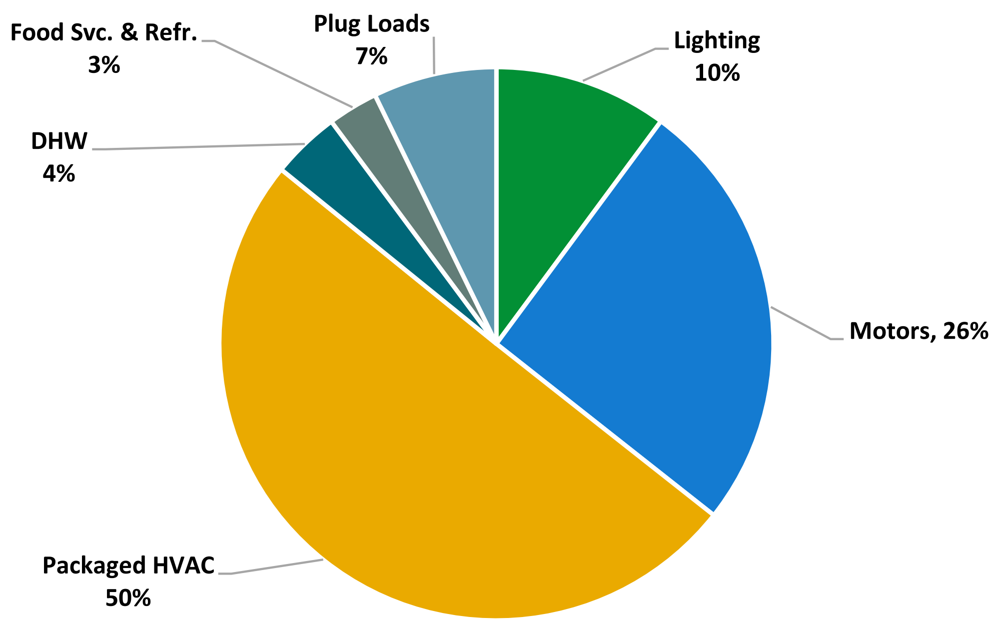
Table of Contents

1 Executive Summary

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

BUILDING PERFORMANCE REPORT

Annual Energy Utilities	Costs: $537,461 Electricity: 3,571,128 kWh Propane: 4,746 Gallons	
ENERGY STAR® Benchmarking Score	38 *(1-100 scale)*	This building performs below the national average. This report contains suggestions about how to improve building performance and reduce energy costs.



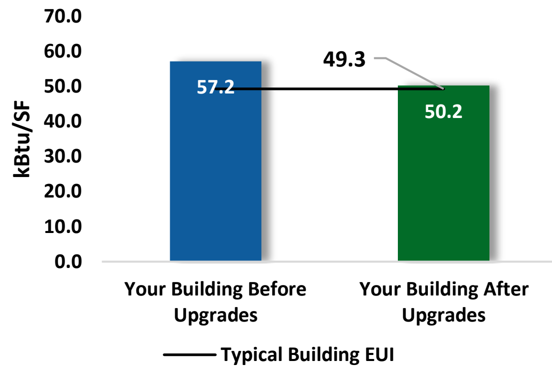
Energy Use by System

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.

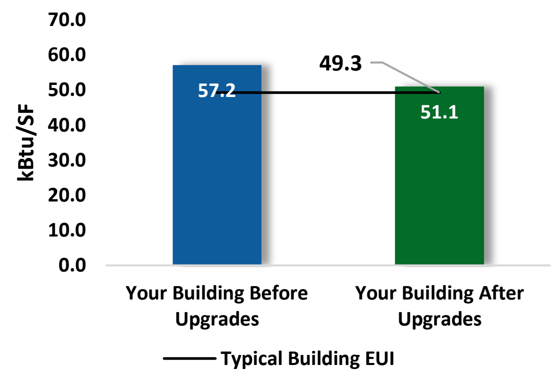
Scenario 1: Full Package (All Evaluated Measures)

Installation Cost	$789,200
Potential Rebates & Incentives[1]	$56,680
Annual Cost Savings	$65,978
Annual Energy Savings	Electricity: 449,996 kWh
Greenhouse Gas Emission Savings	227 Tons
Simple Payback	11.1 Years
Site Energy Savings (All Utilities)	12%



Scenario 2: Cost Effective Package[2]

Installation Cost	$242,600
Potential Rebates & Incentives	$29,280
Annual Cost Savings	$57,724
Annual Energy Savings	Electricity: 393,700 kWh
Greenhouse Gas Emission Savings	198 Tons
Simple Payback	3.7 Years
Site Energy Savings (all utilities)	11%



On-site Generation Potential

Photovoltaic	Additional Scope
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			**56,905**	**1.0**	**0**	**$8,343**	**$34,600**	**$4,870**	**$29,730**	**3.6**	**57,303**
ECM 1	Install LED Fixtures	Yes	53,902	0.2	0	$7,903	$32,380	$4,520	$27,860	3.5	54,279
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	700	0.2	0	$103	$530	$60	$470	4.6	705
ECM 3	Retrofit Fixtures with LED Lamps	Yes	2,304	0.6	0	$338	$1,690	$290	$1,400	4.1	2,320
Lighting Control Measures			**18,807**	**5.9**	**0**	**$2,757**	**$23,710**	**$2,630**	**$21,080**	**7.6**	**18,939**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	18,807	5.9	0	$2,757	$23,710	$2,630	$21,080	7.6	18,939
Motor Upgrades			**907**	**0.2**	**0**	**$133**	**$3,700**	**$0**	**$3,700**	**27.8**	**913**
ECM 5	Premium Efficiency Motors	No	907	0.2	0	$133	$3,700	$0	$3,700	27.8	913
Variable Frequency Drive (VFD) Measures			**299,333**	**68.9**	**0**	**$43,888**	**$171,200**	**$20,600**	**$150,600**	**3.4**	**301,426**
ECM 6	Install VFD on Variable Air Volume (VAV) Fans	Yes	193,183	49.1	0	$28,324	$104,900	$12,400	$92,500	3.3	194,534
ECM 7	Install VFDs on Constant Volume (CV) Fans	Yes	52,817	14.8	0	$7,744	$35,600	$4,500	$31,100	4.0	53,187
ECM 8	Install VFDs on Water Supply Pump	Yes	53,333	4.9	0	$7,820	$30,700	$3,700	$27,000	3.5	53,706
Unitary HVAC Measures			**55,390**	**50.2**	**0**	**$8,121**	**$542,900**	**$27,400**	**$515,500**	**63.5**	**55,777**
ECM 9	Install High Efficiency Air Conditioning Units	No	50,923	46.5	0	$7,466	$519,800	$27,400	$492,400	65.9	51,279
ECM 10	Install High Efficiency Heat Pumps	No	4,467	3.6	0	$655	$23,100	$0	$23,100	35.3	4,498
Domestic Water Heating Upgrade			**5,136**	**0.0**	**0**	**$753**	**$740**	**$250**	**$490**	**0.7**	**5,172**
ECM 11	Install Low-Flow DHW Devices	Yes	5,136	0.0	0	$753	$740	$250	$490	0.7	5,172
Food Service & Refrigeration Measures			**13,519**	**1.5**	**0**	**$1,982**	**$12,350**	**$930**	**$11,420**	**5.8**	**13,614**
ECM 12	Dishwasher Replacement	Yes	9,072	1.0	0	$1,330	$10,800	$700	$10,100	7.6	9,136
ECM 13	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	820	0.1	0	$120	$750	$80	$670	5.6	826
ECM 14	Vending Machine Control	Yes	3,627	0.4	0	$532	$800	$150	$650	1.2	3,652
TOTALS (COST EFFECTIVE MEASURES)			**393,700**	**77.4**	**0**	**$57,724**	**$242,600**	**$29,280**	**$213,320**	**3.7**	**396,453**
TOTALS (ALL MEASURES)			**449,996**	**127.8**	**0**	**$65,978**	**$789,200**	**$56,680**	**$732,520**	**11.1**	**453,143**

* - 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).

All Evaluated Energy Improvements[3]

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

[3] 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.

1.1 Planning Your Project

Careful planning makes for a successful energy project. When considering this scope of work, you will have some decision 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 for the largest energy consumers in the state. Customers in this category spend about $5 million a year on energy bills. This program 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 Vernon High School. This report provides information on how your facility uses energy, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help you implement the ECMs.

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

2.1 Site Overview

On July 10, 2024, TRC performed an energy audit at Vernon High School located in Vernon, New Jersey. TRC met with facility staff to review the facility operations and help focus our investigation on specific energy-using systems.

Vernon High School campus is a 2-story, 220,720 square foot complex comprised of the school, maintenance building, press box, concession stand, and wastewater treatment plant built in 1972. Spaces include classrooms, a gymnasium, an auditorium, offices, a cafeteria, corridors, stairwells, a commercial kitchen, and mechanical spaces.

The facility has its own wastewater treatment plant. The small plant supports the high school only.

2.2 Building Occupancy

The school is fully occupied from September through June. Typical weekday occupancy is 231 staff and 907 students. Summer occupancy includes a summer day camp and continuing maintenance activities.

Building Name	Weekday/Weekend	Operating Schedule
Vernon High School - General	Weekday	5:30 AM - 1 AM
vernon High School - Gymnasium & Auditorium	Weekend	Varied

Building Occupancy Schedule

2.3 Building Envelope

Building walls are concrete block over structural steel with a brick façade. The roof is flat and covered with black membrane, and it is in poor condition.

The maintenance building has a metal exterior and roof and is in fair condition. The press box and concession stand are also in fair condition. They are used seasonally.



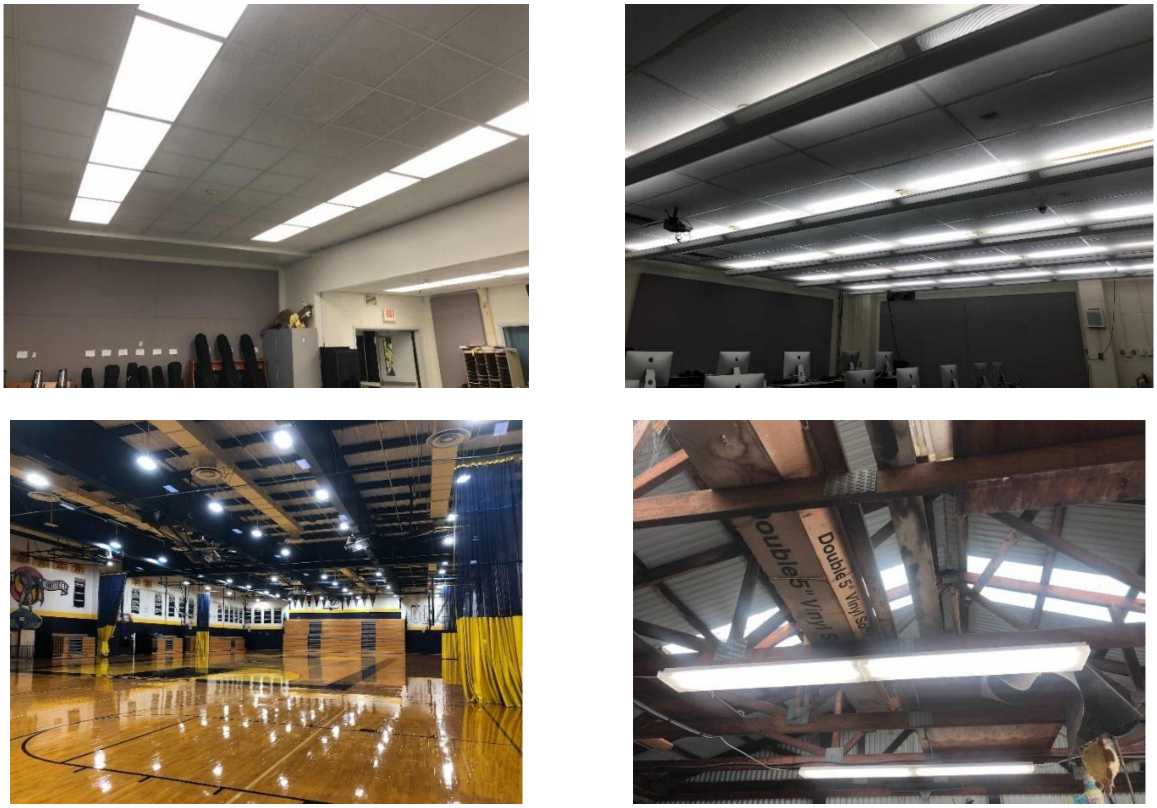

High School Building Exterior, Maintenance Building, and Press box

2.4 Lighting Systems

The primary interior lighting system uses linear LED T8 lamps. There are also several 32-Watt T8 linear fluorescent fixtures and a few T12 linear fluorescent fixtures. Fixture types include 1-, 2-, 3-, or 4-lamp, 2- or 4-foot-long recessed troffer or surface mounted fixtures and 2-foot fixtures with linear tube lamps. Typically, T8 fluorescent lamps use electronic ballasts and T12 fluorescent lamps use magnetic ballasts.

Additionally, there are some compact fluorescent lamps CFL, incandescent, and LED general purpose lamps.

The gymnasium fixtures have manually controlled high bay LED fixtures. The auditorium fixtures have LED PAR38 lamp fixtures and are manually controlled. All exit signs are LED. Most fixtures are in fair condition. Interior lighting levels were generally sufficient.



Linear LED and Fluorescent Fixtures

Most lighting fixtures are controlled manually and with a few controlled by occupancy sensors.

Key Switch, Motion Sensor, and manual Switches

Exterior fixtures include wall packs, flood lights, and canopy lights with high intensity discharge (HID) lamps. Several of the fixtures have already been upgraded to LED.

Exterior light fixtures are controlled by a time clock, switches, or photocells, depending on the fixture. The athletic fields are illuminated with flood lights with high intensity discharge (HID) lamps and are manually controlled.

LED Wall Packs, Canopy, and Flood Light Fixtures

The site has pole-mounted LED fixtures illuminating roadways and parking lots throughout the complex. The site lighting is fed from the main campus electric meter. Fixtures are controlled by a timeclock or photocells depending on the fixture.

Pole Mounted LED Fixtures

2.5 Air Handling Systems

Unit Ventilators

Unit ventilators are equipped with supply fan motors and electronically controlled outside air dampers and fan coil valves connected to the heating hot water distribution system. They provide heating and ventilation to classrooms. This system is original to the building and appears to be in fair operating condition.

Unit Ventilator

Unitary Electric HVAC Equipment

Areas of the high school use ductless mini split air conditioning (AC) units or heat pumps. These vary in capacity between 0.75 and 3.5-tons of cooling. The heat pumps have a heating capacity between 13 and 41.50 MBh. The units vary in condition with several are ready for replacement.

Outside Condensing Unit and Indoor Unit

Unitary Heating Equipment

Mechanical and storage rooms are heated by electric resistance unit heaters. These vary in capacity between 17.05 and 34.05 MBh. The units are in fair condition. Equipment is controlled by a manual dial thermostat.

Unit Heaters

Packaged Units

Several classrooms are served with packaged air-source heat pump (PTHP) units controlled by room thermostats. These 11-14.60 EER units have a heating capacity of 47.2 – 50.20 MBh and 3.50 – 3.75-ton cooling capacity.

Packaged Air Source Heat Pump

Areas of the school are served by packaged roof top units (RTUs). There are 10 units ranging in size from 2.75 to 50-tons of cooling. These units are equipped with economizers that are in fair condition.

Refer to Appendix A for detailed information about each unit.

Rooftop Packaged Units

Air Handling Units (AHUs)

The building is conditioned by several air handling units. These units are equipped with a supply fan motors and electric resistance duct heaters. Units vary in size and capacity. Outside condenser units' range in size between 1.5- and 60-tons of cooling with EERs ranging from 8 to 13. The electric resistance duct heaters capacities range from 68.24 to 511 MBh.

The HVAC systems are controlled by the facility's Building Automation System (BAS).

Outside Condensers and Air Handling Units

2.6 Domestic Hot Water

The high school hot water is produced by a 600-gallon, 108 kW electric storage water heater. A 24-kW booster heater serves the kitchen dish washer. A 46-gallon 4.5kW electric storage water heater serves the cosmetology building. The kitchen hot water is served by a boiler connected to a storage tank.

A fractional hp circulation pump distributes water to end uses. The circulation pump operates continuously.

Hot Water Storage Unit and Hot Water Boiler

2.7 Food Service Equipment

The kitchen has mixture of electric and propane equipment that is used to prepare meals for students and staff. Most cooking is done using propane ovens. Bulk prepared foods are held in electric holding cabinets. Equipment is not high efficiency and is in fair condition.

The dishwasher is a non-ENERGY STAR high temperature, rack type unit.

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

Cooking Equipment and Dishwasher

2.8 Refrigeration

The kitchen has several stand-up refrigerators with either solid or glass doors as well as several stand-up solid door freezers. There is also a refrigerated chest. All equipment is standard and in fair condition.

The walk-in refrigerator has an estimated fractional ton compressor located on the roof and a two-fan evaporator.

The walk-in medium temperature freezer has a fractional ton compressor located on the roof and a two-fan evaporator.

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

Refrigerators

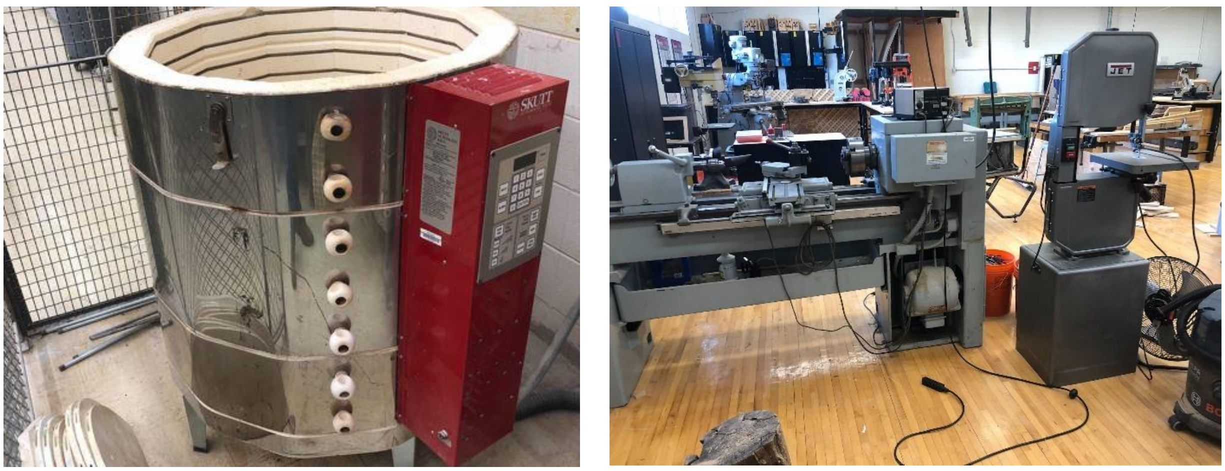
2.9 Plug Load and Vending Machines

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

There are approximately 253 computer workstations throughout the facility. Plug loads include general cafe and office equipment. There are typical classroom loads such as smart boards, projectors, shop equipment, a kiln, and fans.

There are several residential style refrigerators throughout the building. These vary in condition and efficiency.

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



Kiln and Shop Equipment

2.10 Water-Using Systems

Water is (mainly) provided by an on-site well.

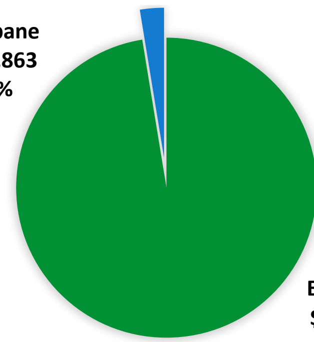
Potable water is used for drinking, cleaning, cooking, sanitary fixtures, landscaping, and vehicle washing.

EPA WaterSense® has set maximum flow rates for sanitary fixtures. They are: 1.28 gallons per flush (gpf) for toilets, 0.5 gpf for urinals, 1.5 gallons per minute (gpm) for lavatory faucets, and 2.0 gpm for showerheads.

3 ENERGY USE AND COSTS

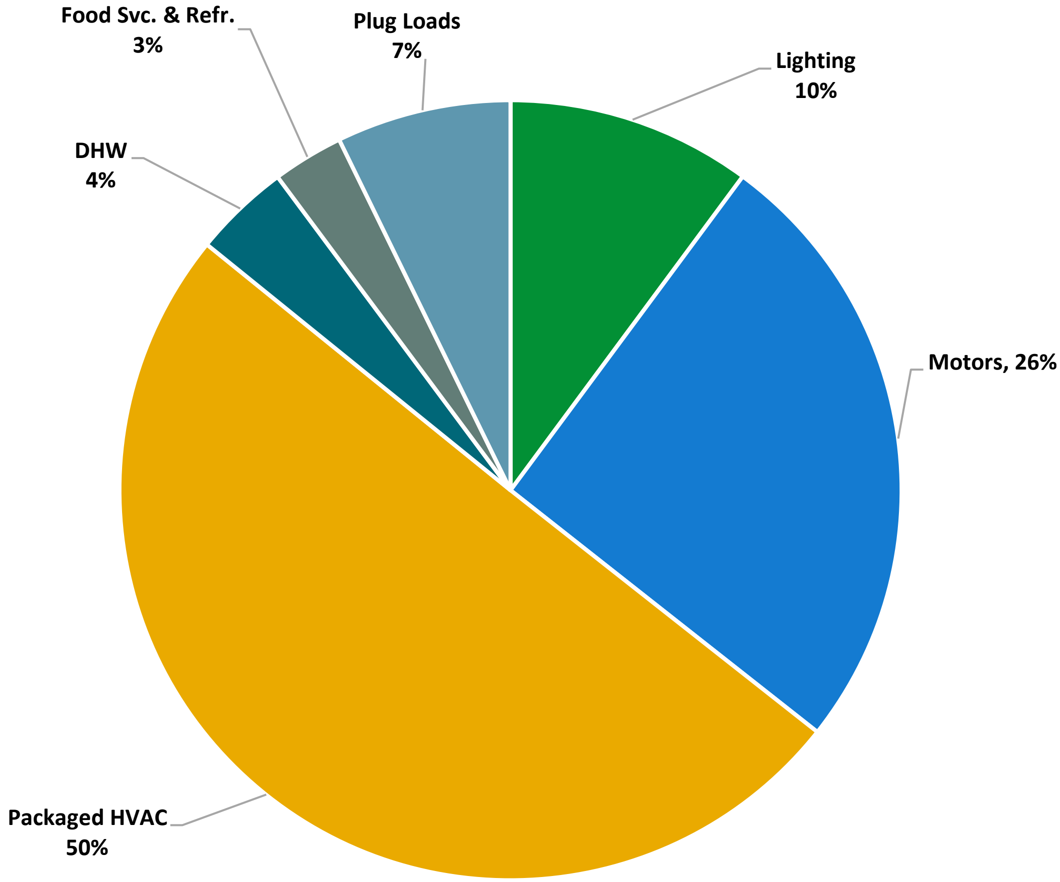
Twelve months of utility billing data are used to develop annual energy consumption and cost data. This information creates a profile of the annual energy consumption and energy costs.

Utility Summary		
Fuel	**Usage**	**Cost**
Electricity	3,571,128 kWh	$523,598
Propane	4,746 Gallons	$13,863
Total		**$537,461**



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.

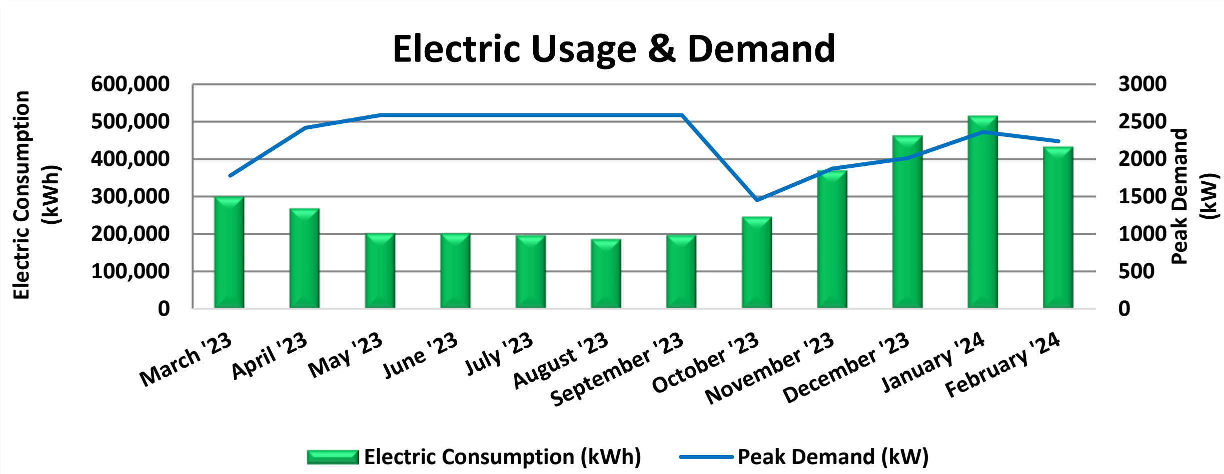
The energy auditor collects information regarding equipment operating hours, capacity, efficiency, and other operational parameters from facility staff, drawings, and on-site observations. This information is used as the inputs to calculate the existing conditions energy use for the site. The calculated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



Energy Balance by System

3.1 Electricity

JCP&L delivers electricity under rate class General Service Secondary Time Of Day 3 Ph JC_GST_01D , with electric production provided by Direct Energy, a third-party supplier.



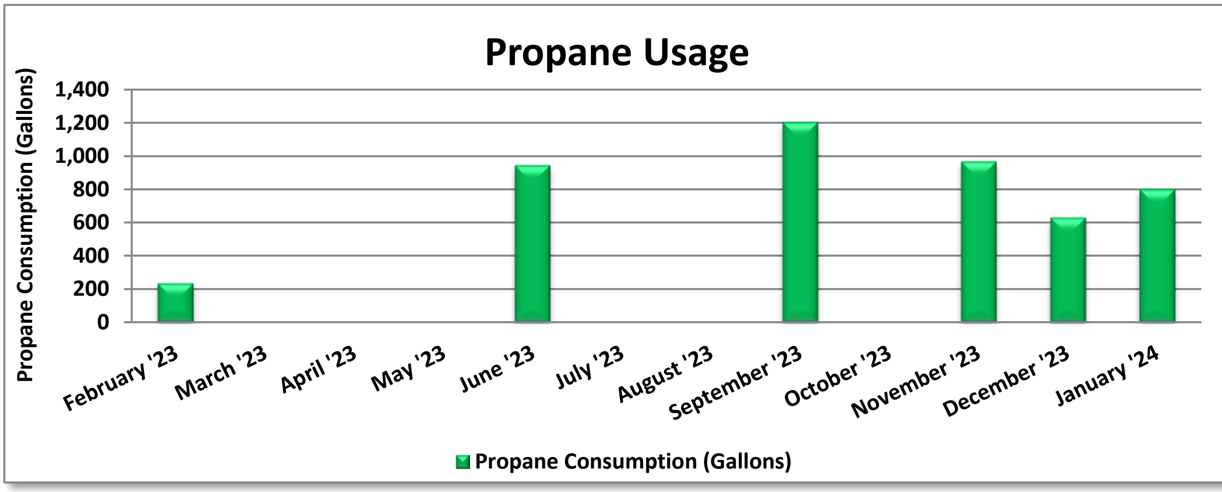
Electric Billing Data					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
4/6/23	30	299,762	1,780	$13,636	$41,189
5/4/23	28	268,387	2,419	$11,189	$39,132
6/5/23	32	201,984	2,586	$9,355	$31,163
7/7/23	32	202,052	2,586	$9,355	$31,259
8/4/23	28	196,586	2,586	$9,355	$29,968
9/7/23	34	186,391	2,586	$9,355	$29,582
10/6/23	29	198,084	2,586	$9,355	$30,729
11/6/23	31	246,117	1,451	$11,047	$37,144
12/6/23	30	370,067	1,874	$14,312	$53,431
1/6/24	31	463,017	2,014	$15,356	$64,452
2/6/24	31	515,735	2,364	$18,074	$73,431
3/7/24	30	432,730	2,238	$17,066	$63,553
Totals	**366**	**3,580,912**	**2,586**	**$147,458**	**$525,033**
Annual	**365**	**3,571,128**	**2,586**	**$147,055**	**$523,598**

Notes:

- Peak demand of 2,586 kW occurred in May '23.
- Average demand over the past 12 months was 2,256 kW.
- The average electric cost over the past 12 months was $0.147/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges. This report uses this blended rate to estimate energy cost savings.

3.2 Propane

Suburban Propane delivers Propane to the project site.



Propane Billing Data			
Period Ending	**Days in Period**	**Propane Usage (Gallons)**	**Fuel Cost**
3/1/23	31	235	$1,469
4/1/23	31	0	$0
5/1/23	30	0	$0
6/1/23	31	0	$0
7/1/23	30	945	$2,232
8/1/23	31	0	$0
9/1/23	31	0	$0
10/1/23	30	1,205	$2,855
11/1/23	31	0	$0
12/1/23	30	968	$2,742
1/1/24	31	631	$2,052
2/1/24	31	802	$2,628
Totals	**368**	**4,785**	**$13,977**
Annual	**365**	**4,746**	**$13,863**

Notes:

- The average Propane cost for the past 12 months is $2.921/Gallon, which is the blended rate used throughout the analysis.
- Fuel deliveries do not necessarily correspond to periods of use.

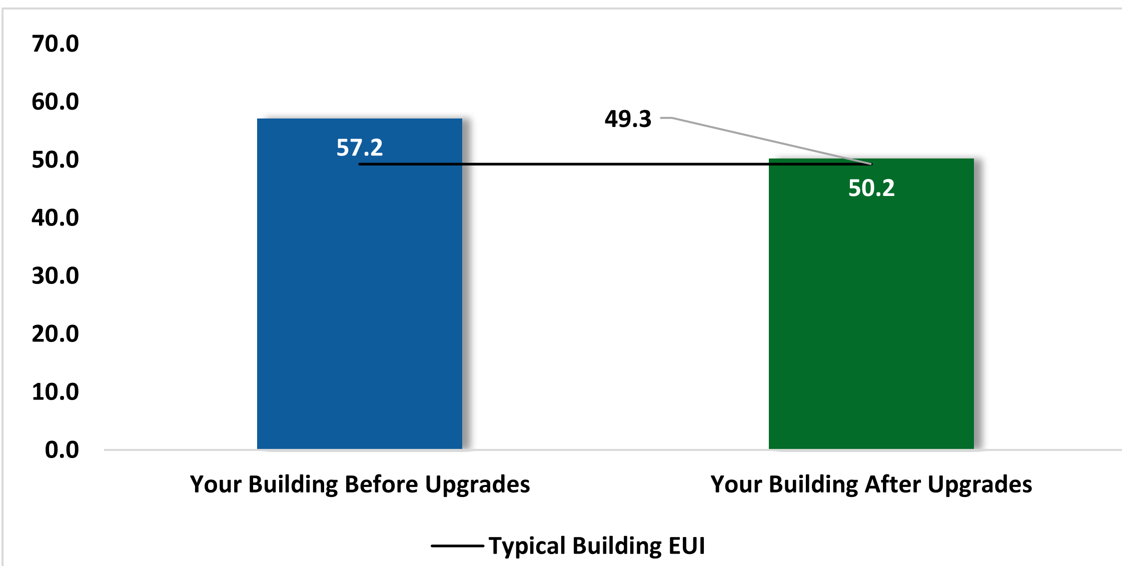
3.3 Benchmarking

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	38

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



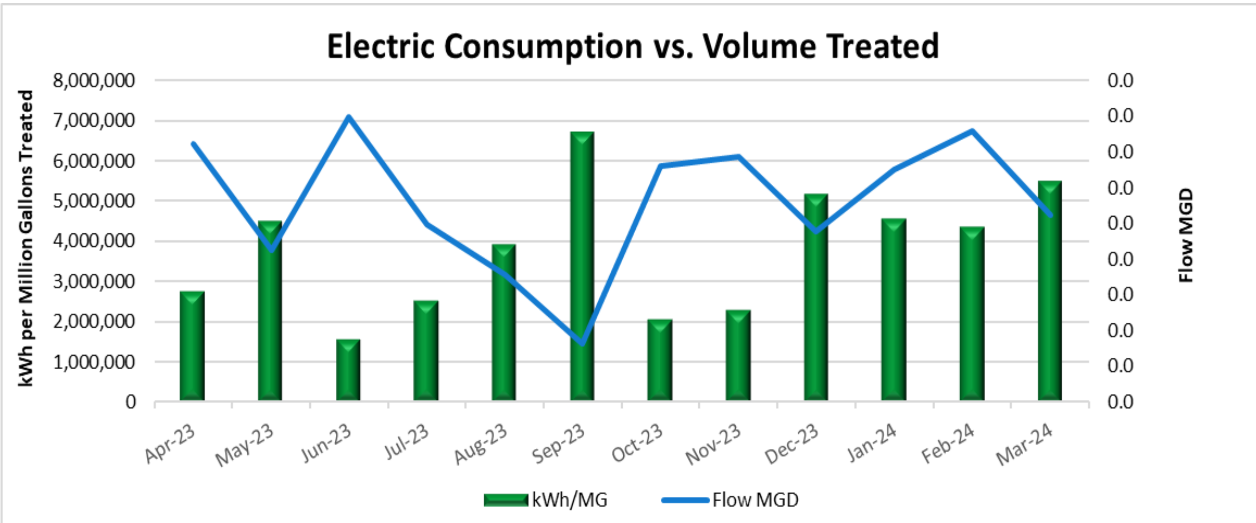
Energy Use Intensity Comparison[4]

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.

For wastewater treatment plants, the EUI is the total source energy use of the property divided by the average influent flow (in gallons per day).

[4] Based on all evaluated ECMs

Wastewater treatment plant energy use is typically dominated by electricity use with most of the electricity accounted for by pumps, blowers, and fans. Plant electricity use varies for many reasons including type of treatment, process volume, equipment efficiency, energy management practices, and climate. In the case of wastewater treatment plants, the score applies to treatment facilities that process more than 0.6 MGD. The score looks at energy performance while controlling for operating parameters such as influent flow, BOD levels, load factor, application of trickle filters and nutrient removal, and weather.



WWTP: kWh vs MGD

The energy use intensity (EUI) of plants that participated in the EPA's ENERGY STAR program through 2013 ranged from less than 5 to more than 50 kBtu/GPD. Generally, plants that have higher influent biological oxygen demand (BOD) use more energy. The following table from the 2015 ENERGY STAR Data Trends "Energy Use in Wastewater Treatment Plants" provides a high-level view of the effect of various parameters on wastewater plant energy use. The 5th percentile represents plants with lower EUIs.

	Range of Values		
Property Characteristic	5th percentile	Median	95th percentile
Influent Flow (MGD)	0.2	3	74
Influent Biological Oxygen Demand (mg/L)	102	200	391
Effluent Biological Oxygen Demand (mg/L)	1	5	20
Plant Load Factor (%)	25	60	100

Tracking your Energy Performance

Keeping track of your energy and water use on a monthly basis is one of the best ways to keep utility costs in check and keep your facility operating efficiently. 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.

3.4 Understanding Your Utility Bills

The State of New Jersey Department of the Public Advocate provides detailed information on how to read natural gas and electric bills. Your bills contain important information including account numbers, meter numbers, rate schedules, meter readings, and the supply and delivery charges. Gas and electric bills both provide comparisons of current energy consumption with prior usage.

Sample bills, with annotation, may be viewed at:
https://www.nj.gov/rpa/docs/Understanding_Electric_Bill.pdf
https://www.nj.gov/rpa/docs/Understanding_Gas_Bill.pdf

Why Utility Bills Vary

Utility bills vary from one month to another for many reasons. For this reason, assessing the effects of your energy savings efforts can be difficult.

Billing periods vary, typically ranging between 28 and 33 days. Electric bills provide the kilowatt-hours (kWh) used per month while gas bills provide therms (or hundreds of cubic feet - CCF) per month consumption information. Monthly consumption information can be helpful as a tool to assess your efforts to reduce energy, particularly when compared to monthly usage from a similar calendar period in a prior year.

Bills typically vary seasonally, often with more gas consumed in the winter for heating, and more electricity used in the summer when air conditioning is used. Facilities with electric heating may experience higher electricity use in the winter. Seasonal variance will be impacted by the type of heating and cooling systems used. Normal seasonal fluctuations are further impacted by the weather. Extremely cold or hot weathers causes HVAC equipment to run longer, increasing usage. Other monthly fluctuations in usage can be caused by changes in building occupancy. Utility bills provide a comparison of usage between the current period and comparable billing month period of the prior year. Year-to-year monthly use comparisons can point to trends with energy savings for measures/projects that were implemented within the timeframe, but these comparisons do not account for changing weather of occupancy patterns.

The price of fuel and purchased power used to produce and delivery electricity and gas fluctuates. Any increase or decrease in these costs will be reflected in your monthly bill. Additionally, billing rates occasionally change after justification and approval of the NJBPU. For this reason, it is more useful to review energy use rather than cost when assessing energy use trends or the impact of energy conservation measures implemented.

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			**56,905**	**1.0**	**0**	**$8,343**	**$34,600**	**$4,870**	**$29,730**	**3.6**	**57,303**
ECM 1	Install LED Fixtures	Yes	53,902	0.2	0	$7,903	$32,380	$4,520	$27,860	3.5	54,279
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	700	0.2	0	$103	$530	$60	$470	4.6	705
ECM 3	Retrofit Fixtures with LED Lamps	Yes	2,304	0.6	0	$338	$1,690	$290	$1,400	4.1	2,320
Lighting Control Measures			**18,807**	**5.9**	**0**	**$2,757**	**$23,710**	**$2,630**	**$21,080**	**7.6**	**18,939**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	18,807	5.9	0	$2,757	$23,710	$2,630	$21,080	7.6	18,939
Motor Upgrades			**907**	**0.2**	**0**	**$133**	**$3,700**	**$0**	**$3,700**	**27.8**	**913**
ECM 5	Premium Efficiency Motors	No	907	0.2	0	$133	$3,700	$0	$3,700	27.8	913
Variable Frequency Drive (VFD) Measures			**299,333**	**68.9**	**0**	**$43,888**	**$171,200**	**$20,600**	**$150,600**	**3.4**	**301,426**
ECM 6	Install VFD on Variable Air Volume (VAV) Fans	Yes	193,183	49.1	0	$28,324	$104,900	$12,400	$92,500	3.3	194,534
ECM 7	Install VFDs on Constant Volume (CV) Fans	Yes	52,817	14.8	0	$7,744	$35,600	$4,500	$31,100	4.0	53,187
ECM 8	Install VFDs on Water Supply Pump	Yes	53,333	4.9	0	$7,820	$30,700	$3,700	$27,000	3.5	53,706
Unitary HVAC Measures			**55,390**	**50.2**	**0**	**$8,121**	**$542,900**	**$27,400**	**$515,500**	**63.5**	**55,777**
ECM 9	Install High Efficiency Air Conditioning Units	No	50,923	46.5	0	$7,466	$519,800	$27,400	$492,400	65.9	51,279
ECM 10	Install High Efficiency Heat Pumps	No	4,467	3.6	0	$655	$23,100	$0	$23,100	35.3	4,498
Domestic Water Heating Upgrade			**5,136**	**0.0**	**0**	**$753**	**$740**	**$250**	**$490**	**0.7**	**5,172**
ECM 11	Install Low-Flow DHW Devices	Yes	5,136	0.0	0	$753	$740	$250	$490	0.7	5,172
Food Service & Refrigeration Measures			**13,519**	**1.5**	**0**	**$1,982**	**$12,350**	**$930**	**$11,420**	**5.8**	**13,614**
ECM 12	Dishwasher Replacement	Yes	9,072	1.0	0	$1,330	$10,800	$700	$10,100	7.6	9,136
ECM 13	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	820	0.1	0	$120	$750	$80	$670	5.6	826
ECM 14	Vending Machine Control	Yes	3,627	0.4	0	$532	$800	$150	$650	1.2	3,652
TOTALS			**449,996**	**127.8**	**0**	**$65,978**	**$789,200**	**$56,680**	**$732,520**	**11.1**	**453,143**

* - 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).

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		**56,905**	**1.0**	**0**	**$8,343**	**$34,600**	**$4,870**	**$29,730**	**3.6**	**57,303**
ECM 1	Install LED Fixtures	53,902	0.2	0	$7,903	$32,380	$4,520	$27,860	3.5	54,279
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	700	0.2	0	$103	$530	$60	$470	4.6	705
ECM 3	Retrofit Fixtures with LED Lamps	2,304	0.6	0	$338	$1,690	$290	$1,400	4.1	2,320
Lighting Control Measures		**18,807**	**5.9**	**0**	**$2,757**	**$23,710**	**$2,630**	**$21,080**	**7.6**	**18,939**
ECM 4	Install Occupancy Sensor Lighting Controls	18,807	5.9	0	$2,757	$23,710	$2,630	$21,080	7.6	18,939
Variable Frequency Drive (VFD) Measures		**299,333**	**68.9**	**0**	**$43,888**	**$171,200**	**$20,600**	**$150,600**	**3.4**	**301,426**
ECM 6	Install VFD on Variable Air Volume (VAV) Fans	193,183	49.1	0	$28,324	$104,900	$12,400	$92,500	3.3	194,534
ECM 7	Install VFDs on Constant Volume (CV) Fans	52,817	14.8	0	$7,744	$35,600	$4,500	$31,100	4.0	53,187
ECM 8	Install VFDs on Water Supply Pump	53,333	4.9	0	$7,820	$30,700	$3,700	$27,000	3.5	53,706
Domestic Water Heating Upgrade		**5,136**	**0.0**	**0**	**$753**	**$740**	**$250**	**$490**	**0.7**	**5,172**
ECM 11	Install Low-Flow DHW Devices	5,136	0.0	0	$753	$740	$250	$490	0.7	5,172
Food Service & Refrigeration Measures		**13,519**	**1.5**	**0**	**$1,982**	**$12,350**	**$930**	**$11,420**	**5.8**	**13,614**
ECM 12	Dishwasher Replacement	9,072	1.0	0	$1,330	$10,800	$700	$10,100	7.6	9,136
ECM 13	Refrigerator/Freezer Case Electrically Commutated Motors	820	0.1	0	$120	$750	$80	$670	5.6	826
ECM 14	Vending Machine Control	3,627	0.4	0	$532	$800	$150	$650	1.2	3,652
TOTALS		**393,700**	**77.4**	**0**	**$57,724**	**$242,600**	**$29,280**	**$213,320**	**3.7**	**396,453**

* - 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).

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		**56,905**	**1.0**	**0**	**$8,343**	**$34,600**	**$4,870**	**$29,730**	**3.6**	**57,303**
ECM 1	Install LED Fixtures	53,902	0.2	0	$7,903	$32,380	$4,520	$27,860	3.5	54,279
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	700	0.2	0	$103	$530	$60	$470	4.6	705
ECM 3	Retrofit Fixtures with LED Lamps	2,304	0.6	0	$338	$1,690	$290	$1,400	4.1	2,320

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

ECM 1: Install LED Fixtures

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

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

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

Affected Building Areas: corridor and exterior 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: maintenance building

ECM 3: Retrofit Fixtures with LED Lamps

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

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

Affected Building Areas: all areas with fluorescent fixtures with T8 tubes, CFL, or incandescent fixtures

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		**18,807**	**5.9**	**0**	**$2,757**	**$23,710**	**$2,630**	**$21,080**	**7.6**	**18,939**
ECM 4	Install Occupancy Sensor Lighting Controls	18,807	5.9	0	$2,757	$23,710	$2,630	$21,080	7.6	18,939

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.

<u>ECM 4: Install Occupancy Sensor Lighting Controls</u>

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

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

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

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

Affected Building Areas: classrooms, theater, restrooms, and storage rooms

4.3 Motors

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Motor Upgrades		**907**	**0.2**	**0**	**$133**	**$3,700**	**$0**	**$3,700**	**27.8**	**913**
ECM 5	Premium Efficiency Motors	907	0.2	0	$133	$3,700	$0	$3,700	27.8	913

<u>ECM 5: Premium Efficiency Motors</u>

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

Affected Motors:

Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Additional Motor Description
Roof High School	Vernon High School	2	Supply Fan	0.5	Supply Fan
Roof High School	Vernon High School	2	Supply Fan	0.5	Supply Fan
Roof High School	Vernon High School	1	Supply Fan	1.5	Supply Fan
Roof High School	Vernon High School	2	Supply Fan	0.5	Supply Fan

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

4.4 Variable Frequency Drives (VFD)

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**299,333**	**68.9**	**0**	**$43,888**	**$171,200**	**$20,600**	**$150,600**	**3.4**	**301,426**
ECM 6	Install VFD on Variable Air Volume (VAV) Fans	193,183	49.1	0	$28,324	$104,900	$12,400	$92,500	3.3	194,534
ECM 7	Install VFDs on Constant Volume (CV) Fans	52,817	14.8	0	$7,744	$35,600	$4,500	$31,100	4.0	53,187
ECM 8	Install VFDs on Water Supply Pump	53,333	4.9	0	$7,820	$30,700	$3,700	$27,000	3.5	53,706

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 VFD on Variable Air Volume (VAV) Fans

Replace existing air volume control devices on variable volume fans, such as inlet vanes and variable pitch fan blades, with VFDs. Inlet guide vanes and variable pitch fan blades are an inefficient means of controlling the air volume compared to VFDs. The existing volume control device will be removed or permanently disabled, and the control signal will be redirected to the VFD to determine proper fan motor speed.

Energy savings result from using a more efficient control device to regulate the air flow provided by the fan. Additional maintenance savings may result from this measure. VFDs are solid state electronic devices, which generally require less maintenance than mechanical air volume control devices.

Affected Air Handlers: AHUs in high school

ECM 7: Install VFDs on Constant Volume (CV) Fans

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

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

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

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

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

Affected Air Handlers: AHUs in high school

ECM 8: Install VFDs on Water Supply Pump

Install VFDs to control water supply pump(s). Since water supply systems become an open system whenever and end-use valve or fixture is opened, the VFD will need to be controlled to maintain sufficient pressure in the distribution system to deliver water to the furthest point in the system.

Energy savings result from reducing the pump speed during low demand periods. Ensure that your control system includes the sensors and inputs required to optimize water flow in your water supply.

4.5 Unitary HVAC

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Unitary HVAC Measures		**55,390**	**50.2**	**0**	**$8,121**	**$542,900**	**$27,400**	**$515,500**	**63.5**	**55,777**
ECM 9	Install High Efficiency Air Conditioning Units	50,923	46.5	0	$7,466	$519,800	$27,400	$492,400	65.9	51,279
ECM 10	Install High Efficiency Heat Pumps	4,467	3.6	0	$655	$23,100	$0	$23,100	35.3	4,498

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

ECM 9: Install High Efficiency Air Conditioning Units

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

Affected Units: ductless minis and packaged units

ECM 10: Install High Efficiency Heat Pumps

Replace standard efficiency heat pumps with high efficiency 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: ductless mini-HPs

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		**5,136**	**0.0**	**0**	**$753**	**$740**	**$250**	**$490**	**0.7**	**5,172**
ECM 11	Install Low-Flow DHW Devices	5,136	0.0	0	$753	$740	$250	$490	0.7	5,172

ECM 11: 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.

4.7 Food Service and Refrigeration Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Food Service & Refrigeration Measures		**13,519**	**1.5**	**0**	**$1,982**	**$12,350**	**$930**	**$11,420**	**5.8**	**13,614**
ECM 12	Dishwasher Replacement	9,072	1.0	0	$1,330	$10,800	$700	$10,100	7.6	9,136
ECM 13	Refrigerator/Freezer Case Electrically Commutated Motors	820	0.1	0	$120	$750	$80	$670	5.6	826
ECM 14	Vending Machine Control	3,627	0.4	0	$532	$800	$150	$650	1.2	3,652

ECM 12: Dishwasher Replacement

Replace existing dishwashers with new energy-efficient under-counter single-rack dishwashers. New high efficiency models often use an average of 40% less energy and water, compared to current standard efficiency equipment.

ECM 13: Refrigerator/Freezer Case Electrically Commutated Motors

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

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

ECM 14: Vending Machine Control

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

4.8 Measures for Future Consideration

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

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

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

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

Upgrade to a Heat Pump System

Electric resistance heating units work by passing an electric current through wires to heat them. The system is 100% efficient since for every unit of electricity consumed, one unit of heat is produced.

But there is a way to convert electricity to create heat at better than a 1:1 ratio. Heat pumps operate on a more efficient principle, the refrigeration cycle. Instead of directly converting electricity to heat, electricity does the work, via a compressor, of moving refrigerant through a system that transfers heat from a cooler place to a warmer place. That system can move three to five as much energy as is available using electric resistance heating methods. Heat pumps work in a similar manner to an air conditioner, except they reverse the cooling process to circulate warm air instead of cold air. Also, heat pumps are generally capable of dispensing refrigerated air as they can typically be operated in air conditioning mode.

Electric resistance heat, including electric furnaces and baseboard heaters, can be inexpensive to install but often expensive to run. Facilities with these systems can save substantial energy at a moderate cost by installing a heat pump when they replace a central air conditioner.

Even in buildings without central air-conditioning, there are opportunities to save energy when an existing electric furnace needs to be replaced, as well as opportunities to install ductless electric heat pumps in buildings with baseboard electric heaters and electric fan coils. Unit ventilators with built-in electric resistance heaters can be replaced with unit ventilators with integrated heat pumps.

Electric heat pumps have high coefficient of performance (COP) ratings and are substantially more efficient than traditional electric heating systems. Further investigation is required to determine whether installing a heat pump system is a cost-effective solution when replacing existing electrical heating systems.

VRF Systems

Consider variable refrigerant flow (VRF) systems as part of a comprehensive package unit upgrade project. (VRF systems use direct expansion (DX) heat pumps to transport heat between an outdoor condensing unit and a network of indoor evaporators, located near or within the conditioned space, through refrigerant piping installed in the building. Attributes that distinguish VRF from other DX system types are:

- Multiple indoor units connected to a common outdoor unit
- Scalability
- Variable capacity
- Distributed control
- Simultaneous heating and cooling capability

VRF provides flexibility by allowing for many different indoor units (with different capacities and configurations), individual zone control, the unique ability to offer simultaneous heating and cooling in separate zones on a common refrigerant circuit, and heat recovery from one zone to another. VRF systems are equipped with at least one variable-speed and/or variable-capacity compressor.

To match the building's load profiles, energy is transferred from one indoor space to another through the refrigerant line, and only one energy source is necessary to provide both heating and cooling. VRF systems also operate efficiently at part load because of the compressor's variable capacity control. VRF systems are ideal for applications with varying loads or where zoning is required. Some other advantages of VRF systems include consistent comfort, quiet operation, energy efficiency, installation flexibility, zoned heating and cooling, state-of-the-art controls, and reliability.

VRF systems are more expensive than conventional heat pump systems; however, the higher initial cost can be offset by improved cooling efficiency during part load operation—a SEER (cooling) rating of 18.0 is not uncommon for small packaged VRF-equipped heat pumps.

When you are replacing packaged HVAC equipment, we recommend a comprehensive approach. Work with your contractor or design engineer to make sure your systems are sized and zoned according to current space configurations and occupancy. Select high efficiency equipment and controls that match your heating and cooling needs. Commission the system and controls to ensure proper operation, comfort, ventilation, and energy use.

4.9 Wastewater Process Energy Considerations

"Electricity constitutes between 25 and 40 percent of a typical wastewater treatment plant's (WWTP's) operating budget,"[5] and process motors and blowers often consume 75% or more of the energy used in plant operations. Regardless of your plant's size and treatment processes there are fundamental ways to approach operations, controls, retrofits, and planned upgrades to ensure reliable operations that match energy use to your production requirements.

Energy Management

Strategic investments in improved plant efficiency require organizational commitment and a partnership between stakeholders including management, engineers, operators, and the public. The Public Service Commission of Wisconsin, for example, offers the following outline for an Energy Management Plan:

1. Establish an organizational commitment
2. Assemble and initiate an energy team
3. Develop a baseline of facility energy use
4. Develop equipment energy use profiles
5. Identify and assess project opportunities
6. Prioritize implementation opportunities
7. Develop and implement the plan
8. Track and report progress
9. Continually update the plan and achieve energy management goals[6]

Baseline Measurements

A process improvement plan begins with collecting information and establishing a baseline. In Section 3.0, we provided a graph comparing monthly electricity consumption and production records (kWh per million gallons treated). This energy baseline can help you understand the relative efficiency of the plant over time and in consideration of seasonal variations. A daily baseline can be established to determine how energy use varies with diurnal flow; such a correlation requires real-time data for both power and flow. Measurement tools include smart meters, SCADA systems, and sub metering approaches.

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[5] Statewide Assessment of Energy Use by the Municipal Water and Wastewater Sector - New York State Energy Research and Development Authority, November 2008.

[6] Energy Best Practices Guide: Water & Wastewater Industry, Public Service Commission of Wisconsin, 2020

Assess and Identify

After determining how energy is spent, consider system changes (equipment or operations) that reduce energy consumption or power demand. Also consider renewable energy opportunities that can displace purchased energy. Calculate the costs and savings for proposed measures. Opportunities can be categorized by process area or funding approach and should take into consideration the existing equipment condition and expected life.

Prioritize, Implement, Track, and Report

Evaluate costs and benefits of proposed changes and prioritize the opportunities. An Energy Management Plan should reflect the priorities of the stakeholders and be effectively executed to realize energy benefits. Preferred implementation strategies may vary depending on measure and scope. Tracking and reporting mechanisms should be put in place to report results.

Best Practices

The following is a list of Operation and Maintenance practices, arranged by systems, to consider. The list is organized by system (blower aeration, mechanical aeration, mixing, pumping, etc.) in approximate order from highest to lowest energy use. Because some measures are common to multiple systems, they are repeated, so that each system has a complete list.

Blower Aeration System
Fix air piping leaks. For exposed pipes, apply soapy water to create bubbles. For underground pipes, look for air bubbles surfacing through soil during or just after rain events.
Reduce air demand – take excess aeration basins off line; eliminate air flow to empty aeration basins; reduce air flow in aerated channels to that necessary to keep solids in suspension; reduce air flow in aerated grit chamber to that necessary to separate organics from grit.
Eliminate air flow restrictions – clean intake air filters, fix sticking check valves, open or eliminate throttling valves, enlarge undersized valves or piping.
Minimize inlet air temperature for centrifugal blowers, especially those which draw air from inside buildings (such as turbo blowers). Consider piping blower intake to outside of building.
Dissolved Oxygen (DO) Control Sensors – clean and check DO Probe calibration twice a month; airflow meters and pressure sensors annually.
Check placement of DO probe in basin for representative DO reading.
Lower DO set point to lowest possible setting which results in proper treatment. (That should be less than 2 PPM. However, if either ammonia or nitrogen removal is required, higher set point may be required, especially during cold weather).
Lower blower output pressure by fully opening air valve to highest demand aeration zone, and then balancing other air valves to obtain uniform DO set point concentration across remainder of aeration basin; check and tune the settings annually. Use Most Open Valve control strategy for plants with centrifugal blowers and more than three aeration basins.
Monitor Blower Performance – check air flow and pressure against blower curve to determine if units are operating at most efficient point.
Identify most efficient blower (highest SCFM/kW) and program controls to run that unit as primary blower.
If different capacity blowers are available, program blower operation to match diurnal air demand. If blowers are positive displacement units, adjust belts and sheaves to match output to diurnal air demand.
Monitor SCADA System to identify if two or more blowers operate at reduced speed. Determine if one unit at higher speed will satisfy demand while drawing less kW. If so, take excess equipment off line.
Diffuser air flow – check CFM/diffuser rate. If it exceeds manufacturer's recommendation, add diffusers or reduce air flow per diffuser to restore oxygen transfer efficiency.
Diffuser maintenance – every week, look for air "boils" which could indicate broken pipes or diffusers; measure air pressure of each drop leg (at a set SCFM blower air flow rate) to detect distribution piping resistance and

diffuser fouling. Flex diffuser membranes with air pulses or clean diffusers as needed to reduce pressure and increase oxygen transfer efficiency.
If nitrification is not required, lower Mean Cell Residence Time to 4 - 5 days and turn off aeration system from 1 to 2 hours during the early morning low flow period in order to inhibit nitrifying bacteria.
Convert first zone of aeration basin to anoxic selector (if nitrifying) or to anaerobic selector (if not nitrifying). The selector helps remove surfactants, which increases oxygen transfer efficiency.
Mechanical Aeration Systems
Check that the submerged depth of the mechanical aerator is set to produce the maximum mixing and aeration at a lowest amperage draw.
Stage unit operation to match DO demand. If different capacity units are available, program operation to match diurnal air demand. Use timers to turn units ON/OFF or VFD's to change speed. Take excess units off line.
Monitor SCADA System to identify if two or more aerators operate at reduced speed. Determine if one unit at higher speed will satisfy demand while drawing less kW. If so, take excess equipment off line.
Dissolved Oxygen (DO) Controls - Lower DO set point to lowest possible setting which results in proper treatment (less than 2.0 PPM for aeration basins and as low as 0.2 PPM for aerobic digesters).
DO probe – clean and check calibration twice per month, replace parts as needed.
Identify most efficient unit (lbs of O2 transferred/kWh) and program controls to run that unit as primary unit.
If nitrification is not required, lower Mean Cell Residence Time to 4 -5 days and turn off aeration system from 1 to 2 hours during the early morning low flow period in order to inhibit nitrifying bacteria.
Monitor units for excessive vibration and amp draw to detect fowling. Clean and recheck.
Secondary Treatment Mixing System (in anoxic or anaerobic cells of aeration system) **and Anaerobic Digester Mixing System**
Reduce number of aeration basin mixers and/or speed of units to point where solids settling is just beginning to be observed (visually on the surface or by tube sampler through tank depth). Take excess equipment off line.
Reduce number of anaerobic digester mixers (or pumps) and/or speed of units to optimize methane production. Monitor digester solids concentration at various levels and maintain sufficient mixing to ensure that solids separation is not occurring. Take excess units off line.
Identify most efficient unit (GPM/kW) and program controls to run that unit as primary unit.
Monitor units for excessive vibration and amp draw to detect fowling. Clean and recheck.
Pumping Systems – Lift Stations, RAS; WAS; Trickling Filter and Aeration Basin Recirculation
Reduce RAS, WAS, and Primary Sludge flow rates to minimum needed. This increases solids concentrations and reduces pumping of excess water
Reduce Trickling Filter and Aeration Basin recirculation rates to minimum needed. This reduces pumping of excess water.
Fix piping leaks and pump leaks (packing & seals).
Eliminate piping restrictions: throttling valves, unnecessary valves, sticking check valves.
Eliminate air from pipelines by checking and flushing air release valves.
Flush scum and sludge piping periodically to reduce head loss.
Reduce pumping head – raise liquid level at pump inlet to maximize suction pressure.
Monitor pump performance – check flow and total head (discharge pressure minus suction pressure) against pump curve to determine if units are operating on the curve and at most efficient point on the curve.
Where there are multiple pumps, identify most efficient pump (GPM/kW) and program controls to run that unit as primary pump. Take excess units off line.
Monitor pumps and motors for excessive vibration and amp draw to detect plugging and excessive wear. Clean and check clearance between impeller and volute. Replace impeller and/or wear rings if necessary.
Plant Water System for Non-potable Use
Reduce demand – adjust spray nozzles in clarifiers and aeration basins; use quick On/Off/adjustable flow nozzles on wash down hoses; adjust pump seal water flow to lowest recommended setting; reduce chlorine gas dilution water flow rate.
Fix piping leaks.
Eliminate piping restrictions, throttling valves, unnecessary valves, sticking check valves.
Tune pump control system – adjust pressure set point to minimum needed.

Install accumulator pressure tank to allow system to turn off when there is no demand.
Identify most efficient unit (GPM/kW) and program controls to run that unit as primary unit.
Monitor pumps and motors for excessive vibration and amp draw to detect plugging and excessive wear. Clean and check clearance between impeller and volute. Replace impeller and/or wear rings if necessary.
Program SCADA system to display total daily usage and to alarm for excessive use of plant water.
Ultra Violet Disinfection System
Replace lamps with low pressure, high output lamps, if possible.
Keep lamps clean and remove scaling.
Program light bank control for ON/OFF operation and intensity variation in proportion to plant flow
Check quarterly that UV intensity meter, water turbidity meter, and flow meter are clean, calibrated, and operating correctly.
Odor Control System
Reduce air flow to minimum needed to control odor and corrosion during warm weather and to ensure code required air changes per hour.
Consider enclosing odor sources so as to minimize the need to treat air for the entire building.
Consider turning system off during cool weather when odor production is minimal.
Consider using odor monitoring equipment to automatically control the system.
For biofilters, measure air pressure of each distribution pipe at a set SCFM blower flow rate, to detect piping resistance, and to determine if filter media is compacting and needs to be changed.
Other Measures
Use SCADA System to observe trends, including larger motor kW demand and monthly plant kWh/Million Gallons treated. Use information to tune the controls.
Use SCADA System to operate only the equipment needed, so blower, pumps and mixer outputs match demands.
Regularly check for manual overrides (HOA switch in HAND position) so control systems can do their jobs. Fix or tune control systems so manual overrides are not necessary.
Fix equipment that is not operating correctly or efficiently, such as worn bearings, failed control equipment and sensors, or improperly placed sensors.
Examine equipment which operates 24/7 or on a fixed schedule, like odor control and ventilation blowers. Adjust operation to meet needs and seasonal variation.
Rethink *Standard Operating Procedures* to maximize energy efficiency.

The following table developed by Wisconsin "Focus on Energy" shows the typical energy savings and payback periods for a variety of wastewater process measures and best practices, grouped by category. There is no one measure or mix of measures that is appropriate for every facility. Measures should not be assessed or implemented in isolation since there are often interactive effects that will impact the overall savings of the combined measures. A well-executed Energy Management Plan will lead you to the fundamental measures applicable to your site conditions.

Process	Best Practices Measure	Typical Energy Savings of unit of process (%)	Typical Payback (Years)
Operations	Operational Flexibility	10 – 25	< 2
	Staging of Treatment Capacity	10 – 30	< 2
	Manage for Seasonal/Tourist Peaks Variable	Variable	4 – 6
	Flexible Sequencing of Basin Use	15 – 40	2 – 5
	Cover Basins to Reduce Freezing and Aerosol or Odor Emissions	Variable	Variable
	Reduce Fresh Water Consumption through Final Effluent Recycling	10 – 50	2 – 3
Aeration	Optimize Aeration System	30 – 70	3 – 7
	Fine Bubble Aeration	20 – 75	1 – 5
	Variable Blower Air Flow Rate	15 – 50	<3
	Dissolved Oxygen Control	20 – 50	2 – 3
	Cascade Aeration	Variable	Variable
	Aerobic Digestion Options	20 – 50	Variable
	Blower Technology Options	10 – 25	1 – 7
	Assess Aeration System Configuration	Variable	Variable
Sludge and Biosolids	Improve Solids Capture in Dissolved Air Flotation (DAF)	Variable	Variable
	Evaluate Replacing Centrifuge with Screw Press	Variable	Variable
	Replace Centrifuge with Gravity Belt Thickener	Variable	Variable
	Digestion Options	Variable	Variable
	Mixing Options in Aerobic Digesters	10 – 50	1 – 3
	Mixing Options in Anaerobic Digesters	Variable	Variable
	Recover Heat from Wastewater	Variable	Variable
Special Treatment Options	Anoxic-Zone Mixing Options	25 – 50	3 – 5
	Side-stream De-ammonification	–	–
	Biotower Energy Efficiency	15 – 30	Variable
Biogas Enhancement	Optimize Anaerobic Digester Performance	Variable	Variable
	Use Biogas to Produce Combined Heat and/or Power (CHP)	Variable	Variable
	Assessment of Beneficial Utilization	Variable	Variable

Table based on information published by Wisconsin Focus on Energy in the "ENERGY BEST PRACTICES GUIDE: WATER & WASTEWATER INDUSTRY" (February 2020)– https://focusonenergy.com

Third Party Resources

DOE and EPA have developed several publicly available software tools that help wastewater treatment plant operators measure and track energy performance.

EPA ENERGY STAR Portfolio Manager

Portfolio Manager allows users to track and assess energy and water use at individual sites and across portfolios of buildings. Portfolio Manager uses survey data and regression analysis to calculate an ENERGY STAR score, which allows buildings and wastewater treatment plants to compare energy performance against peers.

In the case of wastewater treatment plants, the score applies to primary, secondary, and advanced treatment facilities that process more than 0.6 MGD, with or without nutrient removal capacity. The score looks at energy performance while controlling for operating parameters such as influent flow, BOD levels, load factor, application of trickle filters and nutrient removal, and weather. In addition to calculating the score, Portfolio Manager can track normalized energy performance over time, using the same operational parameters that generate the score. The tool represents energy performance as energy use intensity per flow (kBtu/mg) and can generate reports with a host of other metrics such as energy cost, greenhouse gas emissions, and energy use by type (e.g., electricity, natural gas, fuel oil) using downloadable templates. An ENERGY STAR Portfolio has been established for this facility and is discussed in more detail in Section 3 of this report.

https://www.energystar.gov/buildings/benchmark

EPA Energy Assessment Tool

The Energy Assessment Tool (EAT) is a spreadsheet-based tool developed by EPA's Region 4 office. The tool enables wastewater treatment facility operators to easily and quickly develop metrics for energy efficiency and energy savings. Facilities can develop absolute, flow-normalized, and BOD load-normalized values with this tool. This tool has limited data requirements and provides a quick look at energy usage and how it has changed over a period of up to five years.

https://www.epa.gov/sustainable-water-infrastructure/energy-efficiency-water-utilities

DOE Energy Performance Indicator (EnPI) Tool

The EnPI tool is a regression analysis tool developed by DOE to help energy managers establish a normalized baseline of energy consumption and track annual progress in energy intensity improvement and energy savings.

In constructing the regression models, users include the independent variables they believe impact energy consumption in their plants. This contrasts with Portfolio Manager, which hardwires those variables into the tool. The advantage of the EnPI approach is that it gives users greater flexibility to include the variables most relevant to their plants. On the other hand, it requires greater investigation from the user to determine what those variables are.

The tool generates several energy models, and it highlights the model with the greatest statistical validity, based on DOE-developed guidance. Outputs include energy performance improvement (in percentage terms) and annual and total energy savings (in Btu). The tool allows energy managers to roll up multiple treatment plants and other facility-level energy data and metrics to an enterprise level to determine organization-wide energy performance. DOE has also released an EnPI Lite tool.

https://www.energy.gov/eere/amo/articles/energy-performance-indicator-tool

DOE Wastewater Energy Management Toolkit (SWIFt)

This toolkit helps wastewater facilities establish and implement energy management and planning by collecting best practices and innovative approaches used by wastewater facilities who partnered with DOE's Sustainable Wastewater Infrastructure of the Future (SWIFt) Accelerator. The toolkit resources support best practices and innovative approaches successfully used by wastewater facilities to establish and implement energy management and planning. The kit includes sections on Energy Data Management, Measure Evaluation, Project Financing, and Improvement Planning.

https://betterbuildingssolutioncenter.energy.gov/wastewater-energy-management-toolkit

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[7] . 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.

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

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

tension, and cleaning and lubricating bearings. Consult a licensed technician to assess these and other motor maintenance strategies.

Fans to Reduce Cooling Load

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

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 5-10°F during low occupancy hours (reduce heating setpoints and increase cooling setpoints). Cooling load can be reduced by increasing the facility's occupied setpoint temperature. In general, during the cooling season, thermostats should be set as high as possible without sacrificing occupant comfort.

Economizer Maintenance

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

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

AC System Evaporator/Condenser Coil Cleaning

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

HVAC Filter Cleaning and Replacement

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

Ductwork Maintenance

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

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

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

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

Optimize HVAC Equipment Schedules

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

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

Water Heater Maintenance

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

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

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

Procurement Strategies

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

6 WATER BEST PRACTICES

Getting Started

The commercial and institutional sector is the second largest consumer of publicly supplied water in the United States, accounting for 17% of the withdrawals from public water supplies[8]. In New Jersey, excluding water used for power generation, approximately 80% of total water use was attributed to potable supply during the period of 2009 to 2018. Water withdrawals for potable supply have not changed noticeably during the period from 1990 to 2018[9].

Water management planning serves as the foundation for any successful water reduction effort. It is the first step a commercial or institutional facility owner or manager should take to achieve and sustain long-term water savings. Understanding how water is used within a facility is critical for the water management planning process. A water assessment provides a comprehensive account of all known water uses at the facility. It allows the water management team to establish a baseline from which progress and program success can be measured. It also enables the water management team to set achievable goals and identify and prioritize specific projects based on the relative savings opportunities and project cost-effectiveness.

Water conservation devices may significantly reduce your water and sewer usage costs. Any reduction in water use reduces grid-level electricity use since a significant amount of electricity is used to treat and deliver water from reservoirs to end users.

For more information regarding water conservation or additional details regarding the practices shown below go to the EPA's WaterSense website[10] or download a copy of EPA's "WaterSense at Work: Best Management Practices for Commercial and Institutional Facilities"[11] to get ideas for creating a water management plan and best practices for a wide range of water using systems.

Leak Detection and Repair

Identifying and repairing leaks and other water use anomalies within a facility's water distribution system or from processes or equipment can keep a facility from wasting significant quantities of water. Examples of common leaks include leaking toilets and faucets, drip irrigation malfunctions, stuck float valves, and broken distribution lines. Reading meters, installing failure abatement technologies, and conducting visual and auditory inspections are important best practices to detect leaks. Train building occupants, employees, and visitors to report any leaks that they detect. To reduce unnecessary water loss, detected leaks should be repaired quickly. Repairing leaks in water distribution that is pressurized by on-site pumps or in heated or chilled water piping will also reduce energy use.

Toilets and Urinals

Toilets and urinals are considered sanitary fixtures and are found in most facilities. High efficiency fixtures are at least 20% more efficient than available standard products. Leaking or damaged equipment is a substantial source of water waste. Train users to report continuously flushing, leaking, or otherwise improperly operating equipment to the appropriate personnel. Depending on the age of the equipment

[8] Estimated from analyzing data in: Solley, Wayne B,. et al, "Estimated Use of Water in the United States in 1995", U.S Geological Suvey Circular 1200, (1998)

[9] https://dep.nj.gov/wp-content/uploads/dsr/trends-water-supply.pdf

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

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

and the frequency of use, it may be cost effective to replace older inefficient fixtures with current generation WaterSense labeled equipment.

Commercial facilities typically use tank toilets or wall-mount flushometers. Educate and inform users with restroom signage and other means to avoid flushing inappropriate objects. For tank toilets, periodically check to ensure fill valves are working properly and that water level is set correctly. Annually test toilets to ensure the flappers are not worn or allowing water to seep from the tank into the bowl and down the sewer. Control stops and piston valves on flushometer toilets should be checked at least annually.

Most urinals use water to flush liquid. These standard single-user fixtures are present in most facilities. Non-water urinals use a specially designed trap that allows liquid waste to drain out of the fixture through a trap seal, and into the drainage system. Flushing urinals should be inspected at least annually for proper valve and sensor operation. For non-water urinals, follow maintenance practices as directed by the manufacturer to ensure products perform as expected. Non-water urinals can be considered during urinal replacement, however, review the condition and design of the existing plumbing system and the expected usage patterns to ensure that these products will provide the anticipated performance.

Faucets and Showerheads

Faucets and showerheads are sanitary fixtures that generally dispense heated water. Reducing water use by these fixtures translates into a reduction of site fuel or electric use depending on how water is heated. High efficiency fixtures are at least 20% more efficient than available standard products. Leaking or damaged equipment is a substantial source of water waste. Train users to report continuously dripping, leaking, or otherwise improperly operating equipment to the appropriate personnel. Depending on the age of the equipment and the frequency of use, it may be cost effective to replace older fixtures with current generation WaterSense labeled equipment.

Faucets are used for a variety of purposes, and standard flow rates are dictated by the intended use. Public use lavatory faucets and kitchen faucets are subject to maximum flow rates while service sinks are not. Periodically inspect faucet aerators for scale buildup to ensure flow is not being restricted. Clean or replace the aerator or other spout end device as needed. Check and adjust automatic sensors (where installed) to ensure they are operating properly to avoid faucets running longer than necessary. Post materials in restrooms and kitchens to ensure user awareness of the facility's water-efficiency goals. Remind users to turn off the tap when they are done and to consider turning the tap off during sanitation activities when it is not being used. Consider installing lavatory and kitchen faucet fixtures with reduced flow. Federal standards limit kitchen and restroom faucet flows to 2.2 gpm. To qualify for a WaterSense label a faucet cannot exceed 1.5 gpm.

Effective in 1992, the maximum allowable flow rate for all showerheads sold in the United States is 2.5 gpm. Since this standard was enacted, many showerheads have been designed to use even less water. WaterSense labeled equipment is designed to use 2.0 gpm, or less. For optimum showerhead efficiency, the system pressure should be tested to make sure that it is between 20 and 80 pounds per square inch (psi). Verify that plumbing lines are routed through a shower valve to prevent water pressure fluctuations. Periodically inspect showerheads for scale buildup to ensure flow is not being restricted. In general, replace showerheads with 2.5 gpm flow rates or higher with WaterSense labeled models. Note: Use of poor performing replacement reduced flow showerheads may result in increased use if the duration of use is increased to compensate for reduced performance. WaterSense labeled showerheads are independently certified to meet or exceed minimum performance requirements for spray coverage and force.

7 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.

7.1 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.

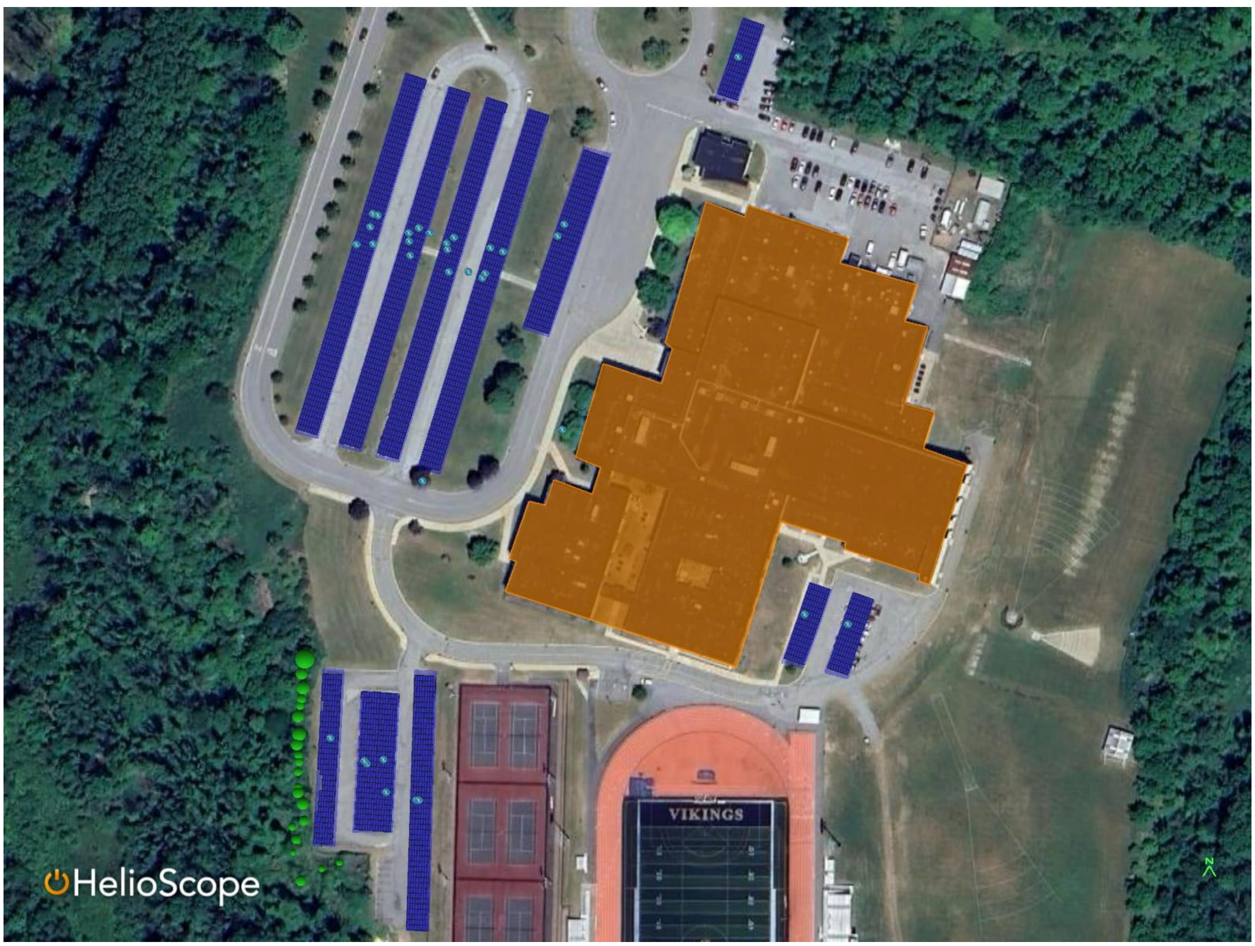
An additional study for solar photovoltaic for the Vernon High School is provided below.

Executive Summary

This section summarizes projected energy and cost impacts, as well as design considerations, for a proposed 1.25 MW-DC carport solar photovoltaic (PV) system for Vernon High School site located at 1832 Route 565, Glenwood, NJ 07418. Please note this is a feasibility stage memo, and all cost/savings values are solely estimates and not for design level application.

Here are the system details:

- 1.25 MW Carport Solar PV System: The carport solar panels are strategically positioned to make the most efficient use of the open parking spaces for maximizing coverage of the solar energy generation. The projected solar PV system is expected to generate a total energy output of 1,510,874 kWh, accounting for 42% of the site's total electricity consumption for the year 2023-2024.



Solar PV Layout Figure – HelioScope Design

Site Assessment for PV Installation

Based on the facility interview and site assessment, TRC has decided to focus solely on the carport solar option to determine project feasibility. The available open areas of the school are actively used for sports activities, limiting their suitability for ground mount solar installations. Additionally, the building's roof requires further review and assessment to evaluate its structural capacity to support the additional load associated with rooftop solar panels if that option were to be pursued. Therefore, only the carport solar option is considered in this feasibility review.

Equipment	Estimated Max Demand Savings (kW)	Estimated Annual Energy Generation (kWh)	Estimated Annual GHG Reduction (MT-CO_2e)	Estimated Annual Cost Savings ($)	Estimated Gross Project Cost ($)	Total Incentives ($)	Net Project Cost ($)	Simple Payback Period[12] (yr.)
1.25 MW Solar PV	271	1,510,874	301	$137,015	$7,937,000	$4,365,350	$3,571,650	26.1

Project Summary Table

Rebates and Incentives

Equipment	Estimated Gross Project Cost ($)	ITC Rebate (1)	MACRS Rebate (2)	Net Project Cost
1.25 MW Solar PV	$7,937,000	$2,381,100	$1,984,250	$3,571,650

Incentive Summary Table

Multiple incentives are available to reduce the project cost.

1. Federal Income Tax Credit (ITC): As of the passage of the 2022 Inflation Reduction Act, the ITC refund can be claimed by non-taxable entities as a cash rebate. The ITC is equal to 30% of the system cost and is scheduled to persist until 2033.

2. Modified Accelerated Cost Recovery System (MACRS): As of the passage of the 2022 Inflation Reduction Act, the MACRS refund can be claimed by non-taxable entities as a cash rebate. This rebate allows 85% of the system cost to be claimed as equipment depreciation at Year 1, approximately equivalent to 25% of the system cost.

[12] Simple payback is computed as the "Net Project Cost" divided by the "Estimated Annual Cost Savings".

Ownership Models

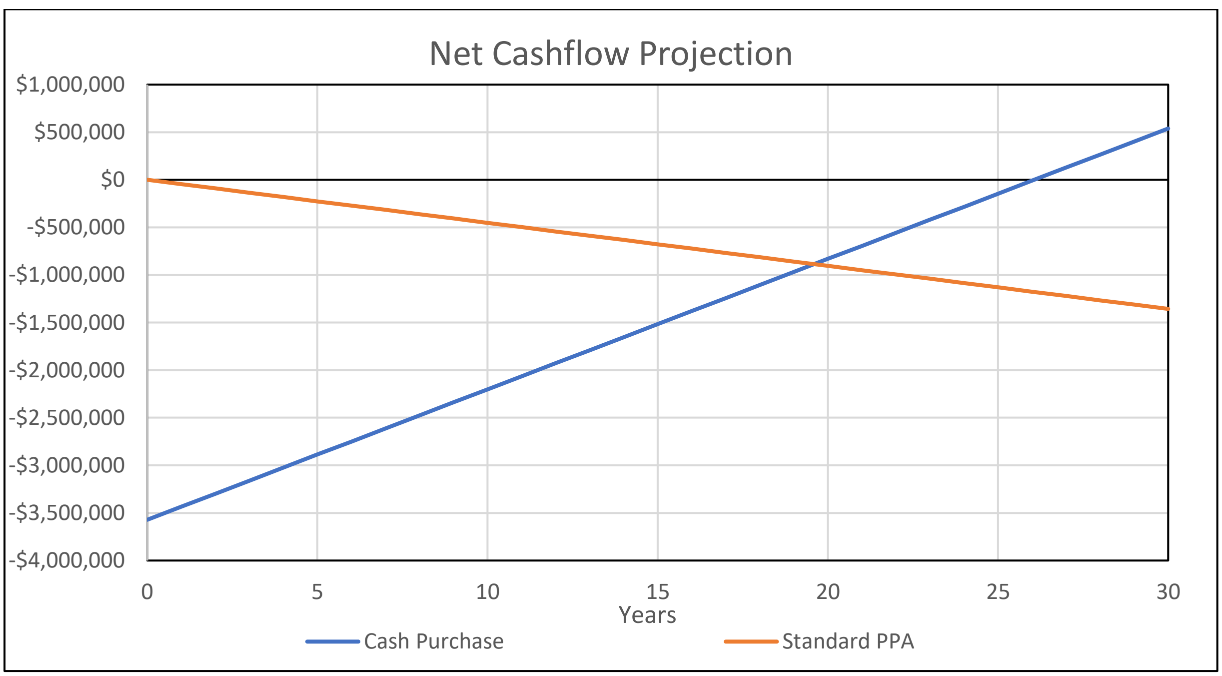
This report explores two ownership models: Cash Purchase and Power Purchase Agreement (PPA).

- Cash Purchase: In this case, the entire system is purchased upfront by the customer.
- Standard Power Purchase Agreement: In this scenario, a third party installs and owns the system, and sells electricity to the customer at a reduced rate. Calculations assume the owner charges a 3% interest rate on the system. In the table below, the interest rate is factored in as an offset to the "Annual Savings ($)". Return on Investment (ROI) is null because there is no cost to the customer.

Ownership Plan	Upfront Gross Project Cost ($)	Year 1 Cost After Rebates ($)	Annual Savings ($)	Lifetime 30-Year Cost Savings ($)	30-Year ROI
Cash Purchase	$7,937,000	$3,571,650	$137,015	$4,110,435	115%
PPA	$0	$0	($45,208)	($1,356,253)	-

Ownership Model Table

Analysis clearly shows that opting for a cash purchase is more advantageous than choosing a Power Purchase Agreement (PPA). This conclusion is based on the consideration of existing available incentives (i.e., ITC & MACRS).



Ownership Model Life Cycle Comparison

PV System Sizing

TRC modeled the proposed solar PV system using HelioScope, a meteorologically and location-dependent solar resource, to estimate its available size and component quantities. The software accounts for building shading, tree shading, tilt angles, and appropriate spacing. The PV system is sized to utilize all available parking space.

Energy Generation and Management

A HelioScope model was developed to establish approximate PV system sizing. The output was entered into Energy Toolbase® (ETB), a utility cost analysis tool that compares the generation profile vs the building's monthly consumption data. Because the site's energy generation rate structure and energy delivery rate structure are provided by different firms, ETB's estimate of baseline utility cost varied from available billing data by 25.5%, potentially due to rate schedule changes. ETB outputs were supplemented with worksheet calculations to true up the difference.

Cost savings were finalized by applying an 0.5% annual maintenance cost penalty to the solar PV system; the "Estimated Annual Cost Savings" in the Project Summary Table offsets the utility savings accordingly. The ETB analysis was used to simulate PV operation throughout the year and to calculate utility cost savings with hourly utility rate sensitivity.

Project Cost

Project cost estimates were calculated using RS Means 2022 Construction Cost Catalogue, along with vendor quotes and guidelines available from the modeling software. Construction costs have been escalated by 10% to account for inflation. Costs include contingencies and markups for all potential project tasks, including design, permitting, taxes, and a 30% contingency for infrastructure upgrades. A line-by-line breakdown of the costs considered is provided in Appendix C.

At a high level, average system costs are $6.35/Watt solar PV, based on the gross project cost. Please note that while detailed, cost estimates are still at the feasibility stage. Costs may vary by 30% relative to engineering assessments of the electrical and structural infrastructure.

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

8 Electric Vehicles

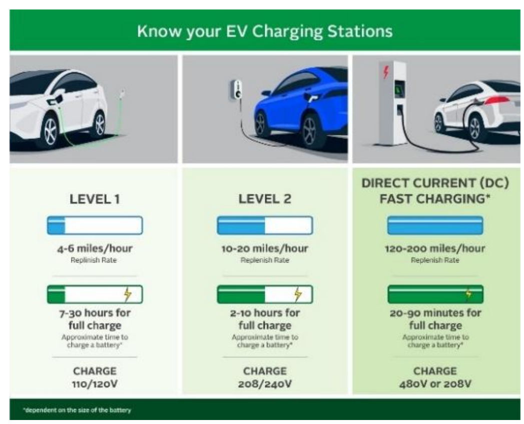
All electric vehicles (EVs) have an electric motor instead of an internal combustion engine. EVs function by plugging into a charge point, taking electricity from the grid, and then storing it in rechargeable batteries. Although electricity production may contribute to air pollution, the U.S. EPA categorizes 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

8.1 EV 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.

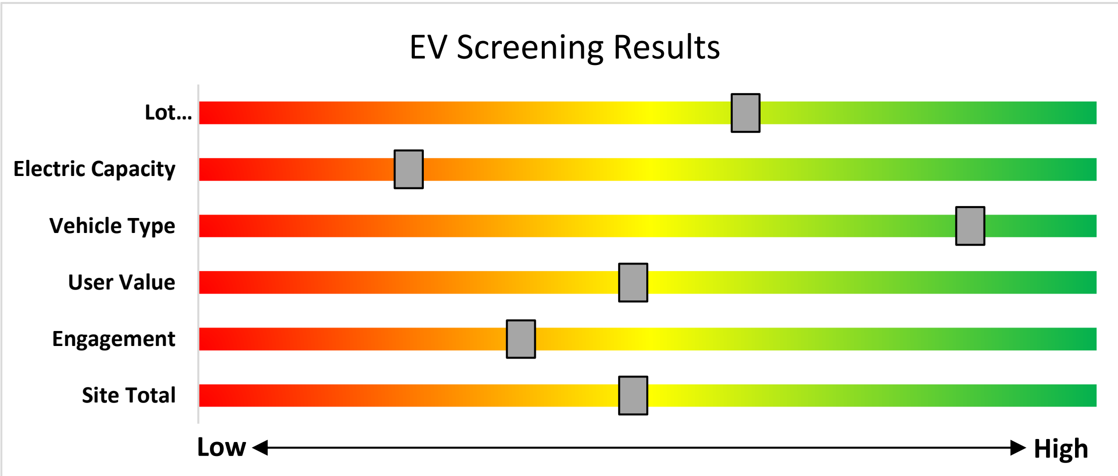
The primary costs associated with installing EV charging are the charger hardware and the cost to extend power from the facility to parking spaces. This may include upgrades to electric panels to serve increased loads.

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.



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), Public Service Electric and Gas Company (PSE&G) or Jersey Central Power and Light (JCP&L), 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, PSE&G or JCP&L, up to 90% of the combined charger purchase and installation costs. Please check ACE, PSE&G or JCP&L program eligibility requirements before purchasing EV charging equipment, as additional conditions on types of eligible chargers may apply for utility incentives.

EV Charging incentive information is available from Atlantic City Electric, PSE&G and JCP&L.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

9 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 New Jersey.

NJBPU and NJCEP Administered Programs

- New Construction (residential, commercial, industrial, government)
- Large Energy Users
- Energy Savings Improvement Program (financing)
- State Facilities Initiative*
- Local Government Energy Audits
- Combined Heat & Power & Fuel Cells

*State facilities are also eligible for utility programs

Utility Administered Programs

atlantic city electric (An Exelon Company) · Jersey Central Power & Light (A FirstEnergy Company) · PSEG · Rockland Electric Company · Elizabethtown Gas · South Jersey Gas · New Jersey Natural Gas

- Existing buildings (residential, commercial, industrial, government)
- Efficient Products
  - Lighting & Marketplace
  - HVAC
  - Appliance Rebates
  - Appliance Recycling

9.1 New Jersey's Clean Energy Program

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. To qualify entities must have incurred at least $5 million in total 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 http://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[13]

Eligible Technology	Size (Installed Rated Capacity)	Incentive ($/Watt)[5]	% of Total Cost Cap per Project	$ Cap per Project
CHPs powered by non-renewable or renewable fuel source, or a combination:[4] - Gas Internal Combustion Engine - Gas Combustion Turbine - Microturbine Fuel Cells ≥60%	≤500 kW[1]	$2.00	30-40%[2]	$2 million
	>500 kW - 1 MW[1]	$1.00		
	> 1 MW - 3 MW[1]	$0.55	30%	$3 million
	>3 MW[1]	$0.35		
Fuel Cells ≥40%	Same as above[1]	Applicable amount above	30%	$1 million
Waste Heat to Power (WHP)[3] Powered by non-renewable fuel source. Heat recovery or other mechanical recovery from existing equipment utilizing new electric generation equipment (e.g. steam turbine)	≤1MW[1]	$1.00	30%	$2 million
	> 1MW[1]	$.50	30%	$3 million

13

[1] Incentives are tiered, which means the incentive levels vary based upon the installed rated capacity, as listed in the chart above. For example, a 4 MW CHP system would receive $2.00/watt for the first 500 kW, $1.00/watt for the second 500 kW, $0.55/watt for the next 2 MW and $0.35/watt for the last 1 MW (up to the caps listed).
[2] The maximum incentive will be limited to 30% of total project. For CHP projects up to 1 MW, this cap will be increased to 40% where a cooling application is used or included with the CHP system (e.g. absorption chiller).
[3] Projects will be eligible for incentives shown above, not to exceed the lesser of % of total project cost per project cap or maximum $ per project cap. Projects installing CHP or FC with WHP will be eligible for incentive shown above, not to exceed the lesser caps of the CHP or FC incentive. Minimum efficiency will be calculated based on annual total electricity generated, utilized waste heat at the host site (i.e. not lost/rejected), and energy input.
[4] Systems fueled by a Class 1 Renewable Fuel Source, as defined by N.J.A.C. 14:8-2.5, are eligible for a 30% incentive bonus. If the fuel is mixed, the bonus will be prorated accordingly. For example, if the mix is 60/40 (60% being a Class 1 renewable), the bonus will be 18%. This bonus will be included in the final performance incentive payment, based on system performance and fuel mix consumption data. Total incentive, inclusive of bonus, shall not exceed above stipulated caps.
[5] CHP-FC systems located at Critical Facility and incorporating blackstart and islanding technology are eligible for a 25% incentive bonus. This bonus incentive will be paid with the second/Installation incentive payment. Total incentive, inclusive of bonus, shall not exceed above stipulated caps.

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 http://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 (CSI) Program

The CSI Program opened on April 15, 2023, and will serve as the permanent program within the SuSI Program providing incentives to larger solar facilities. The CSI Program is open to qualifying grid supply solar facilities, non-residential net metered solar installations with a capacity greater than five (5) megawatts ("MW"), and to eligible grid supply solar facilities installed in combination with energy storage.

CSI eligible facilities will only be allowed to register in the CSI program upon award of a bid pursuant to N.J.A.C. 14:8-11.10.

The CSI program structure has separate categories, or tranches, to ensure that a range of solar project types, including those on preferred sites, are able to participate despite potentially different project cost profiles. The Board has approved four tranches for grid supply and large net metered solar and an additional fifth tranche for storage in combination with grid supply solar. The following table lists procurement targets for the first solicitation:

Tranche	Project Type	MW (dc) Targets
Tranche 1.	Basic Grid Supply	140
Tranche 2.	Grid Supply on the Built Environment	80
Tranche 3.	Grid Supply on Contaminated Sites and Landfills	40
Tranche 4.	Net Metered Non- Residential	40
Tranche 5.	*Storage Paired with Grid	160 MWh

*The storage tranche of 160 MWh corresponds to a 4-hour storage pairing of 40 MW of solar

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 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 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.

Demand Response (DR) Energy Aggregator

Demand Response Energy Aggregator is a program designed to reduce the electric load when electric wholesale prices are high or when the reliability of the electric grid is threatened due to peak demand. Grid operators call upon curtailment service providers and commercial facilities to reduce electric usage during times of peak demand, making the grid more reliable and reducing transmission costs for all ratepayers. Curtailment service providers provide regular payments to medium and large consumers of electric power for their participation in DR programs. Program participation is voluntary and participants receive payments whether or not their facility is called upon to curtail its electric usage.

Typically, an electric customer must be capable of reducing their electric demand, within minutes, by at least 100 kW or more in order to participate in a DR program. Customers with greater capability to quickly curtail their demand during peak hours receive higher payments. Customers with back-up generators on site may also receive additional DR payments for their generating capacity if they agree to run the generators for grid support when called upon. Eligible customers who have chosen to participate in DR programs often find it to be a valuable source of revenue for their facility, because the payments can significantly offset annual electric costs.

Participating customers can often quickly reduce their peak load through simple measures, such as temporarily raising temperature setpoints on thermostats (so that air conditioning units run less frequently) or agreeing to dim or shut off less critical lighting. This usually requires some level of building automation and controls capability to ensure rapid load reduction during a DR curtailment event. DR program participants may need to install smart meters or may need to also sub-meter larger energy-using equipment, such as chillers, to demonstrate compliance with DR program requirements.

DR does not include the reduction of electricity consumption based on normal operating practice or behavior. For example, if a company's normal schedule is to close for a holiday, the reduction of electricity due to this closure or scaled-back operation is not considered a DR activity in most situations.

The first step toward participation in a DR program is to contact a curtailment service provider. A list of these providers is available on the website of the independent system operator, PJM, and it includes contact information for each company, as well as the states where they have active business[14]. PJM also posts training materials for program members interested in specific rules and requirements regarding DR activity along with a variety of other DR program information[15].

Curtailment service providers typically offer free assessments to determine a facility's eligibility to participate in a DR program. They will provide details regarding program rules and requirements for metering and controls, assess a facility's ability to temporarily reduce electric load, and provide details on payments to be expected for participation in the program. Providers usually offer multiple options for DR to larger facilities, and they may also install controls or remote monitoring equipment of their own to help ensure compliance with all terms and conditions of a DR contract.

[14] http://www.pjm.com/markets-and-operations/demand-response.aspx.

[15] http://www.pjm.com/training/training-events.aspx.

9.2 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.

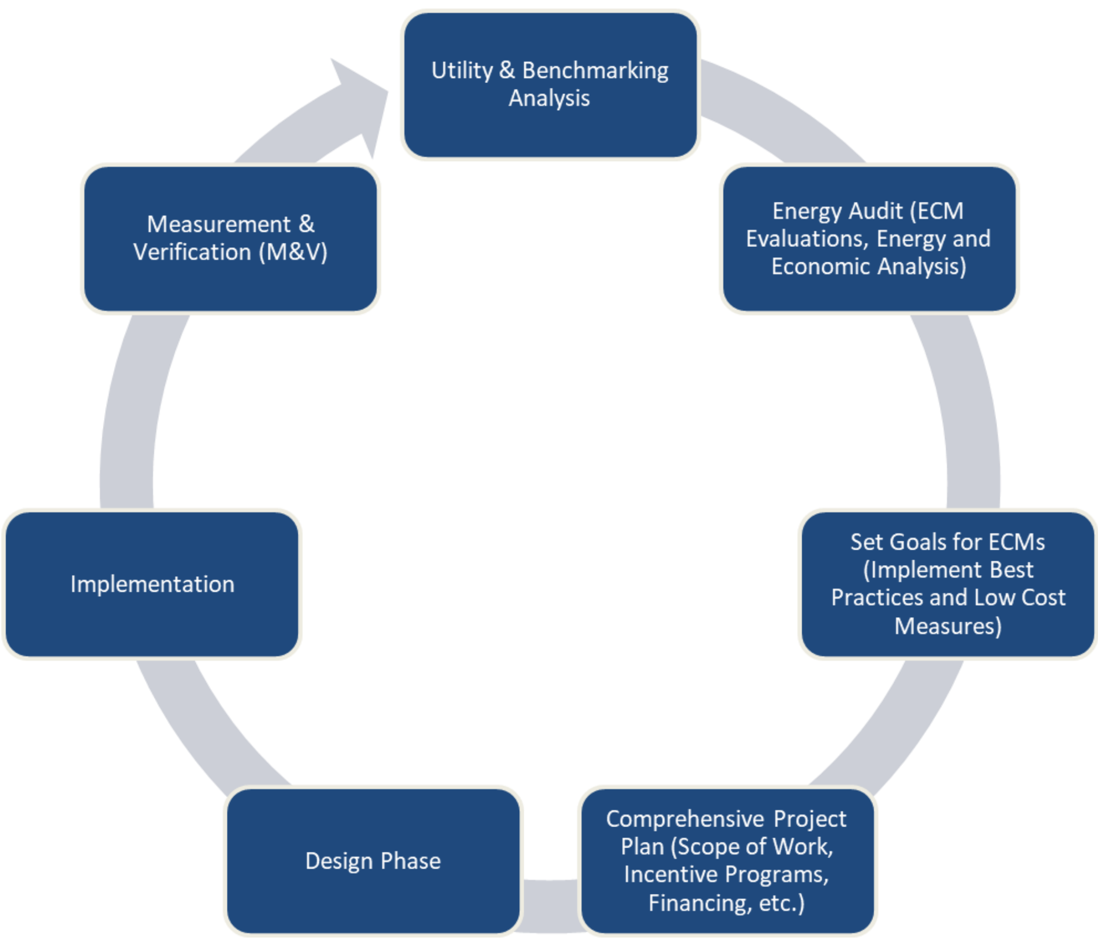
Engineered Solutions

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.

10 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.



Project Development Cycle

11 Energy Purchasing and Procurement Strategies

11.1 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[16].

11.2 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[17].

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

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

APPENDIX A: EQUIPMENT INVENTORY & RECOMMENDATIONS

Lighting Inventory & Recommendations

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 012	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 012	54	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775	4	None	Yes	54	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,915	0.3	1,091	0	$160	$1,320	$140	7.4
Classroom 017	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 017	88	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775	4	None	Yes	88	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,915	0.6	1,778	0	$261	$1,980	$210	6.8
Classroom 017	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Classroom 017 Storage A	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Classroom 017 Storage B	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Classroom 017	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Classroom 019	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
Classroom 019	56	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775	4	None	Yes	56	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,915	0.4	1,132	0	$166	$1,320	$140	7.1
Classroom 103	30	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	30	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 104	48	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	48	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 104	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Classroom 105	30	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	30	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 106	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 110	32	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	32	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 114	40	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	40	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 115	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 116	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 117	30	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	30	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 11B	54	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775	4	None	Yes	54	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,915	0.3	1,091	0	$160	$1,320	$140	7.4
Classroom 121	25	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	25	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 122	29	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	29	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 124	25	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	25	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 125	20	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	20	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	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 126	20	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	20	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 127	20	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	20	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 129	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 13	54	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	2,775	4	None	Yes	54	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,915	0.2	546	0	$80	$990	$110	11.0
Classroom 130	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 131	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 133	29	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	29	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 14	54	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	54	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 142	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 143	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 144	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 145	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 146	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 148	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 149	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 15	63	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	63	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 150	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 151	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 152	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775	4	None	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,915	0.1	242	0	$36	$330	$40	8.2
Classroom 153	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 155	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775	4	None	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,915	0.1	242	0	$36	$330	$40	8.2
Classroom 156	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775	4	None	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,915	0.1	242	0	$36	$330	$40	8.2
Classroom 157	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775	4	None	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,915	0.1	242	0	$36	$330	$40	8.2
Classroom 158	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Classroom 159	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	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 160	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 161	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 162	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 163	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 164	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 18	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
Classroom 18	24	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775	4	None	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,915	0.2	485	0	$71	$660	$70	8.3
Classroom Music Rm 24	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom Music Rm 24	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,775		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,775	0.0	0	0	$0	$0	$0	0.0
Computer Lab 107	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Computer Lab 109	23	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	23	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Computer Lab 123/132	58	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	58	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Conference 1	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Conference 2	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Corridor 2	31	Exit Signs: LED - 2 W Lamp	None		6	4,380		None	No	31	Exit Signs: LED - 2 W Lamp	None	6	4,380	0.0	0	0	$0	$0	$0	0.0
Corridor 2	17	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	17	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Corridor 2	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Corridor 2	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Corridor 2	19	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	19	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Corridor 2	21	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	21	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Corridor 2	17	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	17	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Corridor 2	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Corridor 2	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Corridor 2	17	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	17	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Corridor 2	25	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	25	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0

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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 3	15	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	15	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor 3	9	LED - Fixtures: Ambient - 4' - Direct Fixture	Wall Switch	S	20	2,775		None	No	9	LED - Fixtures: Ambient - 4' - Direct Fixture	Wall Switch	20	2,775	0.0	0	0	$0	$0	$0	0.0
Corridor 3	67	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	67	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Corridor 3	24	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	1,943		None	No	24	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,943	0.0	0	0	$0	$0	$0	0.0
Corridor 3	4	Metal Halide: (1) 70W Lamp	Occupancy Sensor	S	95	1,943	1	Fixture Replacement	No	4	LED - Fixtures: Downlight Recessed	Occupancy Sensor	21	1,943	0.2	466	0	$68	$760	$20	10.8
Corridor Gym	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	9	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,775		None	No	9	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,775	0.0	0	0	$0	$0	$0	0.0
Dining Area 1	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Dining Area 1	24	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775	4	None	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,915	0.2	485	0	$71	$660	$70	8.3
Dining Area 1	73	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775	4	None	Yes	73	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,915	0.5	1,475	0	$216	$1,650	$180	6.8
Dining Area 1	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,760	4	None	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.1	574	0	$84	$330	$40	3.4
Dining Area Facility	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
Dining Area Facility	12	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	40	2,775	4	None	Yes	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	1,915	0.1	334	0	$49	$330	$40	5.9
Electrical Room 10	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Electrical Room 11	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Electrical Room 154 3/4	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	490		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	490	0.0	0	0	$0	$0	$0	0.0
Electrical Room 154A	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Electrical Room 2	16	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	16	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Electrical Room 3	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Electrical Room 411	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
Electrical Room 411	4	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	700		None	No	4	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	700	0.0	0	0	$0	$0	$0	0.0
Electrical Room 5	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Electrical Room 6	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Electrical Room 9	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Exterior 2	4	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock		100	4,380		None	No	4	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock	100	4,380	0.0	0	0	$0	$0	$0	0.0

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Exterior 2	3	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Photocell		50	4,380		None	No	3	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Photocell	50	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 2	12	LED - Fixtures: Flood Fixture	Wall Switch		75	4,380		None	No	12	LED - Fixtures: Flood Fixture	Wall Switch	75	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 2	3	LED - Fixtures: Flood Fixture	Timeclock		100	4,380		None	No	3	LED - Fixtures: Flood Fixture	Timeclock	100	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 2	3	LED - Fixtures: Fuel Pump Canopy	Timeclock		50	4,380		None	No	3	LED - Fixtures: Fuel Pump Canopy	Timeclock	50	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 2	7	LED - Fixtures: Fuel Pump Canopy	Timeclock		30	4,380		None	No	7	LED - Fixtures: Fuel Pump Canopy	Timeclock	30	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 2	12	LED - Fixtures: Wall Pack	Timeclock		30	4,380		None	No	12	LED - Fixtures: Wall Pack	Timeclock	30	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 2	24	Metal Halide: (1) 400W Lamp	Timeclock		458	4,380	1	Fixture Replacement	No	24	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	120	4,380	0.0	35,531	0	$5,209	$16,680	$1,200	3.0
Exterior 2	64	Metal Halide: (1) 50W Lamp	Timeclock		72	4,380	1	Fixture Replacement	No	64	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	15	4,380	0.0	15,978	0	$2,343	$13,750	$3,200	4.5
Exterior 4 Courtyard	2	Exit Signs: LED - 2 W Lamp	None		6	4,380		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 4	2	LED Lamps: (1) 9W A19 Screw-In Lamp	Timeclock		9	4,380		None	No	2	LED Lamps: (1) 9W A19 Screw-In Lamp	Timeclock	9	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 4	6	LED - Fixtures: Wall Pack	Timeclock		30	4,380		None	No	6	LED - Fixtures: Wall Pack	Timeclock	30	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 5 Courtyard	2	Exit Signs: LED - 2 W Lamp	None		6	4,380		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 5	2	LED - Fixtures: Wall Pack	Timeclock		30	4,380		None	No	2	LED - Fixtures: Wall Pack	Timeclock	30	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 6	14	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Photocell		100	4,380		None	No	14	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Photocell	100	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 6	2	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Photocell		120	4,380		None	No	2	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Photocell	120	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 6	11	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Photocell		120	4,380		None	No	11	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Photocell	120	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 6	14	LED - Fixtures: Post Top	Photocell		120	4,380		None	No	14	LED - Fixtures: Post Top	Photocell	120	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Score Board	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,290	3	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,290	0.0	849	0	$125	$300	$60	1.9
Gymnasium 1	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
Gymnasium 1	64	LED - Fixtures: High-Bay	Occupancy Sensor	S	120	3,500		None	No	64	LED - Fixtures: High-Bay	Occupancy Sensor	120	3,500	0.0	0	0	$0	$0	$0	0.0
Gymnasium 1	8	LED - Fixtures: High-Bay	Occupancy Sensor	S	120	8,760		None	No	8	LED - Fixtures: High-Bay	Occupancy Sensor	120	8,760	0.0	0	0	$0	$0	$0	0.0
Gymnasium Weight Room	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Gymnasium Weight Room	8	LED - Fixtures: High-Bay	Wall Switch	S	120	3,500	4	None	Yes	8	LED - Fixtures: High-Bay	Occupancy Sensor	120	2,415	0.2	844	0	$124	$270	$40	1.9
Janitorial 3	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Janitorial 4	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0

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Janitorial 434	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Janitorial 5	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Janitorial 6	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Janitorial Kitchen	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Kitchen 1	8	Compact Fluorescent: (1) 13W Spiral Plug-In Lamp	Wall Switch	S	13	2,775	3	Relamp	No	8	LED Lamps: (2) 12W Plug-In Lamps	Wall Switch	10	2,775	0.0	54	0	$8	$100	$10	11.4
Kitchen 1	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
Kitchen 1	3	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	2,775	3, 4	Relamp	Yes	3	LED Lamps: A19 Lamps	Occupancy Sensor	9	1,915	0.1	363	0	$53	$410	$40	7.0
Kitchen 1	36	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775	4	None	Yes	36	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,915	0.2	727	0	$107	$990	$110	8.3
Kitchen 1	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Kitchen 1	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775	4	None	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,915	0.1	202	0	$30	$330	$40	9.8
Library 1	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Library 1	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Library 1	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Library 1	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Library 1	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Library 1	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Library 1	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Library 1	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Library 1	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Lobby 2 Aud Rear Lobby	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
Lobby 2 Aud Rear Lobby	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Lobby Gym	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Lobby Gym	8	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	40	2,775		None	No	8	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	2,775	0.0	0	0	$0	$0	$0	0.0
Lobby Gym	5	LED Lamps: (1) 12W Plug-In Lamp	Wall Switch	S	12	2,775		None	No	5	LED Lamps: (1) 12W Plug-In Lamp	Wall Switch	12	2,775	0.0	0	0	$0	$0	$0	0.0
Locker Room 437	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

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Locker Room 437	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Locker Room 437	13	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775	4	None	Yes	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,915	0.1	263	0	$39	$330	$40	7.5
Locker Room Boys Main	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Locker Room Boys Main	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Locker Room Boys Main	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Locker Room Boys Main	59	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775	4	None	Yes	59	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,915	0.4	1,192	0	$175	$1,320	$140	6.8
Locker Room Girls Main	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Locker Room Girls Main Janitor Closet	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Locker Room Girls Main	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	1,943		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,943	0.0	0	0	$0	$0	$0	0.0
Locker Room Girls Main	58	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	1,943	4	None	Yes	58	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,340	0.4	820	0	$120	$1,320	$140	9.8
Locker Room Team A	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
Locker Room Team A	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Locker Room Team A	13	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775	4	None	Yes	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,915	0.1	263	0	$39	$330	$40	7.5
Locker Room Team A	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Locker Room Team B	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Locker Room Team B	13	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775	4	None	Yes	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,915	0.1	263	0	$39	$330	$40	7.5
Locker Room Team B	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Locker Room Team B	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Mechanical Generator Room	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Mechanical Kitchen	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 009	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 010	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 019E	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 019F	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 111	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	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 - Enclosed 112	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 120	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 120A	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 120B	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 120C	2	LED Lamps: (1) 9W A19 Screw-In Lamp	Wall Switch	S	9	2,775		None	No	2	LED Lamps: (1) 9W A19 Screw-In Lamp	Wall Switch	9	2,775	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 120D	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 136A	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 136A (1)	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 136C	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 136C	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,943	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	52	0	$8	$50	$10	5.3
Office - Enclosed 136D	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 136E	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 136F	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 136G	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 136H	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 138	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 139A	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 139B	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 139B Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	700	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	19	0	$3	$50	$10	14.6
Office - Enclosed 147	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 153A	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 153B	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 153C	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 16	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 161A	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	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 - Enclosed 18D	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 231A	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 36	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 410	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	2,775		None	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,775	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 438	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed AD	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed AD Closet	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed AD Restroom	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed Boys Main	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed Girls Main	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed Janitor	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed Kitchen	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed MO A	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed Principal	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed Team A	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed Team B	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed Theater	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed Theater Control Room	4	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	52	2,775	3	Relamp	No	4	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	37	2,775	0.0	135	0	$20	$150	$10	7.1
Office - Enclosed Trainer	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed Trainer Restroom	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,775		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,775	0.0	0	0	$0	$0	$0	0.0
Office - Open Plan 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
Office - Open Plan Main Office	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Open Plan Main Office	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	1,943		None	No	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Open Plan 136	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
Office - Open Plan 136	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	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 - Open Plan 136	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	1,943		None	No	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,943	0.0	0	0	$0	$0	$0	0.0
Restroom - Boys Main Offife	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,290		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,290	0.0	0	0	$0	$0	$0	0.0
Restroom - Female 10	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Restroom - Female 11	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	4,290	3	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,290	0.0	56	0	$8	$40	$10	3.7
Restroom - Female 421	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Restroom - Female 438	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,290		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,290	0.0	0	0	$0	$0	$0	0.0
Restroom - Female 6	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Restroom - Female 7	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Restroom - Female 8	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	4,290		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,290	0.0	0	0	$0	$0	$0	0.0
Restroom - Female 9	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Restroom - Female Dressing Rm	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Restroom - Female Dressing Rm	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Restroom - Female Faculty	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Restroom - Female Main Locker	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Restroom - Male	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,775		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,775	0.0	0	0	$0	$0	$0	0.0
Restroom - Male 11	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Restroom - Male 15	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,775		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,775	0.0	0	0	$0	$0	$0	0.0
Restroom - Male 419	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Restroom - Male 5	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Restroom - Male 6	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Restroom - Male 7	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,775		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,775	0.0	0	0	$0	$0	$0	0.0
Restroom - Male 8	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Restroom - Male 9	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Restroom - Male Dressing Rm	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Restroom - Male Dressing Rm	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	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 - Male Faculty	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex 1	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	2,775	3	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,775	0.0	36	0	$5	$40	$10	5.7
Restroom - Unisex 426	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex 5	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex Janitor RR	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex MO	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex MO B	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex Team B	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Server Room 147A	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Server Room 2	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Server Room 2	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	700	3	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.1	56	0	$8	$150	$30	14.6
Storage 10	6	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	700	3	Relamp	No	6	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	700	0.1	54	0	$8	$230	$40	23.8
Storage 102	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	490		None	No	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	490	0.0	0	0	$0	$0	$0	0.0
Storage 139	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Storage 14-B	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Storage 14-B	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Storage 14-B	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Storage 147A	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Storage 19A	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Storage 19B	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Storage 19C	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Storage 413	3	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	700		None	No	3	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	700	0.0	0	0	$0	$0	$0	0.0
Storage 435	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Storage 443	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Storage 6	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	700		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	700	0.0	0	0	$0	$0	$0	0.0

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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 Copy Rm	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	700		None	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	700	0.0	0	0	$0	$0	$0	0.0
Storage Kitchen	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Storage Theater	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	700		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	700	0.0	0	0	$0	$0	$0	0.0
Theater 1	46	Compact Fluorescent: (1) 12W Biaxial Plug-In Lamp	Wall Switch	S	12	500		None	No	46	Compact Fluorescent: (1) 12W Biaxial Plug-In Lamp	Wall Switch	12	500	0.0	0	0	$0	$0	$0	0.0
Theater 1	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
Theater 1	4	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	30	2,775		None	No	4	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	30	2,775	0.0	0	0	$0	$0	$0	0.0
Theater 1	128	LED Lamps: (1) 18W PAR38 Screw-In Lamp	Wall Switch	S	18	2,775	4	None	Yes	128	LED Lamps: (1) 18W PAR38 Screw-In Lamp	Occupancy Sensor	18	1,915	0.5	1,605	0	$235	$2,320	$250	8.8
Theater 1	64	LED Lamps: (1) 18W PAR38 Screw-In Lamp	Wall Switch	S	18	2,775	4	None	Yes	64	LED Lamps: (1) 18W PAR38 Screw-In Lamp	Occupancy Sensor	18	1,915	0.3	803	0	$118	$1,320	$140	10.0
Theater 1	14	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775	4	None	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,915	0.1	283	0	$41	$330	$40	7.0
Theater 1	12	LED - Fixtures: Wall-Wash Lights	Wall Switch	S	40	2,775	4	None	Yes	12	LED - Fixtures: Wall-Wash Lights	Occupancy Sensor	40	1,915	0.1	334	0	$49	$330	$40	5.9
Theater 2 Black Box	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
Theater 2 Black Box	35	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775	4	None	Yes	35	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,915	0.2	707	0	$104	$990	$110	8.5
Theater 2 Black Box	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	2,775		None	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,775	0.0	0	0	$0	$0	$0	0.0
Lobby 3	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Lobby 3	10	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	1,943		None	No	10	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 201	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 204	45	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	45	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 205	45	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	45	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 206	45	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	45	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 211	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 212	29	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	29	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 213	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 214	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 215	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 216	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0

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Classroom 217	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 218	23	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	23	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 219	23	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	23	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 220	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 222	29	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	29	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 223	23	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	23	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 230	23	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	23	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 231	23	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	23	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 232	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 233	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 234	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 235	19	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	19	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 236	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom 237	19	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	19	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom E202	30	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	30	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom E203	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
Classroom E203	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	S	44	1,943		None	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,943	0.0	0	0	$0	$0	$0	0.0
Classroom E203	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,775	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,915	0.1	283	0	$42	$480	$70	9.9
Computer Lab 207	48	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	48	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Computer Lab 208	12	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	40	2,775	4	None	Yes	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	1,915	0.1	334	0	$49	$330	$40	5.9
Computer Lab 225	96	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	96	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Corridor 4	18	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	18	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor 4	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Corridor 4	24	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,775		None	No	24	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,775	0.0	0	0	$0	$0	$0	0.0
Corridor 4	25	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,775		None	No	25	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,775	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 4	26	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,775		None	No	26	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,775	0.0	0	0	$0	$0	$0	0.0
Corridor 4	27	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,775		None	No	27	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,775	0.0	0	0	$0	$0	$0	0.0
Corridor 4	12	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,775		None	No	12	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,775	0.0	0	0	$0	$0	$0	0.0
Corridor 4	22	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,775		None	No	22	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,775	0.0	0	0	$0	$0	$0	0.0
Electrical Room 231B	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Janitorial 7	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Janitorial 8	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Library 2	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Library 2	192	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	192	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Lounge 224	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Mechanical 1	22	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	22	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Mechanical 2	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Mechanical 3	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Mechanical 408	6	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	700		None	No	6	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	700	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 210	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 225B	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 228	18	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	18	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 229	9	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	1,943		None	No	9	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 236A	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 236A	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 236B	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 50	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Restroom - Female	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Restroom - Female 13	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Restroom - Male	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	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 - Male 12	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,775		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,775	0.0	0	0	$0	$0	$0	0.0
Restroom - Male 13	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,943		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,943	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex 8	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,775		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,775	0.0	0	0	$0	$0	$0	0.0
Storage 205	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	700		None	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	700	0.0	0	0	$0	$0	$0	0.0
Storage 209	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Storage 22	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Storage 221	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	700	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.1	75	0	$11	$200	$40	14.6
Storage 230 Prep Rm	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	490		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	490	0.0	0	0	$0	$0	$0	0.0
Storage 410	5	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	700		None	No	5	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	700	0.0	0	0	$0	$0	$0	0.0
Storage 410	19	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	700		None	No	19	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	700	0.0	0	0	$0	$0	$0	0.0
Aux Gym Storage	16	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	700		None	No	16	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	700	0.0	0	0	$0	$0	$0	0.0
Storage Prep Rm 232	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	490		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	490	0.0	0	0	$0	$0	$0	0.0
Storage Prep Rm 235	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	490		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	490	0.0	0	0	$0	$0	$0	0.0
Electrical Room 4	4	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	700		None	No	4	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	700	0.0	0	0	$0	$0	$0	0.0
Exterior 1	2	Metal Halide: (1) 250W Lamp	Wall Switch		295	4,380	1	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	75	4,380	0.0	1,927	0	$283	$1,190	$100	3.9
Gym Stairs 1	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch		29	4,380		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,380	0.0	0	0	$0	$0	$0	0.0
Gym Stairs 1	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch		29	4,380		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,380	0.0	0	0	$0	$0	$0	0.0
Stairs A	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Stairs A	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch		29	4,380		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,380	0.0	0	0	$0	$0	$0	0.0
Stairs B	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Stairs B	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch		29	4,380		None	No	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,380	0.0	0	0	$0	$0	$0	0.0
Stairs C	11	LED - Linear Tubes: (2) 4' Lamps	Wall Switch		29	4,380		None	No	11	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,380	0.0	0	0	$0	$0	$0	0.0
Stairs D	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Stairs D	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch		29	4,380		None	No	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,380	0.0	0	0	$0	$0	$0	0.0
Stairs E	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0

	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 E	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch		29	1,095		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,095	0.0	0	0	$0	$0	$0	0.0
Stairs F	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 F	13	LED - Linear Tubes: (2) 4' Lamps	Wall Switch		29	1,095		None	No	13	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,095	0.0	0	0	$0	$0	$0	0.0
Fire Alarm Building	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,380	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,380	0.0	117	0	$17	$50	$10	2.3
Fire Alarm Building	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,380	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,380	0.0	117	0	$17	$50	$10	2.3
Office - Enclosd 137	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch		29	4,380		None	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,380	0.0	0	0	$0	$0	$0	0.0
Office - Enclosd 137	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,380	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,380	0.0	117	0	$17	$50	$10	2.3
Office - Enclosed Mail Room	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch		29	4,380		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,380	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed Mail Room	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch		29	4,380		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,380	0.0	0	0	$0	$0	$0	0.0
Elevator Room	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch		29	4,380		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,380	0.0	0	0	$0	$0	$0	0.0
Maintenance Building	1	LED - Fixtures: Flood Fixture	Photocell		50	4,380		None	No	1	LED - Fixtures: Flood Fixture	Photocell	50	4,380	0.0	0	0	$0	$0	$0	0.0
Maintenance Building	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch		29	1,000		None	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	0	0	$0	$0	$0	0.0
Maintenance Building	2	Linear Fluorescent - T12: 8' T12 (75W) - 1L	Wall Switch		92	1,000	2	Relamp & Reballast	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.1	102	0	$15	$180	$20	10.7
Cosmetology Building - Classroom 1	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
Cosmetology Building - Classroom 1	15	LED - Linear Tubes: (2) 4' Lamps	Wall Switch		29	2,000		None	No	15	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.0	0	0	$0	$0	$0	0.0
Cosmetology Building - Classroom 2	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
Cosmetology Building - Classroom 2	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch		29	2,000		None	No	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.0	0	0	$0	$0	$0	0.0
Cosmetology Building - Exterior 1	11	LED Lamps: (1) 12W Screw-In Lamp	Timeclock		12	1,000		None	No	11	LED Lamps: (1) 12W Screw-In Lamp	Timeclock	12	1,000	0.0	0	0	$0	$0	$0	0.0
Cosmetology Building - Lobby 1	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch		17	2,000		None	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,000	0.0	0	0	$0	$0	$0	0.0
Cosmetology Building - Lobby Restroom	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch		17	2,000		None	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,000	0.0	0	0	$0	$0	$0	0.0
Cosmetology Building - Office - Enclosed 1	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch		29	2,000		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.0	0	0	$0	$0	$0	0.0
Cosmetology Building - Office - Enclosed 1	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch		29	2,000		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.0	0	0	$0	$0	$0	0.0
Cosmetology Building - Restroom 1	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch		17	2,000		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,000	0.0	0	0	$0	$0	$0	0.0
Cosmetology Building - Restroom 2	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch		17	2,000		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,000	0.0	0	0	$0	$0	$0	0.0
WWTP	1	LED - Fixtures: Flood Fixture	Photocell		50	4,380		None	No	1	LED - Fixtures: Flood Fixture	Photocell	50	4,380	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
WWTP	4	Linear Fluorescent - EST12: 4' T12 (34W) - 2L	Wall Switch		72	4,290	2, 4	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,960	0.1	723	0	$106	$680	$80	5.7
WWTP	4	Neon: (1) Strip Light	Other		200	8,760		None	No	4	Neon: (1) Strip Light	Other	200	8,760	0.0	0	0	$0	$0	$0	0.0
Vernon High School	24	Metal Halide: (1) 400W Lamp	Timeclock		458	240		None	No	24	Metal Halide: (1) 400W Lamp	Timeclock	458	240	0.0	0	0	$0	$0	$0	0.0
Vernon High School	72	Metal Halide: (1) 1000W Lamp	Timeclock		1,080	200		None	No	72	Metal Halide: (1) 1000W Lamp	Timeclock	1,080	200	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
Mechanical Kitchen	Vernon High School	2	Air Compressor	2.00	86.5%	No	MagneTek	R147	W	500		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical	Vernon High School	3	Return Fan	3.00	89.5%	No	Baldor	M3211T	W	2,745		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 2	Vernon High School	1	Exhaust Fan	5.00	89.5%	No	Reliance Electric	Unknown	B	2,745		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 2	Vernon High School	1	Return Fan	5.00	89.5%	No	Century	Unknown	W	2,745		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Exterior	Vernon High School	41	Exhaust Fan	0.25	65.0%	No	Unknown	Unknown	W	2,745		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior	Vernon High School	1	Exhaust Fan	0.13	65.0%	No	Unknown	Unknown	W	2,745		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior	Vernon High School	2	Exhaust Fan	1.00	85.5%	No	Unknown	Unknown	W	2,745		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Exterior	Vernon High School	1	Exhaust Fan	1.00	85.5%	No	Unknown	Unknown	W	2,745		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Storage 410	Vernon High School	1	DHW Circulation Pump	0.04	65.0%	No	Taco	007-SF5	W	8,760		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Gymnasium 1	Vernon High School	16	Other	0.13	65.0%	No	Unknown	Unknown	W	2,745		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Gymnasium 1	Vernon High School	6	Other	0.50	70.0%	No	Hussey	04K17D09A	W	2,745		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Storage 410	Vernon High School	2	Other	5.00	89.5%	No	Leeson	C184T17FC27	W	2,745		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Kitchen	Vernon High School	1	Water Supply Pump	10.00	89.5%	No	Century	E371M2	W	3,391	8	No	89.5%	Yes	1	1.0	10,599	0	$1,554	$7,500	$1,100	4.1
Mechanical Kitchen	Vernon High School	1	Water Supply Pump	20.00	90.2%	No	Baldor	JMM2514T	W	3,391	8	No	91.0%	Yes	1	2.0	21,367	0	$3,133	$11,600	$1,300	3.3
Mechanical Kitchen	Vernon High School	1	Water Supply Pump	20.00	90.2%	No	Unknown	Unknown	W	3,391	8	No	91.0%	Yes	1	2.0	21,367	0	$3,133	$11,600	$1,300	3.3
Roof High School	Vernon High School	1	Exhaust Fan	10.00	91.7%	No	Baldor	Unknown	W	3,391		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0
Roof High School	EF-19 - High School	1	Exhaust Fan	5.00	90.2%	No	Century	Unknown	W	2,745		No	90.2%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 3	Vernon High School	1	Exhaust Fan	1.50	86.5%	No	Brook Crompton	T58022	W	2,745		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 3	Vernon High School	1	Return Fan	5.00	89.5%	No	Teco	Unknown	W	2,745		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 408	Vernon High School	1	Return Fan	20.00	91.7%	No	Baldor	M2515T	W	3,391	6	No	93.0%	Yes	1	6.1	21,210	0	$3,110	$12,200	$1,300	3.5

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical 1	Vernon High School	1	Supply Fan	10.00	91.7%	No	Marathon	SJ 215TTDBD6026	W	3,391	6	No	91.7%	Yes	1	2.9	10,345	0	$1,517	$8,400	$1,100	4.8
Mechanical 1	Vernon High School	1	Supply Fan	10.00	89.9%	No	Industrial Electric	Unknown	W	3,391	6	No	91.7%	Yes	1	2.9	10,925	0	$1,602	$8,300	$1,100	4.5
Mechanical 2	Vernon High School	1	Supply Fan	3.00	86.5%	No	Century	E 226	W	2,745		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 2	Vernon High School	1	Supply Fan	7.50	86.5%	No	General Electric	5K213AL205D	W	3,391	6	No	91.0%	Yes	1	2.3	8,957	0	$1,313	$6,700	$1,000	4.3
Mechanical 2	Vernon High School	1	Supply Fan	2.00	86.5%	No	Century	H886L	W	2,745		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 2	Vernon High School	1	Supply Fan	15.00	91.0%	No	Baldor	02111T	W	3,391	6	No	92.4%	Yes	1	4.4	16,063	0	$2,355	$11,900	$1,200	4.5
Mechanical 2	Vernon High School	1	Supply Fan	15.00	85.6%	No	Century	6-323409-03	W	3,391	6	No	93.0%	Yes	1	4.8	19,004	0	$2,786	$10,300	$1,200	3.3
Mechanical 3	Vernon High School	1	Supply Fan	7.50	91.0%	No	WorldWide Electric	ODP7.5-18-213T	W	3,391		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 408	Vernon High School	1	Supply Fan	50.00	93.0%	No	Baldor	M2543T	W	4,067	6	No	94.5%	Yes	1	14.6	62,917	0	$9,225	$24,600	$3,000	2.3
Mechanical 408	Vernon High School	1	Supply Fan	5.00	87.5%	No	Baldor	Unknown	W	2,745		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 408	Vernon High School	1	Supply Fan	7.50	88.5%	No	Baldor	M3311T	W	3,391		No	88.5%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 1	Vernon High School	1	Supply Fan	20.00	81.5%	No	Century	Unknown	W	3,391	6	No	93.0%	Yes	1	6.9	28,461	0	$4,173	$12,200	$1,300	2.6
Exterior 1	Vernon High School	1	Supply Fan	2.00	86.5%	No	Baldor	Unknown	W	2,745		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 1	Vernon High School	1	Supply Fan	15.00	93.0%	No	Baldor	EFM2513T	W	3,391	6	No	93.0%	Yes	1	4.3	15,301	0	$2,243	$10,300	$1,200	4.1
Storage 410	Vernon High School	1	Process Pump	3.00	87.5%	No	Muffin Monster	30001-1206-DI	W	2,745		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
Vernon High School	Vernon High School	3	Supply Fan	0.13	65.0%	No	Unknown	Unknown	W	2,745		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 1	Vernon High School	2	Water Supply Pump	2.00	86.5%	No	Unknown	Unknown	W	2,745		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 1	Vernon High School	2	Exhaust Fan	0.75	65.0%	No	Unknown	Unknown	W	2,745		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 3	Vernon High School	1	Supply Fan	2.00	86.5%	No	Magnetek	R147	W	2,745		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 1	Vernon High School	1	Process Fan	10.00	91.7%	No	Unknown	Unknown	W	100		No	91.7%	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
Elevator	Vernon High School	1	Other	20.00	70.0%	No	General Electric	Unknown	W	100		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
WWTP	WWTP	2	Process Pump	0.50	70.0%	No	Goulds	WS0534BF	W	365		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
WWTP	WWTP	2	Process Pump	3.00	89.5%	No	Unknown	Unknown	W	8,760		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
WWTP	WWTP	1	Process Pump	0.50	70.0%	No	Baldor	RM3010	W	8,760		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
WWTP	WWTP	1	Process Blower	1.00	70.0%	No	Century	TE102	W	2,745		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
WWTP	WWTP	1	Process Blower	2.00	85.5%	No	US Motors	F104	W	150		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
WWTP	WWTP	1	Process Pump	1.50	86.5%	No	Barnes	3SE1544L	W	2,745		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Classroom	Vernon High School	8	Supply Fan	0.50	70.0%	No	Airedale	CHH3/2-460/410	W	2,745		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Classroom	Vernon High School	4	Supply Fan	0.50	70.0%	No	Airedale	SXW42/2-460/410	W	2,745		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof High School	Liebert Unit	2	Water Supply Pump	1.50	82.0%	No			W	2,745		No	82.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof High School	Libert Dry Cooler	2	Supply Fan	0.75	70.0%	No	Liebert	DDO197A	W	2,745		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof High School	Vernon High School	6	Supply Fan	1.00	80.0%	No	Trane	RAUJC604BC13A0D	W	2,745		No	80.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof High School	Vernon High School	4	Supply Fan	1.00	80.0%	No	Carrier	38AH-054---621DA	W	2,745		No	80.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof High School	Vernon High School	4	Supply Fan	1.00	80.0%	No	Trane	RAUJC404BC13A0D00000	W	2,745		No	80.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof High School	Vernon High School	2	Supply Fan	0.50	70.0%	No	Trane	TTA090A400CC	B	2,745	5	Yes	78.2%	No		0.1	230	0	$34	$1,000	$0	29.6
Roof High School	Vernon High School	2	Supply Fan	0.50	70.0%	No	Trane	TTA180B400CC	B	2,745	5	Yes	78.2%	No		0.1	230	0	$34	$1,000	$0	29.6
Roof High School	Vernon High School	1	Supply Fan	1.50	80.0%	No	Lennox	CHA24 653-1G	B	2,745	5	Yes	86.5%	No		0.1	216	0	$32	$700	$0	22.1
Roof High School	Vernon High School	2	Supply Fan	0.50	70.0%	No	Lennox	CHA16-413-1G	B	2,745	5	Yes	78.2%	No		0.1	230	0	$34	$1,000	$0	29.6
Roof High School	Vernon High School	1	Supply Fan	15.00	91.3%	No	Trane	SEHLF304NK47C5AF9001ACCE	B	3,391	7	No	93.0%	Yes	1	4.4	16,098	0	$2,360	$10,300	$1,200	3.9
Roof High School	Vernon High School	1	Return Fan	5.00	86.5%	No	Trane	SEHLF304NK47C5AF9001ACCE	B	2,745	7	No	89.5%	Yes	1	1.6	4,707	0	$690	$5,600	$900	6.8

		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 High School	Vernon High School	1	Supply Fan	20.00	92.0%	No	Trane	SEHLF504VK67C69F9001ACCE	B	3,391	7	No	93.0%	Yes	1	5.8	21,022	0	$3,082	$12,200	$1,300	3.5
Roof High School	Vernon High School	1	Return Fan	10.00	89.7%	No	Trane	SEHLF504VK67C69F9001ACCE	B	3,391	7	No	91.7%	Yes	1	3.1	10,991	0	$1,611	$7,500	$1,100	4.0
Classrooms	Unit ventilators Classrooms	25	Fan Coil Unit	0.33	65.0%	No	Unknown	Unknown	W	2,745		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Classrooms	Unit ventilators Classrooms	40	Fan Coil Unit	0.75	70.0%	No	Unknown	Unknown	W	2,745		No	70.0%	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
Exterior 1	Vernon High School	1	Ductless Mini-Split HP	1.00	14.00	10.00	11.6 COP	Fujitsu	AOU12RL2	B	10	Yes	1	Ductless Mini-Split HP	1.00	14.00	18.00	3.8 COP	0.3	-215	0	-$32	$2,900	$0	-92.0
Exterior 1	Vernon High School	1	Ductless Mini-Split HP	2.00	27.60	12.50	11.6 COP	Fujitsu	AOU24RLXFW	B	10	Yes	1	Ductless Mini-Split HP	2.00	27.60	18.00	3.8 COP	0.3	-679	0	-$100	$4,800	$0	-48.2
Exterior 1	Vernon High School	1	Ductless Mini-Split AC	1.00		10.00		Sanyo	C1251	B	9	Yes	1	Ductless Mini-Split AC	1.00		18.00		0.3	293	0	$43	$2,800	$0	65.1
Exterior 1	Vernon High School	1	Ductless Mini-Split AC	1.00		10.00		Mitsubishi	PU12EK	B	9	Yes	1	Ductless Mini-Split AC	1.00		18.00		0.3	27	0	$4	$2,800	$0	716.1
Exterior 1	Vernon High School	2	Ductless Mini-Split HP	3.50	41.50	9.50	7.7 HSPF	Daikin	RZQ42MVJU	B	10	Yes	2	Ductless Mini-Split HP	3.50	41.50	18.00	3.8 COP	3.1	5,361	0	$786	$15,400	$0	19.6
Classroom	Vernon High School	54	Unit Ventilator	1.00	12.00	11.00	11 COP	Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Corridor	Vernon High School	5	Electric Resistance Heat		10.24		1 COP	Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Corridor	Vernon High School	10	Electric Resistance Heat		20.47		1 COP	Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Corridor	Vernon High School	8	Electric Resistance Heat		45.38		1 COP	Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Classroom	Vernon High School	1	Electric Resistance Heat		17.06		1 COP	Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Stairs	Vernon High School	3	Electric Resistance Heat		6.82		1 COP	Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Roof High School	Vernon High School	3	Package Unit	5.00		8.90		Lennox	CHA24 653-1G	B	9	Yes	3	Package Unit	5.00		16.00		4.5	4,936	0	$724	$25,800	$1,500	33.6
Roof High School	Vernon High School	1	Package Unit	4.00		9.20		Carrier	50TJ005601	B	9	Yes	1	Package Unit	4.00		16.00		1.1	1,220	0	$179	$8,100	$400	43.1
Roof High School	Vernon High School	1	Package Unit	2.75		10.00		Lennox	CHA16-413-1G	B	9	Yes	1	Package Unit	2.75		16.00		0.6	681	0	$100	$6,700	$300	64.1
Roof High School	Vernon High School	1	Package Unit	15.00		9.90		Trane	TCD181C40CAA	B	9	Yes	1	Package Unit	15.00		14.00		2.7	2,929	0	$429	$17,500	$1,300	37.7
Roof High School	Vernon High School	1	Package Unit	30.00		10.60		Trane	SEHLF304NK47C5AF9001ACCE	B	9	Yes	1	Package Unit	30.00		12.50		2.6	2,839	0	$416	$38,300	$2,600	85.8
Roof High School	Vernon High School	2	Package Unit	50.00		10.50		Trane	SEHLF504VK67C69F9001ACCE	B	9	Yes	2	Package Unit	50.00		12.50		9.1	10,057	0	$1,475	$143,100	$8,500	91.3
Roof High School	Vernon High School	1	Package Unit	10.00		9.20		Carrier	50TJ012611GA	B	9	Yes	1	Package Unit	10.00		14.00		2.2	2,460	0	$361	$14,800	$800	38.8
Classroom	Vernon High School	4	Packaged Air-Source HP	3.50	50.20	14.60	4.9 COP	Airedale	SXW42/2-460/410	W		No							0.0	0	0	$0	$0	$0	0.0
Classroom	Vernon High School	8	Packaged Air-Source HP	3.75	47.20	11.00	4 COP	Airedale	CHH3/2-460/410	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
Exterior 1	Vernon High School	2	Ductless Mini-Split AC	0.75		10.60		Mitsubishi	MU09EW	B	9	Yes	2	Ductless Mini-Split AC	0.75		18.00		0.3	384	0	$56	$4,900	$0	87.0
Mechanical 2	Vernon High School	2	Unit Heater		34.10		1 COP	TPI	P3P5110CA1N	W		No							0.0	0	0	$0	$0	$0	0.0
Storage 1	Vernon High School	2	Unit Heater		17.05		1 COP	Dayton	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Vernon High School	Vernon High School	2	Window AC	1.50		8.00		Unknown	Unknown	B		No							0.0	0	0	$0	$0	$0	0.0
Roof High School	Vernon High School	2	Split-System	7.50		10.30		Trane	TTA090A400CC	B	9	Yes	2	Split-System	7.50		14.00		2.3	2,540	0	$372	$27,500	$1,200	70.6
Ground Floor	Vernon High School	1	Split-System	2.50		9.00		Trane	TTA030C400A0	B	9	Yes	1	Split-System	2.50		16.00		0.7	802	0	$118	$5,100	$300	40.8
Vernon High School	Vernon High School	2	Split-System	3.50		10.00		Carrier	38CK042600	B	9	Yes	2	Split-System	3.50		16.00		1.6	1,733	0	$254	$14,000	$700	52.4
Roof High School	Vernon High School	1	Split-System	60.00		8.00		Trane	RAUJC604BC13A0D	W		No							0.0	0	0	$0	$0	$0	0.0
Roof High School	Vernon High School	2	Split-System	50.00		9.50		Carrier	38AH-054---621DA	B	9	Yes	2	Split-System	50.00		12.50		15.2	16,674	0	$2,445	$182,800	$8,500	71.3
Roof High School	Vernon High School	1	Split-System	40.00		10.00		Trane	RAUJC404BC13A0D00000	W		No							0.0	0	0	$0	$0	$0	0.0
Roof High School	Vernon High School	1	Split-System	15.00		9.50		Trane	TTA180B400CC	B	9	Yes	1	Split-System	15.00		14.00		3.0	3,350	0	$491	$25,600	$1,300	49.5
Exterior 1	Vernon High School	1	Split-System	4.00		13.00		Goodman	GSX130481BE	W		No							0.0	0	0	$0	$0	$0	0.0
Vernon High School	Vernon High School	1	Electric Resistance Heat		255.90		1 COP	Electroduct	F-95-D1660	W		No							0.0	0	0	$0	$0	$0	0.0
Vernon High School	Vernon High School	1	Electric Resistance Heat		307.08		1 COP	Electroduct	F-98-01661	W		No							0.0	0	0	$0	$0	$0	0.0
Mechanical 2	Vernon High School	1	Electric Resistance Heat		511.00		1 COP	Indeeco	XUB150	W		No							0.0	0	0	$0	$0	$0	0.0
Mechanical 1	Vernon High School	3	Electric Resistance Heat		170.60		1 COP	Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Mechanical 1	Vernon High School	2	Electric Resistance Heat		204.72		1 COP	Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Storage 435	Vernon High School	1	Electric Resistance Heat		392.38		1 COP	Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Mechanical 2	Vernon High School	1	Electric Resistance Heat		341.20		1 COP	Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Mechanical 2	Vernon High School	1	Electric Resistance Heat		341.20		1 COP	Unknown	Unknown	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
Mechanical 2	Vernon High School	1	Electric Resistance Heat		136.48		1 COP	Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Mechanical 2	Vernon High School	1	Electric Resistance Heat		136.48		1 COP	Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Mechanical 408	Vernon High School	1	Electric Resistance Heat		648.28		1 COP	Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Mechanical 408	Vernon High School	1	Electric Resistance Heat		648.28		1 COP	Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Storage 410	Vernon High School	1	Electric Resistance Heat		68.24		1 COP	Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Vernon High School	Vernon High School	1	Electric Resistance Heat		358.26		1 COP	Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Mechanical 3	Vernon High School	2	Electric Resistance Heat		290.00		1 COP	Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Cosmetology Building - Exterior	Cosmetoloy Building	2	Split-System	2.50		11.00		American Standard	2TTR3030A1000AA	W		No							0.0	0	0	$0	$0	$0	0.0
Cosmetology Building - Exterior	Cosmetoloy Building	2	Split-System	2.50		10.00		American Standard	TTR030C100A1	W		No							0.0	0	0	$0	$0	$0	0.0
Cosmetology Building	Cosmetology Building	2	Electric Resistance Heat		5.12		1 COP	Qmark	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Cosmetology Building - Restrooms	Cosmetology Building - Restrooms	2	Electric Resistance Heat		3.41		1 COP	Brgan	170-B	W		No							0.0	0	0	$0	$0	$0	0.0
Cosmetology Building	Cosmetoloy Building	1	Ductless Mini-Split HP	1.00	13.00	10.00	3 HSPF	Sanyo	CH1222	W		No							0.0	0	0	$0	$0	$0	0.0
Cosmetology Building	Cosmetology Building	4	Unit Ventilator		18.80		1 COP	Snyder General	AAAMWLAAAV31613000	W		No							0.0	0	0	$0	$0	$0	0.0
Roof High School	Vernon High School	1	Electric Resistance Heat		580.04		1 COP	Trane	SEHLF504VK67C69F9001ACCE	B		No							0.0	0	0	$0	$0	$0	0.0

<u>DHW Inventory & Recommendations</u>

		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
Storage 410	Vernon High School	1	Storage Tank Water Heater (> 50 Gal)	Durawatt Electric	550 P 600A-VE	W		No						0.0	0	0	$0	$0	$0	0.0
Kitchen 1	Vernon High School	1	Booster Water Heater	Hatco	C-24	W		No						0.0	0	0	$0	$0	$0	0.0
Cosmetology Building - Classroom 2	Cosmetology Building	1	Storage Tank Water Heater (≤ 50 Gal)	AO Smth	E6-50R45DV	W		No						0.0	0	0	$0	$0	$0	0.0
Mechanical Kitchen	Kitchen	1	Boiler	RBI	N1160E02	B		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
Vernon High School	11	9	Faucet Aerator (Kitchen)	1.50	1.50	0.0	0	0	$0	$80	$20	0.0
Vernon High School	11	1	Faucet Aerator (Kitchen)	2.20	1.50	0.0	57	0	$8	$10	$0	1.2
Vernon High School	11	13	Faucet Aerator (Lavatory)	2.20	0.50	0.0	1,807	0	$265	$110	$50	0.2
Vernon High School	11	33	Faucet Aerator (Lavatory)	1.50	0.50	0.0	2,699	0	$396	$280	$130	0.4
Vernon High School	11	6	Faucet Aerator (Lavatory)	1.20	0.50	0.0	343	0	$50	$50	$20	0.6
Vernon High School	11	2	Showerhead	2.00	1.50	0.0	230	0	$34	$210	$30	5.3

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
Exterior 2	1	Cooler (35F to 55F)	Unknown	Unknown	13	Yes	No	No	0.1	820	0	$120	$750	$80	5.6
Kitchen 11	1	Cooler (35F to 55F)	Unknown	Unknown		No	No	No	0.0	0	0	$0	$0	$0	0.0
Classroom 012	1	Medium Temp Freezer (0F to 30F)	Heatcraft	ADT090AK		No	No	No	0.0	0	0	$0	$0	$0	0.0

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
Vernon High School	2	Refrigerator Chest	Varied	Varied	No		No	0.0	0	0	$0	$0	$0	0.0
Vernon High School	6	Stand-Up Refrigerator, Glass Door (16 - 30 cu. ft.)	Varied	Varied	No		No	0.0	0	0	$0	$0	$0	0.0
Vernon High School	4	Stand-Up Freezer, Solid Door (≤15 cu. ft.)	Manitowoc	SC-50-NU	No		No	0.0	0	0	$0	$0	$0	0.0
Vernon High School	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Victory	VR-SA-2D	No		No	0.0	0	0	$0	$0	$0	0.0
Vernon High School	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Beverage Air	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Vernon High School	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Atrsa	MBF8005GR	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
Kitchen	1	Ice Making Head (<450 lbs/day), Batch	Prodigu	Unknown	Yes		No	0.0	0	0	$0	$0	$0	0.0
Trainer Office	1	Ice Making Head (≥450 lbs/day), Batch	Scotsman	NS0622A-1B	Yes		No	0.0	0	0	$0	$0	$0	0.0

Cooking Equipment Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	Manufacturer	Model	High Efficiency Equipement?	ECM #	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen 1	1	Electric Combination Oven/Steam Cooker (<15 Pans)	Groen	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen 1	1	Electric Fryer	Pitco	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Dining Area1	2	Insulated Food Holding Cabinet (1/2 Size)	Unknown	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Vernon High School	5	Insulated Food Holding Cabinet (3/4 Size)	Varied	Varied	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen 1	1	Gas Rack Oven (Double)	Vulcan	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen 1	2	Gas Rack Oven (Double)	Varied	Varied	No		No	0.0	0	0	$0	$0	$0	0.0

Plug Load Inventory

	Existing Conditions					
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?	Manufacturer	Model
Classroom	2	Clothes Dryer	5,000	No	Varied	Unknown
Classroom	3	Clothes Washer	1,200	Yes	Encore	Unknown
Vernon High School	20	Coffee Machine	900	No	Unknown	Unknown
Vernon High School	4	Coffee Machine	1,500	No	Bloomfield	8774
Vernon High School	253	Desktop	270	No	Varied	Varied
Storage	4	Dishwasher	1,000	No	Electrolux	Unknown
Office	1	Electric Space Heater	1,500	No	Unknown	Unknown
Gymnasium	1	Fan (Large)	300	No	Unknown	Unknown
Office	6	Fan (Portable)	100	No	Unknown	Unknown
Classroom	2	Kiln	17,300	No	Skutt Automatic Kiln	KM-1231PK
Storage	1	Kiln	7,200	No	Unknown	S-82-3
Office	8	Laptop	75	No	Unknown	Unknown
Vernon High School	43	Microwave	1,500	No	Unknown	Unknown
Classroom	4	Paper Shredder	75	No	Unknown	Unknown
Vernon High School	30	Printer (Medium/Small)	1,380	No	Ricoh	Varied
Vernon High School	15	Printer/Copier (Large)	2,000	No	Savin	Unknown
Classroom	16	Projector	250	No	Unknown	Unknown
Classroom	2	Refrigerator (Large)	572	No	Unknown	Unknown
Vernon High School	26	Refrigerator (Mini)	126	No	Unknown	Unknown
Vernon High School	18	Refrigerator (Residential)	509	No	Unknown	Unknown
Classroom	61	Smart Board	200	No	Benq	RP7502
Vernon High School	2	Television	100	No	Unknown	Unknown
Vernon High School	4	Television	150	No	Unknown	Unknown
Vernon High School	36	Television	200	No	Unknown	Unknown
Classroom	3	Toaster	1,000	No	Unknown	Unknown
Lounge	5	Toaster Oven	1,500	No	Unknown	Unknown
Office	5	Water Cooler	600	No	Unknown	Unknown
Corridor	12	Water Fountain	200	No	Elkay	LZS8WSSP
Classroom	14	Air Purifier	120	No	MedifyAir	MA-112
Classroom	1	Air Fryer	1,500	No	Nuwave	Unknown
Classroom	1	Oven/stove stop	8,800	No	General Electric	JBP23DR1WW
Restroom	4	Hand Dryer	1,500	No	Unknown	Unknown
Theater	26	Stage lighting	60	No	Unknown	Unknown
Theater	38	Stage lighting	10	No	Unknown	Unknown
Theater	59	Stage lighting	10	No	Unknown	Unknown

	Existing Conditions					
Location	**Quantity**	**Equipment Description**	**Energy Rate (W)**	**ENERGY STAR Qualified?**	**Manufacturer**	**Model**
Gymnasium	2	Scoreboard	2,500	No	Unknown	Unknown
Kitchen	1	Pizza Oven	5,000	No	Lincoln	Unknown
Kitchen	1	Hot Food Display	1,810	No	Hatco	GRSDS-36D
Classroom	1	Oven/stove stop	9,100	No	General Electric	JBS15M1WW
Classroom	1	Oven/stove stop	8,500	No	Electrolux	Unknown
Classroom	4	Treadmill	4,000	No	Landice	L9
Library	1	Fish tank	230	No	Unknown	Unknown
Office	1	Electrotherapy machine	10	No	Theratouch	CX4DQ8200
Office	1	Hot Pack Heater	1,000	No	Hydrocollator	SS-2
Classroom	1	Lab Oven	1,500	No	Quincy Lab	40 GC
Computer Lab	3	3D Printer	25	No	Airwolf 3D	Exo
Computer Lab	3	3D Printer	25	No	Airwolf 3D	Axiom
Computer Lab	1	Laser Cutter	105	No	BossLaser	LS3655
Computer Lab	1	Laser Cutter	60	No	BossLaser	LS1420
Computer Lab	1	Waterjet	2,100	No	Wazer	WZR-101
Trainer Office	1	Hydro-Massage Turbine	1,500	No	Unknown	Unknown
Maintenance Building	1	Electric Space Heater	1,500	No	Unknown	Unknown
Maintenance Building	1	Misc. Tools	1,500	No	Unknown	Unknown
Cosmetology Building	2	Desktop	270	No	Varied	Varied
Cosmetology Building	1	Fan	100	No	Unknown	Unknown
Cosmetology Building	2	Microwave	1,500	No	Varied	Varied
Cosmetology Building	1	Air Purifier	200	No	HealthyAir	HA-SCP-G3B2
Cosmetology Building	1	Washer/Dryer	2,500	No	General Electric	GUD27ESSJ0WW
Cosmetology Building	1	Printer	120	No	Unknown	Unknown
Cosmetology Building	2	Mini Refrigerator	126	No	Unknown	Unknown
Cosmetology Building	1	Smart Board	100	No	Unknown	Unknown
WWTP	1	Fan	100	No	Unknown	Unknown
Vernon High School	1	Misc. equipment	2,500	No	Varied	Varied

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
Lounge	3	Glass Fronted Refrigerated	14	Yes	0.4	3,627	0	$532	$800	$150	1.2
Dining Area	2	Non-Refrigerated	N/A	No	0.0	0	0	$0	$0	$0	0.0

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]

Vernon Township High School (Campus)

Primary Property Type: K-12 School
Gross Floor Area (ft²): 220,520
Built: 1972

For Year Ending: February 29, 2024
Date Generated: November 14, 2024

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
Vernon Township High School (Campus) 1832 Route 565 Glenwood, New Jersey 07418	Vernon Township School District 625 Route 517 PO Box 99 Vernon, NJ 07462 973-764-6494	Joe Van Kirk 625 Route 517 BO Box 99 Vernon, NJ 07462 973-764-6494 jvankirk@vtsd.com

Property ID: 35122005

Energy Consumption and Energy Use Intensity (EUI)

Site EUI 55.2 kBtu/ft²	**Annual Energy by Fuel** Electric - Grid (kBtu)	 12,165,669 (100%)	**Annual Emissions** Total (Location-Based) GHG Emissions (Metric Tons CO2e/ year)	 1,068
Source EUI 154.5 kBtu/ft²	**National Median Comparison** National Median Site EUI (kBtu/ft²) National Median Source EUI (kBtu/ft²) % Diff from National Median Source EUI	 49.3 138.1 12%	**Green Power** Green Power – Onsite (kWh) Green Power – Offsite (kWh) Percent of RECs Retained	 N/A 0 N/A

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

____ ________
,
(____)____-______
____

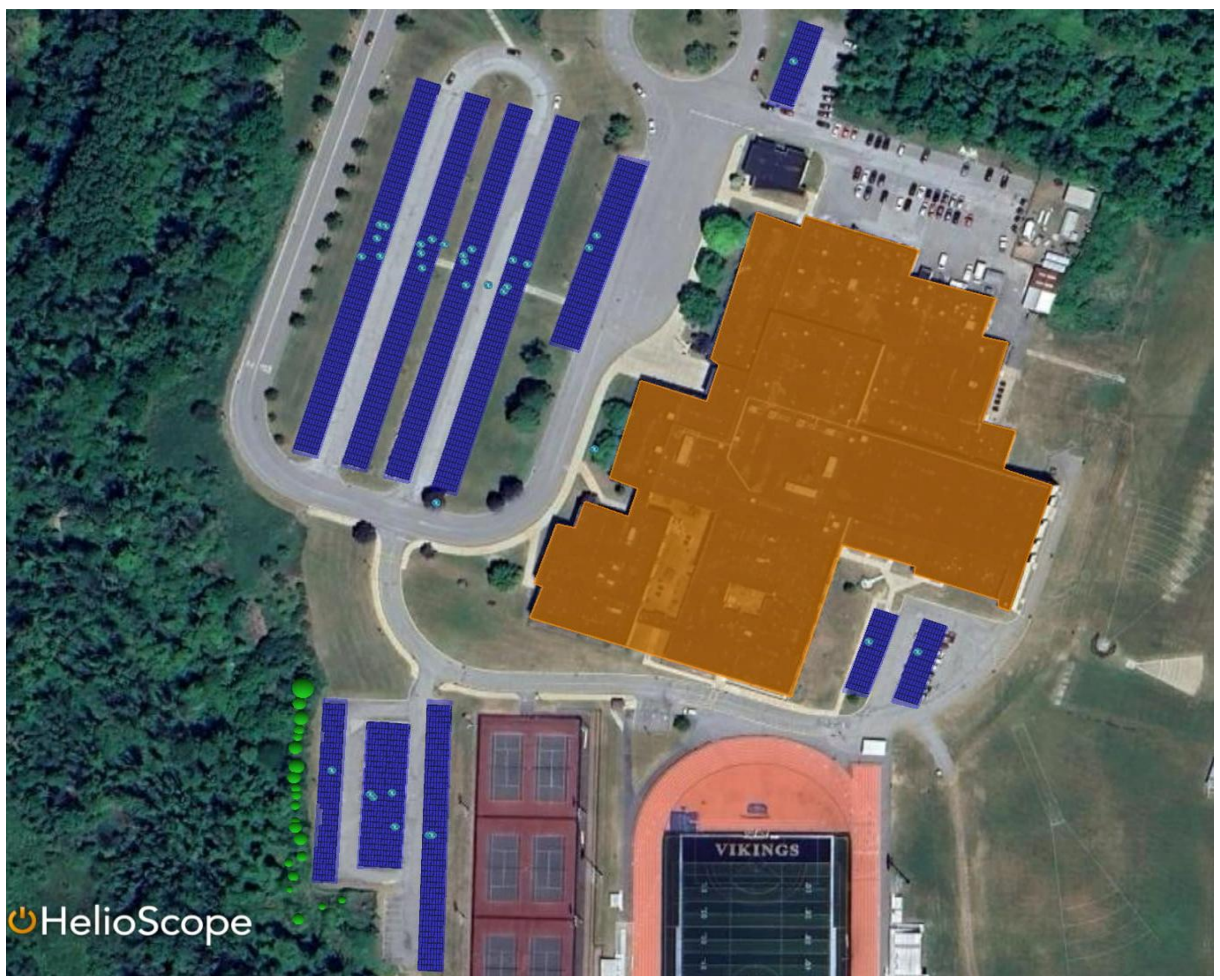
Professional Engineer or Registered Architect Stamp (if applicable)

Summary

DER	Gross Project Cost ($)	Energy Generation (kWh)	Demand Reduction (kW)	GHG Reduction (MT CO2)	Total Annual Utility Cost Savings ($/yr)	New Maintenance Penalty ($/yr)	Net Annual Cost Savings ($/yr)	Incentives (ITC) ($)	Depreciation (MACRS) ($)	Net Project Cost ($)	Net Simple Payback (yr)
1.25 MW Solar PV	$7,937,000	1,510,874	271	301	$176,700	$39,685	$137,015	$2,381,100	$1,984,250	$3,571,650	26.1
Total	$7,937,000	1,510,874	271	301	$176,700	$39,685	$137,015	$2,381,100	$1,984,250	$3,571,650	26.1

PPA Alternative:	-$45,208	Annual Utility Savings

Baseline kWh	3,570,328
Saved kWh	1,510,874
% NZE	42%
NZE Solar Size MW	2.95



Equipment	Estimated Max Demand Savings (kW)	Estimated Annual Energy Generation (kWh)	Estimated Annual GHG Reduction ($MT-CO_2e$)	Estimated Annual Cost Savings ($)	Estimated Gross Project Cost ($)	Total Incentives ($)	Net Project Cost ($)	Simple Payback Period (yr)
1.25 MW Solar PV	271	1,510,874	301	$137,015	$7,937,000	$4,365,350	$3,571,650	26.1
Total	271	1,510,874	301	$137,015	$7,937,000	$4,365,350	$3,571,650	26.1

Ownership Plan	Upfront Cost	Year 1 Cost After Rebates	Annual Savings	Lifetime 30-Year Cost Savings ($)	30-Year ROI
Cash Purchase	$7,937,000	$3,571,650	$137,015	$4,110,435	115%
PPA	$0	$0	($45,208)	($1,356,253)	-

Equipment	Estimated Gross Project Cost ($)	ITC Rebate	MACRS Rebate	Net Project Cost
1.25 MW Solar PV	$7,937,000	$2,381,100	$1,984,250	$3,571,650

Costing

System Description	Quantity	Unit	Equipment Cost per Unit ($)	Labor Cost Per Unit ($)	Material Cost Per Unit ($)	Total Material Cost ($)	Total Equipment Cost ($)	Total Labor Cost ($)	Total Cost ($)	Source	Notes
Solar Array											
PV Modules (Trina Solar 320 W)	1,250,000	Watts DC			$ 0.45	$ 562,500	$ -	$ -	$ 62,500	PV size from ETB, cost from NREL report	https://www.nrel.gov/docs/fy22osti/83586.pdf
Inverter, 30 kW	34	Ea.		$ 400	$ 4,500	$ 153,000	$ -	$ 54,454	$ 207,454	Inverter size from Helioscope - Cost from online quote Labor - 4 Hrs Electrician per unit	https://www.solaris-shop.com/sma-sunny-tripower-x-30-us-50-stp-30-us-50-480vac-afci-dc-disconnect-sunspec-certified-rapid-shutdown-transmitter/
Carport Racking Cost/Labor/Installation	1,250,000	Watts DC		$ 1.21	$ 1.00	$1,250,000	$ -	$1,513,875	$2,763,875	Energy ToolBase	Considered PV Mounting/Racking Cost
PV String Combiner Panels	30	Ea.		$ 100.10	$ 568	$ 16,839	$ -	$ 5,931	$ 22,770	Online Quote Labor - 1 Hrs Electrician per unit	https://www.solaris-shop.com/sma-cu1000-us-11-string-combiner-w-disconnect/ Each 1000V combiner box with disconnect switch can accommodate 8 strings total Project site has up to 237 strings
Electrical BOS Carport	8,402	m^2	$ -	$ -	$ 50.00	$ 420,112	$ -	$ -	$ 420,112	assumed the same cost as the ground mounted https://www.nrel.gov/docs/fy22osti/83586.pdf	U.S. Solar Photovoltaic System and Energy Storage Cost Benchmarks, With Minimum Sustainable Price Analysis: Q1 2022
Carport Linear LED Surface Mount Lighting Fixture	42	Ea.		$ 100.10	$ 61.83	$ 2,598	$ -	$ 4,205	$ 6,803	RS Means Line #: 26 51 13 44 2010 https://www.1000bulbs.com/product/217486/PLT-90093.html	(1) Electrican to install
Installation rental equipment Ground Mount	8,402	m^2	$ 14.60	$ -	$ -	$ -	$ 122,673	$ -	$ 122,673	assumed the same cost as the ground mounted https://www.nrel.gov/docs/fy22osti/83586.pdf	U.S. Solar Photovoltaic System and Energy Storage Cost Benchmarks, With Minimum Sustainable Price Analysis: Q1 2022
Trenching/Site Prep and Wiring											
Schedule 80 PVC Piping 6" Diameter	3,500	LF	$ -	$ 45	$ 53.00	$ 185,500	$ -	$ 58,328	$ 43,828	RS means - 221113742560	
Trenching and Backfill 12" wide, 36" Deep	15	Day.	$ 425	$,836.40	$ -	$ -	$ 6,375	$ 27,546	$ 33,921	Includes B-54 Crew - reference 312316142850	(2) Days of work (2) Laborers (1) 40 HP Chain Trencher (1) Light Equip Operator
Soil Excavation, Removal, loading, and hauling	15	L.C.Y	$ 6.80	$ 6.15	$ -	$ -	$ 102	$ 92	$ 194	Includes B-34D Crew - reference 312323204304	Includes (1) Truck Driver (1) Truck Tractor (1) Dump Trailer

System Description	Quantity	Unit	Equipment Cost per Unit ($)	Labor Cost Per Unit ($)	Material Cost Per Unit ($)	Total Material Cost ($)	Total Equipment Cost ($)	Total Labor Cost ($)	Total Cost ($)	Source	Notes
Backfill and Asphalt Paving 8" Thick	15	Day.	$ 3,428	$6,777.20	$ 30.00	$ 3,213	$ 51,418	$ 101,658	$ 156,289	Includes B-25 Crew - reference 32 11 26 13 0560	1 Day of Filling Trench and Repaving Asphalt Includes (1) Labor Foreman (7) Laborers (3) Equipment Operators (1) Asphalt Paver, 130 H.P. (1) Tandem Roller, 10 Ton (1) Roller, Pneum. Wheel, 12 Ton
Other Costs											
Migrogrid Controller	1,250	kW	$ -	$ 7.63	$ 155	$ 193,750	$ -	$ 9,533	$ 203,283	https://www.nrel.gov/docs/fy19osti/67821.pdf NREL data base ($155,000/MW)	Inclusive of 1 Electrican @ 8 Hrs Per Unit
User Training	8	Hr.	$ -	$ 150	$ -	$ -	$ -	$ 1,200	$ 1,200		
Total						$ 2,787,500	$ 180,600	$1,876,800	$4,844,902		

Markup	Cost
System Cost	$4,844,902
NJ Sales Tax (6.625%)	$184,672
O&P Cost (10%)	$484,490
EPC Markup (10%)	$484,490
Contingency (30%)	$1,453,470
Escalation from 2022	$484,490
Total Cost	$7,937,000

Solar Cost	$7,602,012	
Electrical Upgrades, Permitting and Misc...	$334,988	
Solar Cost with Elec Upgrades	$7,937,000	$6.35

PPA Analysis

	Income			Net		
Year	Cash Purchase	Standard PPA	PPA with Year 10 Buyout	Cash Purchase	Standard PPA	PPA with Year 10 Buyout
0	-$3,571,650	$0	$0	-$3,571,650	$0	$0
1	$137,015	-$45,208	-$45,208	-$3,434,635	-$45,208	-$45,208
2	$137,015	-$45,208	-$45,208	-$3,297,621	-$90,417	-$90,417
3	$137,015	-$45,208	-$45,208	-$3,160,606	-$135,625	-$135,625
4	$137,015	-$45,208	-$45,208	-$3,023,592	-$180,834	-$180,834
5	$137,015	-$45,208	-$45,208	-$2,886,577	-$226,042	-$226,042
6	$137,015	-$45,208	-$45,208	-$2,749,563	-$271,251	-$271,251
7	$137,015	-$45,208	-$45,208	-$2,612,548	-$316,459	-$316,459
8	$137,015	-$45,208	-$45,208	-$2,475,534	-$361,667	-$361,667
9	$137,015	-$45,208	-$45,208	-$2,338,519	-$406,876	-$406,876
10	$137,015	-$45,208	-$45,208	-$2,201,505	-$452,084	-$452,084
11	$137,015	-$45,208	-$1,874,819	-$2,064,490	-$497,293	-$2,326,904
12	$137,015	-$45,208	$137,015	-$1,927,476	-$542,501	-$2,189,889
13	$137,015	-$45,208	$137,015	-$1,790,461	-$587,710	-$2,052,875
14	$137,015	-$45,208	$137,015	-$1,653,447	-$632,918	-$1,915,860
15	$137,015	-$45,208	$137,015	-$1,516,432	-$678,127	-$1,778,846
16	$137,015	-$45,208	$137,015	-$1,379,418	-$723,335	-$1,641,831
17	$137,015	-$45,208	$137,015	-$1,242,403	-$768,543	-$1,504,817
18	$137,015	-$45,208	$137,015	-$1,105,389	-$813,752	-$1,367,802
19	$137,015	-$45,208	$137,015	-$968,374	-$858,960	-$1,230,788
20	$137,015	-$45,208	$137,015	-$831,360	-$904,169	-$1,093,773
21	$137,015	-$45,208	$137,015	-$694,345	-$949,377	-$956,759
22	$137,015	-$45,208	$137,015	-$557,331	-$994,586	-$819,744
23	$137,015	-$45,208	$137,015	-$420,316	-$1,039,794	-$682,730
24	$137,015	-$45,208	$137,015	-$283,302	-$1,085,002	-$545,715
25	$137,015	-$45,208	$137,015	-$146,287	-$1,130,211	-$408,701
26	$137,015	-$45,208	$137,015	-$9,273	-$1,175,419	-$271,686
27	$137,015	-$45,208	$137,015	$127,742	-$1,220,628	-$134,672
28	$137,015	-$45,208	$137,015	$264,756	-$1,265,836	$2,343
29	$137,015	-$45,208	$137,015	$401,771	-$1,311,045	$139,357
30	$137,015	-$45,208	$137,015	$538,785	-$1,356,253	$276,372

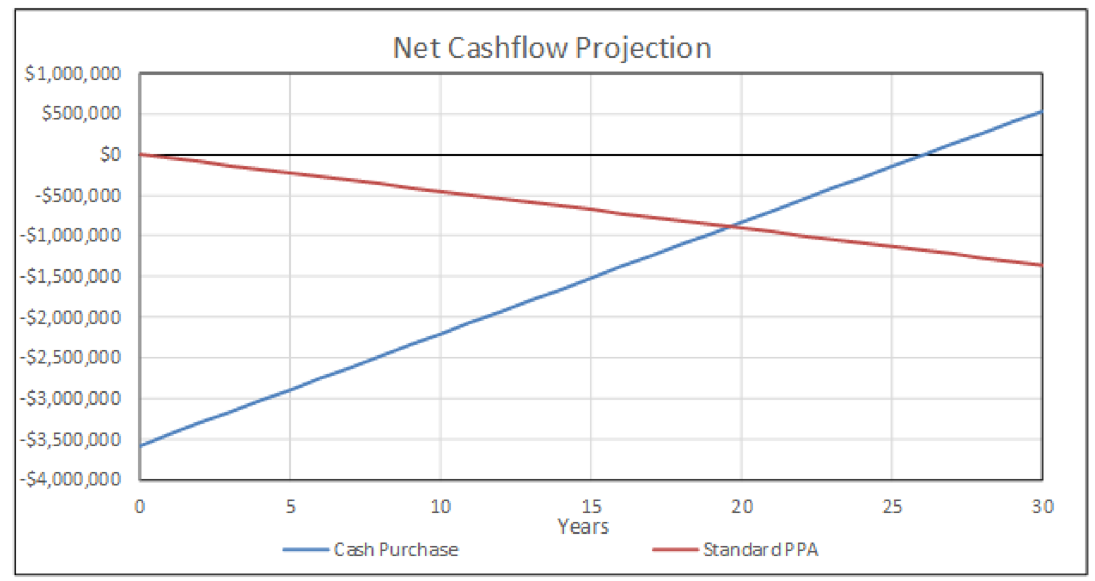
Cash Purchase	
Gross Project Cost	$7,937,000
Rebates	-$2,381,100
85% Depreciation	-$1,984,250
n/a	$0
Final Cost	$3,571,650
Utility Savings	$137,015
Payback	26.1
Financial Life (yr)	30
ROI (Over EUL)	115%

Solar Cost: $7,937,000

Standard PPA	
Gross Project Cost	$7,937,000
Rebates	-$2,381,100
85% Depreciation	-$1,984,250
n/a	$0
Final Cost	$3,571,650
Financial Life (yr)	30
Interest Rate	3.0%
Annual Income from Loan	$182,223
Utility Savings	$137,015
Annual Savings	-$45,208

Solar Cost: $7,937,000

PPA with Year 10 Buyout	
Gross Project Cost	$7,937,000
Rebates	-$2,381,100
85% Depreciation	-$1,984,250
n/a	$0
Final Cost	$3,571,650
Financial Life (yr)	30
Interest Rate	3.0%
Years 1-10	
Contractor's Income	$182,223
Utility Savings	$137,015
Customer Savings	-$45,208
Years 11-30	
Contractor O&P	15%
Buyout Cost	$2,011,834
Utility Savings	$137,015
Year 11-25 Payback	14.7
Lifetime Savings	$2,288,206
ROI (Over RUL)	114%



ETB Outputs

					Raw Utility Info					-25.5%	Cost Markup	
Bill Date Ranges			Energy Before PV/ESS (kWh)	Max Demand Before PV/ESS (kW)	Charges Before PV/ESS ($)				Charges Before PV/ESS ($)			
Start Date	End Date	Season	Total	NC / Max	Other	Energy	Demand	Total	Other	Energy	Demand	Total
1/1/2024	2/1/2024	W	514853	2354	16.69	67934.14	19642.72	87593.55	$ 12.43	$ 50,610.93	$ 14,633.83	$ 65,257.19
2/1/2024	3/1/2024	W	431848	2228	16.69	56992	18586.84	75595.53	$ 12.43	$ 42,459.04	$ 13,847.20	$ 56,318.67
3/1/2023	4/1/2023	W	298880	1781	16.69	39463.5	14840.98	54321.17	$ 12.43	$ 29,400.31	$ 11,056.53	$ 40,469.27
4/1/2023	5/1/2023	W	267505	2409	16.69	35327.49	20103.62	55447.8	$ 12.43	$ 26,318.98	$ 14,977.20	$ 41,308.61
5/1/2023	6/1/2023	W	201102	2576	16.69	26573.91	21503.08	48093.68	$ 12.43	$ 19,797.56	$ 16,019.79	$ 35,829.79
6/1/2023	7/1/2023	S	201170	2576	16.69	26672.2	23094	49782.89	$ 12.43	$ 19,870.79	$ 17,205.03	$ 37,088.25
7/1/2023	8/1/2023	S	195704	2576	16.69	25949.21	23094	49059.9	$ 12.43	$ 19,332.16	$ 17,205.03	$ 36,549.63
8/1/2023	9/1/2023	S	185509	2576	16.69	24600.73	23094	47711.42	$ 12.43	$ 18,327.54	$ 17,205.03	$ 35,545.01
9/1/2023	10/1/2023	S	197202	2576	16.69	26147.35	23094	49258.04	$ 12.43	$ 19,479.78	$ 17,205.03	$ 36,697.24
10/1/2023	11/1/2023	W	245235	1441	16.69	32391.74	11991.78	44400.21	$ 12.43	$ 24,131.85	$ 8,933.88	$ 33,078.16
11/1/2023	12/1/2023	W	369185	1864	16.69	48731.45	15536.52	64284.66	$ 12.43	$ 36,304.93	$ 11,574.71	$ 47,892.07
12/1/2023	1/1/2024	W	462135	2004	16.69	60984.59	16709.72	77711	$ 12.43	$ 45,433.52	$ 12,448.74	$ 57,894.70
Subtotal			3570328		200.28	471768.32	231291.26	0	$ 149.21	$ 351,467.40	$ 172,311.99	$ -
Adjustments			0		0	0	0	0	$ -	$ -	$ -	$ -
Total			3570328		200.28	471768.32	231291.26	703259.86	$ 149.21	$ 351,467.40	$ 172,311.99	$ 523,928.60

Bill Date Ranges			Energy After PV & Before ESS (kWh)	Max Demand After PV & Before ESS (kW)	Charges After PV & Before ESS ($)				Charges After PV & Before ESS ($)			
Start Date	End Date	Season	Total	NC / Max	Other	Energy	Demand	Total	Other	Energy	Demand	Total
1/1/2024	2/1/2024	W	451240	2134	16.69	59548.35	17799.12	77364.16	$ 12.43	$ 44,363.52	$ 13,260.34	$ 57,636.30
2/1/2024	3/1/2024	W	342130	2129	16.69	45164.93	17757.22	62938.84	$ 12.43	$ 33,647.87	$ 13,229.13	$ 46,889.44
3/1/2023	4/1/2023	W	162895	1686	16.69	21537.27	14044.88	35598.84	$ 12.43	$ 16,045.27	$ 10,463.44	$ 26,521.14
4/1/2023	5/1/2023	W	111802	2147	16.69	14801.94	17908.06	32726.69	$ 12.43	$ 11,027.45	$ 13,341.50	$ 24,381.38
5/1/2023	6/1/2023	W	12453	1650	16.69	1705.26	13743.2	15465.15	$ 12.43	$ 1,270.42	$ 10,238.68	$ 11,521.54
6/1/2023	7/1/2023	S	26708	1763	16.69	3596.28	15777	19389.97	$ 12.43	$ 2,679.23	$ 11,753.87	$ 14,445.53
7/1/2023	8/1/2023	S	4118	1908	16.69	608.32	17082	17707.01	$ 12.43	$ 453.20	$ 12,726.09	$ 13,191.72
8/1/2023	9/1/2023	S	12419	1921	16.69	1706.29	17199	18921.98	$ 12.43	$ 1,271.19	$ 12,813.26	$ 14,096.88
9/1/2023	10/1/2023	S	63210	2305	16.69	8424.36	20655	29096.05	$ 12.43	$ 6,276.15	$ 15,387.98	$ 21,676.56
10/1/2023	11/1/2023	W	152277	1307	16.69	20137.56	10868.86	31023.11	$ 12.43	$ 15,002.48	$ 8,097.30	$ 23,112.22
11/1/2023	12/1/2023	W	309909	1791	16.69	40917.39	14924.78	55858.86	$ 12.43	$ 30,483.46	$ 11,118.96	$ 41,614.85
12/1/2023	1/1/2024	W	410293	1898	16.69	54150.52	15821.44	69988.65	$ 12.43	$ 40,342.14	$ 11,786.97	$ 52,141.54
Subtotal			2059454		200.28	272298.48	193580.56	0	$ 149.21	$ 202,862.37	$ 144,217.52	$ -
Adjustments			0		0	0	0	0	$ -	$ -	$ -	$ -
Total			2059454		200.28	272298.48	193580.56	466079.32	$ 149.21	$ 202,862.37	$ 144,217.52	$ 347,229.09

Bill Date Ranges			Energy After PV & Before ESS (kWh)	Max Demand After PV & Before ESS (kW)	Charges After PV & Before ESS ($)				Charges After PV/ESS ($)			
Start Date	End Date	Season	Total	NC / Max	Other	Energy	Demand	Total	Other	Energy	Demand	Total
1/1/2024	2/1/2024	W	451240	2134	16.69	59548.35	17799.12	77364.16	$ 12.43	$ 44,363.52	$ 13,260.34	$ 57,636.30
2/1/2024	3/1/2024	W	342130	2129	16.69	45164.93	17757.22	62938.84	$ 12.43	$ 33,647.87	$ 13,229.13	$ 46,889.44
3/1/2023	4/1/2023	W	162895	1686	16.69	21537.27	14044.88	35598.84	$ 12.43	$ 16,045.27	$ 10,463.44	$ 26,521.14
4/1/2023	5/1/2023	W	111802	2147	16.69	14801.94	17908.06	32726.69	$ 12.43	$ 11,027.45	$ 13,341.50	$ 24,381.38
5/1/2023	6/1/2023	W	12453	1650	16.69	1705.26	13743.2	15465.15	$ 12.43	$ 1,270.42	$ 10,238.68	$ 11,521.54
6/1/2023	7/1/2023	S	26708	1763	16.69	3596.28	15777	19389.97	$ 12.43	$ 2,679.23	$ 11,753.87	$ 14,445.53
7/1/2023	8/1/2023	S	4118	1908	16.69	608.32	17082	17707.01	$ 12.43	$ 453.20	$ 12,726.09	$ 13,191.72
8/1/2023	9/1/2023	S	12419	1921	16.69	1706.29	17199	18921.98	$ 12.43	$ 1,271.19	$ 12,813.26	$ 14,096.88
9/1/2023	10/1/2023	S	63210	2305	16.69	8424.36	20655	29096.05	$ 12.43	$ 6,276.15	$ 15,387.98	$ 21,676.56
10/1/2023	11/1/2023	W	152277	1307	16.69	20137.56	10868.86	31023.11	$ 12.43	$ 15,002.48	$ 8,097.30	$ 23,112.22
11/1/2023	12/1/2023	W	309909	1791	16.69	40917.39	14924.78	55858.86	$ 12.43	$ 30,483.46	$ 11,118.96	$ 41,614.85
12/1/2023	1/1/2024	W	410293	1898	16.69	54150.52	15821.44	69988.65	$ 12.43	$ 40,342.14	$ 11,786.97	$ 52,141.54
Subtotal			2059454		200.28	272298.48	193580.56	0	$ 149.21	$ 202,862.37	$ 144,217.52	$ -
Adjustments			0		0	0	0	0	$ -	$ -	$ -	$ -
Total			2059454		200.28	272298.48	193580.56	466079.32	$ 149.21	$ 202,862.37	$ 144,217.52	$ 347,229.09

Energy Toolbase

PV SYSTEM DETAILS

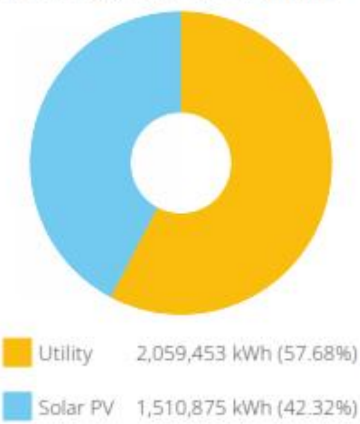
GENERAL INFORMATION
Facility: Vernon High School
Address: 1832 Route 565, Glenwood, NJ 07418

SOLAR PV EQUIPMENT DESCRIPTION
Solar Panels: (3909) Trina Solar TSM-PD14 320
Inverters: (34) SMA Sunny Tripower X 30-US

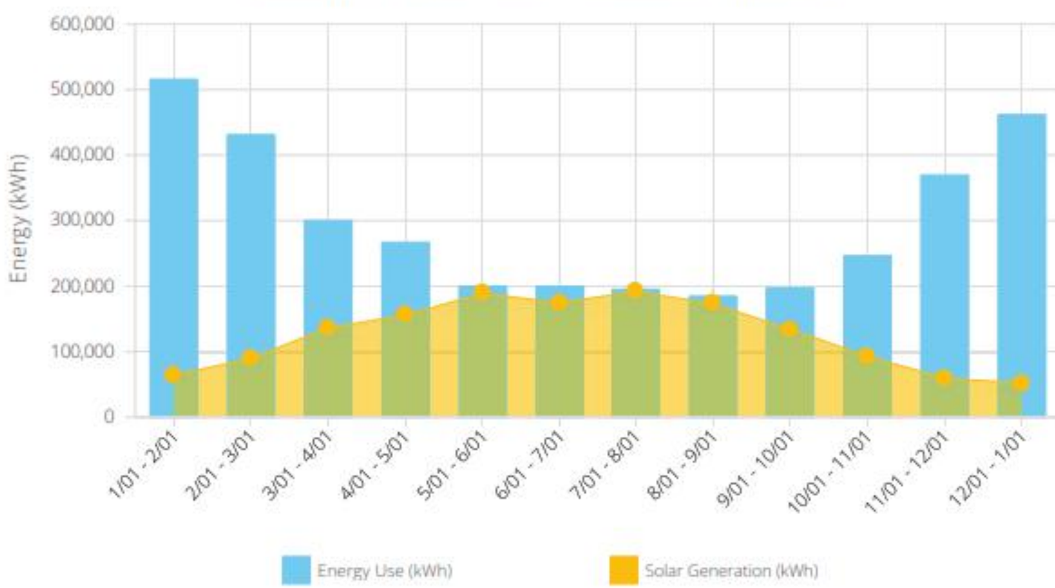
SOLAR PV EQUIPMENT TYPICAL LIFESPAN
Solar Panels: Greater than 30 Years
Inverters: 15 Years

SOLAR PV SYSTEM RATING
Power Rating: 1,250,880 W-DC
Power Rating: 1,100,824 W-AC-CEC

ENERGY CONSUMPTION MIX
Annual Energy Use: 3,570,328 kWh



MONTHLY ENERGY USE VS SOLAR GENERATION



ENVIRONMENTAL BENEFITS

OVER THE NEXT 20 YEARS, YOUR SYSTEM WILL DO MORE THAN JUST SAVE YOU MONEY. ACCORDING TO THE EPA'S GREENHOUSE GAS EQUIVALENCIES CALCULATOR (SOURCE), YOUR SOLAR PV SYSTEM WILL HAVE THE IMPACT OF REDUCING:

23,670	53,819,886	355,056
tons of CO2 Offset	Miles Driven By Cars	Trees Planted

Appendix D: 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 $1/8^{th}$ 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.