Local Government Energy Audit Report

Edison Intermediate School

October 25, 2024

Prepared for:

Westfield Board of Education
800 Rahway Avenue
Westfield, New Jersey 07090

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.

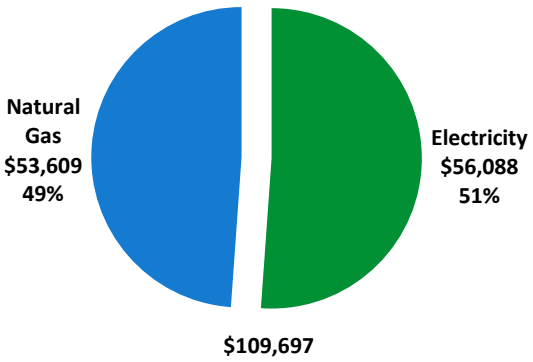
The customer and their respective contractor(s) are responsible to implement energy conservation measures in complete conformance with all applicable local, state, and federal requirements.

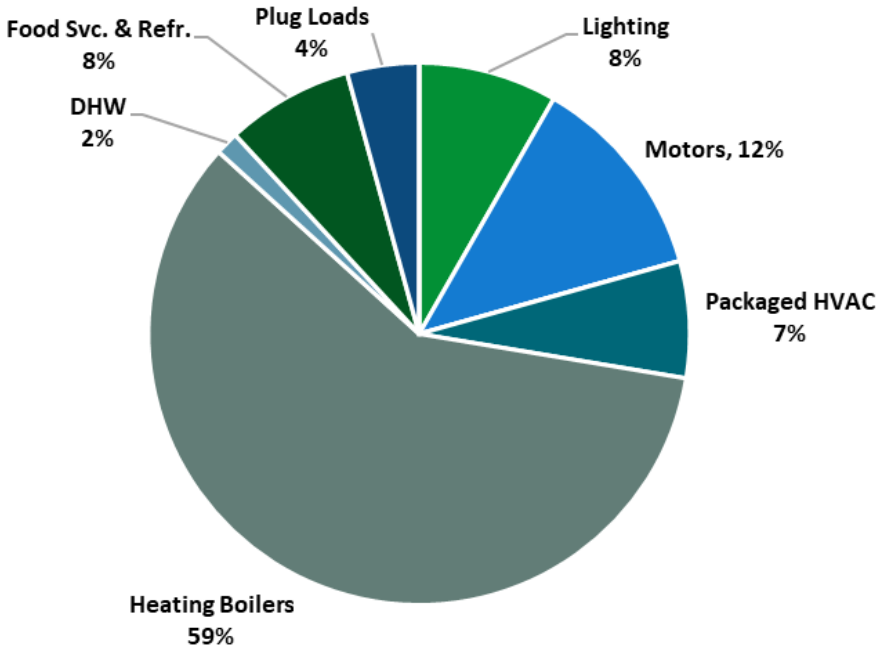
Table of Contents

1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for Edison Intermediate 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: $109,697 Electricity: 551,005 kWh Natural Gas: 31,462 Therms	
ENERGY STAR® Benchmarking Score	82 *(1-100 scale)*	Congratulations, your building performs better than the national average. This report has suggestions about how to keep your building running efficiently, further improve performance, and lower your energy bills even more.



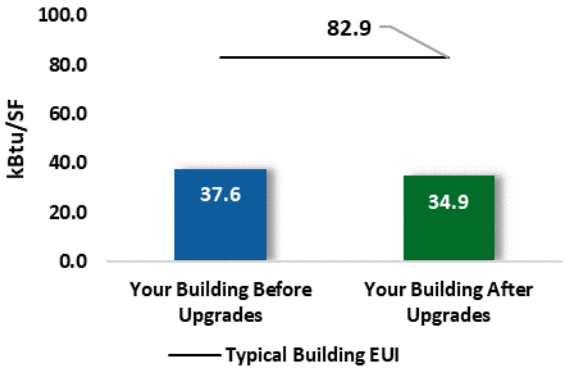
Energy Use by System

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.

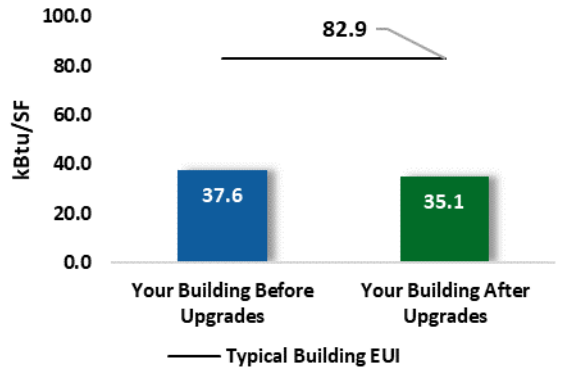
Scenario 1: Full Package (All Evaluated Measures)

Installation Cost	$114,340
Potential Rebates & Incentives[1]	$17,320
Annual Cost Savings	$9,988
Annual Energy Savings	Electricity: 89,806 kWh Natural Gas: 497 Therms
Greenhouse Gas Emission Savings	45 Tons
Simple Payback	9.7 Years
Site Energy Savings (All Utilities)	7%



Scenario 2: Cost Effective Package[2]

Installation Cost	$87,220
Potential Rebates & Incentives	$15,860
Annual Cost Savings	$9,341
Annual Energy Savings	Electricity: 83,467 kWh Natural Gas: 496 Therms
Greenhouse Gas Emission Savings	45 Tons
Simple Payback	7.6 Years
Site Energy Savings (all utilities)	7%



On-site Generation Potential

Photovoltaic	High
Combined Heat and Power	None

[1] Incentives are based on previously run state rebate programs. Contact your utility provider for current program incentives that may apply.

[2] A cost-effective measure is defined as one where the simple payback does not exceed two-thirds of the expected proposed equipment useful life. Simple payback is based on the net measure cost after potential incentives.

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**12,294**	**2.0**	**-2**	**$1,222**	**$7,870**	**$890**	**$6,980**	**5.7**	**12,175**
ECM 1	Install LED Fixtures	Yes	2,260	0.0	0	$230	$1,590	$150	$1,440	6.3	2,276
ECM 2	Retrofit Fixtures with LED Lamps	Yes	7,721	1.9	-1	$764	$5,400	$740	$4,660	6.1	7,627
ECM 3	Install LED Exit Signs	Yes	2,313	0.2	0	$227	$880	$0	$880	3.9	2,272
Lighting Control Measures			**35,423**	**9.9**	**-7**	**$3,480**	**$53,690**	**$11,500**	**$42,190**	**12.1**	**34,804**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	31,298	8.8	-7	$3,074	$44,680	$5,120	$39,560	12.9	30,751
ECM 5	Install High/Low Lighting Controls	Yes	4,125	1.1	-1	$405	$9,010	$6,380	$2,630	6.5	4,053
Variable Frequency Drive (VFD) Measures			**31,532**	**8.7**	**0**	**$3,210**	**$20,600**	**$2,400**	**$18,200**	**5.7**	**31,753**
ECM 6	Install VFDs on Constant Volume (CV) Fans	Yes	31,532	8.7	0	$3,210	$20,600	$2,400	$18,200	5.7	31,753
Unitary HVAC Measures			**4,969**	**3.7**	**0**	**$507**	**$23,000**	**$1,300**	**$21,700**	**42.8**	**5,013**
ECM 7	Install High Efficiency Air Conditioning Units	No	4,969	3.7	0	$507	$23,000	$1,300	$21,700	42.8	5,013
HVAC System Improvements			**0**	**0.0**	**7**	**$119**	**$300**	**$40**	**$260**	**2.2**	**820**
ECM 8	Install Pipe Insulation	Yes	0	0.0	7	$119	$300	$40	$260	2.2	820
Domestic Water Heating Upgrade			**0**	**0.0**	**52**	**$882**	**$2,450**	**$770**	**$1,680**	**1.9**	**6,059**
ECM 9	Install Low-Flow DHW Devices	Yes	0	0.0	52	$882	$2,450	$770	$1,680	1.9	6,059
Food Service & Refrigeration Measures			**5,588**	**0.5**	**0**	**$569**	**$6,430**	**$420**	**$6,010**	**10.6**	**5,627**
ECM 10	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	1,054	0.1	0	$107	$1,500	$160	$1,340	12.5	1,062
ECM 11	Refrigeration Controls	No	1,370	0.0	0	$139	$4,120	$160	$3,960	28.4	1,380
ECM 12	Vending Machine Control	Yes	3,163	0.4	0	$322	$810	$100	$710	2.2	3,185
TOTALS (COST EFFECTIVE MEASURES)			**83,467**	**21.2**	**50**	**$9,341**	**$87,220**	**$15,860**	**$71,360**	**7.6**	**89,857**
TOTALS (ALL MEASURES)			**89,806**	**24.9**	**50**	**$9,988**	**$114,340**	**$17,320**	**$97,020**	**9.7**	**96,250**

* - 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 Edison Intermediate 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 April 8, 2024, TRC performed an energy audit at Edison Intermediate School located in Westfield, New Jersey. TRC met with Facility Staff to review the facility operations and help focus our investigation on specific energy-using systems.

The Edison Intermediate School is a two-story, 133,753 square foot building built in 1958. Spaces include classrooms, gymnasium, auditorium, offices, cafeteria, stairwells, commercial kitchen, and mechanical spaces.

2.2 Building Occupancy

The facility is occupied Monday through Friday during regular business hours and limited use during the weekends. The facility is occupied by 777 students and 101 staff during regular hours.

Building Name	Weekday/Weekend	Operating Schedule
Edison Intermediate School	Weekday	7:00 AM to 6:00 PM
	Weekend	Limited Use

Building Occupancy Schedule

2.3 Building Envelope

Building walls are made of poured concrete and a brick facade. The roof is flat and covered with torch down bitumen membrane and is in good condition.

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

Roof

Facade

Windows

Exterior Doors

2.4 Lighting Systems

The primary interior lighting system uses 14-Watt LED linear fluorescent lamps and 45-Watt direct LED fixtures. Fixture types include 2-lamp, 4-foot-long troffers and surface mounted fixtures and 2-foot fixtures with U-bend tube lamps. Typically, T8 fluorescent lamps use electronic ballasts.

Additionally, there are some 20-Watt and 30-Watt compact fluorescent lamps (CFL), 30-Watt incandescent lamp fixtures, and LED general purpose lamps.

Gymnasium fixtures have manually controlled 150-Watt high bay LED fixtures.

Most exit signs are 2-Watt LED fixtures, however, there are a few 30-Watt incandescent units.

Wall switches control most of the lighting in the school. We have evaluated appropriate occupancy sensors in few places. Lighting fixtures are in good condition. Interior lighting levels were generally sufficient.

Exterior lighting consists of 200-Watt metal halide, 25-Watt incandescent lamp fixtures, and 10-Watt LED lamps.

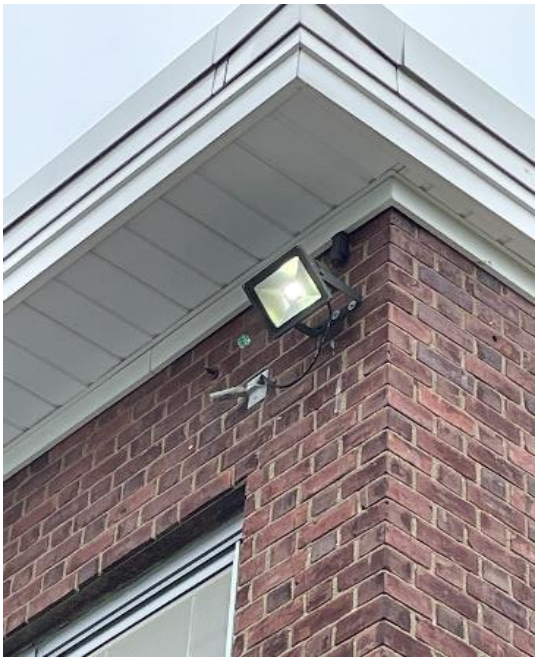
LED Linear Tubes

LED Screw-in Lamps

CFLs

LED Exit Signs

Exterior Metal Halide Fixtures



Exterior LED Fixtures

2.5 Air Handling Systems

Unit Ventilators

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

Unitary Electric HVAC Equipment

Several parts of the building are heated using Mitsubishi split system heat pumps, whose cooling capacity range from 6 tons to 13 tons and heating capacity between 80 MBh to 108 MBh with an HSPF of 4.34.

Lounge 2 is served by a ductless-mini split AC unit of cooling capacity of 2 tons with an EER of 12. Temperature controls on the units are using programmable thermostats in the respective zones.

Many classrooms and smaller offices are cooled using window AC units. Name plates were not available for all the units during the site visit. Capacity and EER have been assumed for analytical purposes. Most of these units have local temperature control within the units.

Majority of these units are within their useful life.

Ductless Mini-split Unit

Window AC Unit

VRF Heat Pump Units

Packaged Units

Larger spaces such as the cafeteria and gymnasium. are served using packaged units. The units have DX cooling capacities ranging from 6 tons to 25 tons. Two of the units have built-in, gas-fired heating burners with nominal thermal efficiencies of 80%.

The units are controlled by room thermostats. These units have an average EER of 11.4. Most of the units are within their useful life. Others have been evaluated for replacement.

Refer to Appendix A for detailed information about each unit.

Packaged Unit

Packaged Unit

2.6 Heating Hot Water Systems

Three condensing Aerco 5,640 MBh hot water boilers serve the building's heating load. The burners are fully modulating with a nominal efficiency of 94%. The boilers are configured in an automated lead-lag control scheme. The boilers appear new and are in good condition. There is a service contract in place.

The hydronic distribution system is a two-pipe, heating-only system.

There are five VFD controlled, 3 hp heating hot water pumps configured in a primary distribution system in a lead-lag control scheme. The boilers provide hot water to unit ventilators and fan coil units throughout the building.

AERCO Condensing Hot Water Boiler

Air Compressor

Unit Ventilators

Heating Hot Water Pumps

VFD Controls

Radiators

2.7 Domestic Hot Water

Hot water is produced by a 98 gallon, 75.1 MBh gas-fired storage water heater with an efficiency of 80%.

Hot water is distributed to its end uses using circulation pumps. The domestic hot water pipes are partially insulated. More insulation has been evaluated. Installed in 2018, the domestic hot water is in good condition.

Domestic Hot Water Heater

2.8 Food Service Equipment

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

The dishwasher is an ENERGY STAR low temperature, rack type unit with an electric booster.

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

Conventional Gas fired Stove

Electric Conveyor Oven

2.9 Refrigeration

The kitchen has several stand-up refrigerators with either solid or glass doors. All equipment is standard efficiency and in good condition.

The walk-in refrigerator has an estimated 0.5-ton compressor and two-fan evaporator. The walk-in medium temperature freezer has a 0.75-ton compressor and a two-fan evaporator.

There is also an ice making machine with an estimated capacity of 150 lbs./day. This is in good condition and is of standard efficiency.

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

Walk-in Unit

Walk-in Unit

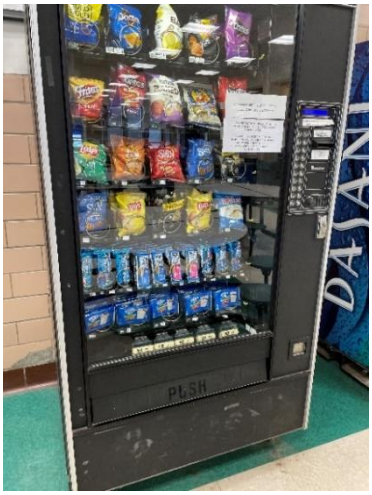
2.10 Plug Load and Vending Machines

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

There are 90 computer workstations throughout the facility. Plug loads include general cafe and office equipment. There are classroom typical loads such as smartboards, projectors, and fans.

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

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



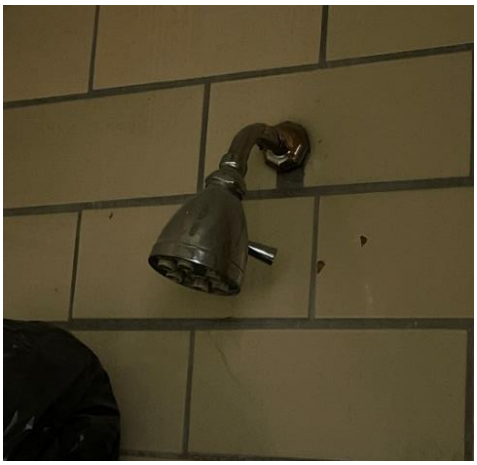
Vending Machine

Vending Machine

2.11 Water-Using Systems

EPA WaterSense® has set maximum flow rates for sanitary fixtures. The faucet flow rates are at 1.5 gallons per minute (gpm), toilets are rated at 1.6 gallons per flush (gpf) and urinals are rated at 1.0 gpf.

Faucets



Showerheads

2.12 On-Site Generation

The Edison Intermediate School has approximately 315 kW photovoltaic (PV) array with approximately 1,095 panels. This system provides approximately 44% of the electricity used.

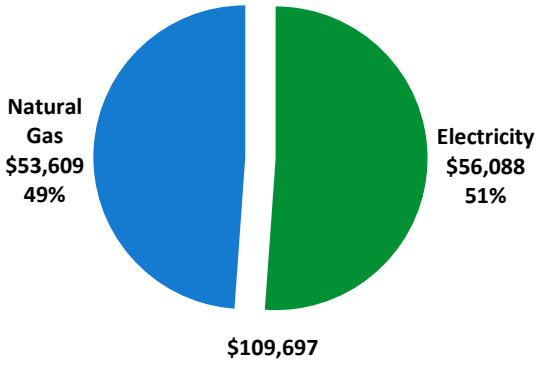
Solar PV

Solar PV

3 Energy Use and Costs

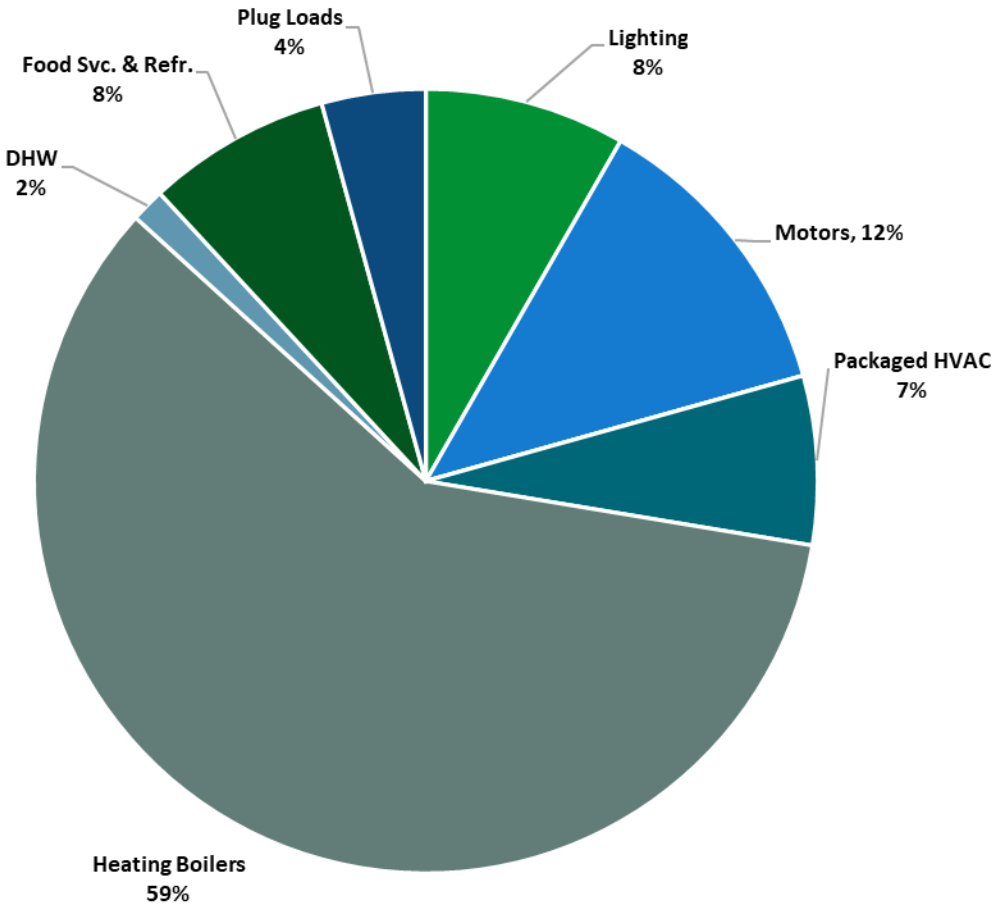
Twelve months of utility billing data are used to develop annual energy consumption and cost data. This information creates a profile of the annual energy consumption and energy costs.

Utility Summary		
Fuel	**Usage**	**Cost**
Electricity	551,005 kWh	$56,088
Natural Gas	31,462 Therms	$53,609
Total		**$109,697**



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.

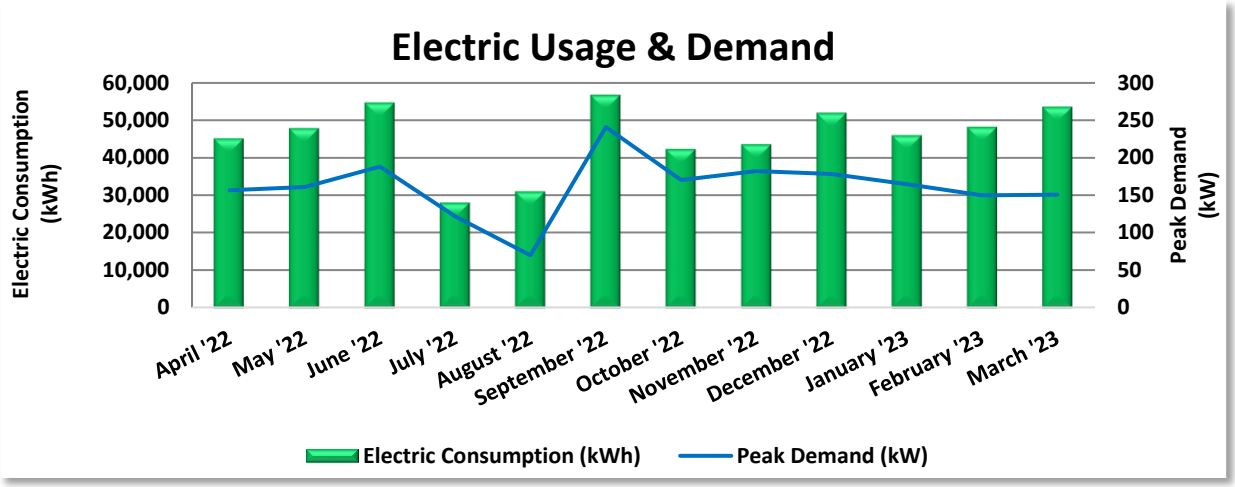
The energy auditor collects information regarding equipment operating hours, capacity, efficiency, and other operational parameters from facility staff, drawings, and on-site observations. This information is used as the inputs to calculate the existing conditions energy use for the site. The calculated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

PSE&G delivers electricity under rate class LPLS, with electric production provided by Constellation - Solar Provider, a third-party supplier.



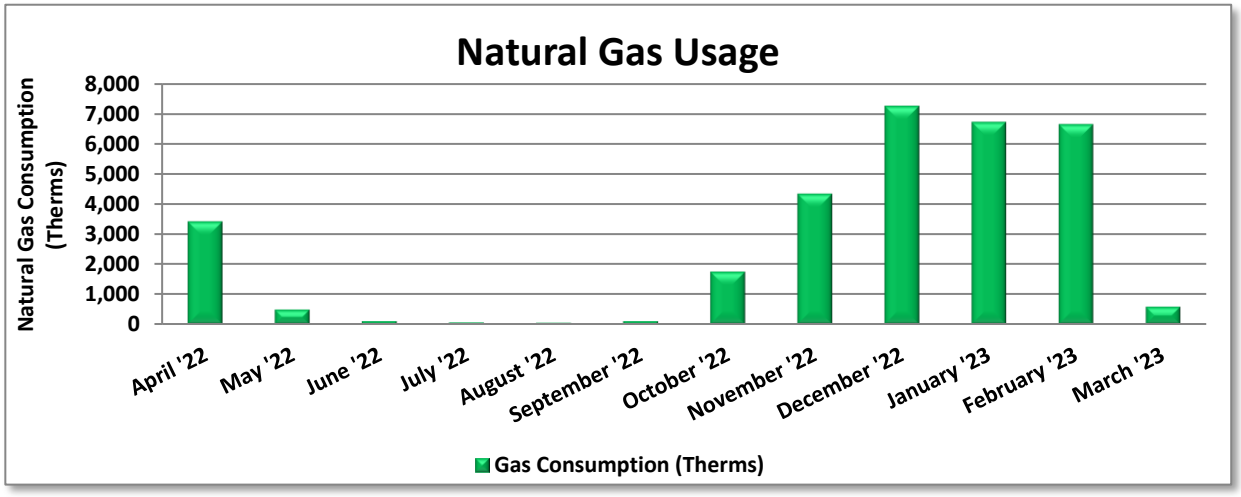
Electric Billing Data					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
4/27/22	30	45,144	156	$592	$3,813
5/25/22	28	47,902	161	$608	$3,930
6/24/22	30	54,738	188	$2,463	$6,078
7/26/22	32	28,107	122	$1,649	$5,191
8/24/22	29	31,086	70	$1,714	$4,472
9/23/22	30	56,760	241	$3,265	$5,861
10/24/22	31	42,336	170	$760	$3,798
11/22/22	29	43,631	182	$814	$3,943
12/23/22	31	51,994	178	$797	$4,943
1/25/23	33	46,008	165	$735	$4,552
2/24/23	30	48,230	150	$669	$4,525
3/27/23	31	53,560	151	$674	$4,829
Totals	**364**	**549,496**	**241**	**$14,740**	**$55,934**
Annual	**365**	**551,005**	**241**	**$14,781**	**$56,088**

Notes:

- Peak demand of 241 kW occurred in September '22.
- Average demand over the past 12 months was 161 kW.
- The average electric cost over the past 12 months was $0.102/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges. This report uses this blended rate to estimate energy cost savings.

3.2 Natural Gas

Elizabethtown Gas delivers natural gas under rate class General Delivery Service - Transportation (GDSINTVFT), with natural gas supply provided by Direct Energy, a third-party supplier.



Gas Billing Data			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
4/30/22	30	3,412	$4,936
5/31/22	31	487	$1,889
7/6/22	36	104	$402
7/31/22	25	62	$1,352
8/31/22	31	52	$1,350
9/30/22	30	103	$1,713
10/31/22	31	1,747	$3,710
11/30/22	30	4,324	$6,230
12/30/22	30	7,245	$11,703
1/31/23	32	6,707	$9,349
2/28/23	28	6,633	$8,811
3/31/23	31	586	$2,164
Totals	**365**	**31,462**	**$53,609**
Annual	**365**	**31,462**	**$53,609**

Notes:

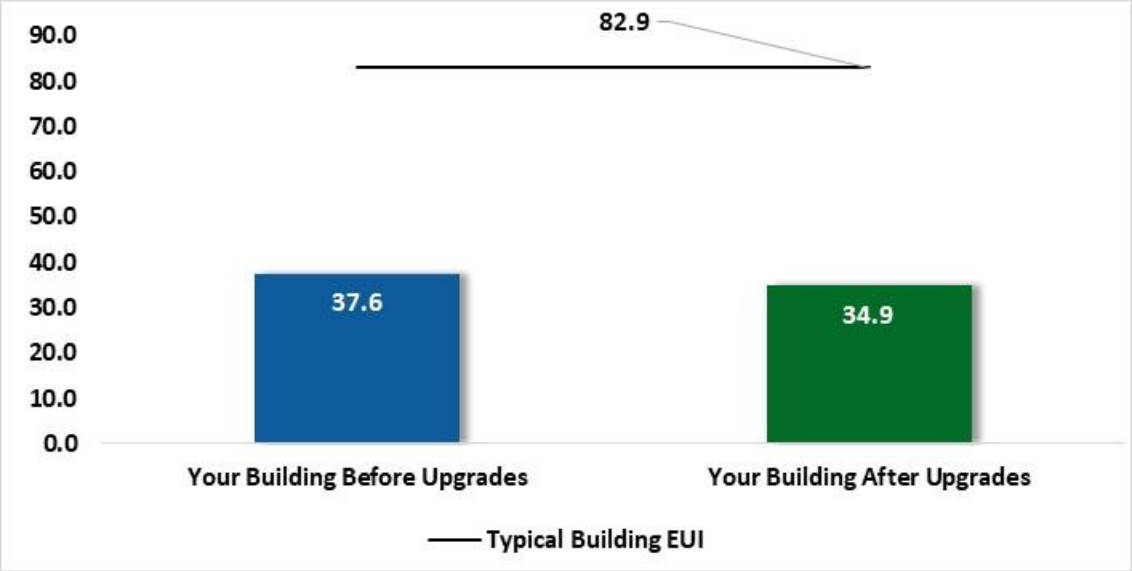
- The average gas cost for the past 12 months is $1.704/therm, which is the blended rate used throughout the analysis.

3.3 Benchmarking

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

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

Benchmarking Score	82



Energy Use Intensity Comparison[4]

Congratulations, your building performs better than the national average. This report has suggestions about how to keep your building running efficiently, further improve performance, and lower your energy bills even more.

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

[4] Based on all evaluated ECMs

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			**12,294**	**2.0**	**-2**	**$1,222**	**$7,870**	**$890**	**$6,980**	**5.7**	**12,175**
ECM 1	Install LED Fixtures	Yes	2,260	0.0	0	$230	$1,590	$150	$1,440	6.3	2,276
ECM 2	Retrofit Fixtures with LED Lamps	Yes	7,721	1.9	-1	$764	$5,400	$740	$4,660	6.1	7,627
ECM 3	Install LED Exit Signs	Yes	2,313	0.2	0	$227	$880	$0	$880	3.9	2,272
Lighting Control Measures			**35,423**	**9.9**	**-7**	**$3,480**	**$53,690**	**$11,500**	**$42,190**	**12.1**	**34,804**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	31,298	8.8	-7	$3,074	$44,680	$5,120	$39,560	12.9	30,751
ECM 5	Install High/Low Lighting Controls	Yes	4,125	1.1	-1	$405	$9,010	$6,380	$2,630	6.5	4,053
Variable Frequency Drive (VFD) Measures			**31,532**	**8.7**	**0**	**$3,210**	**$20,600**	**$2,400**	**$18,200**	**5.7**	**31,753**
ECM 6	Install VFDs on Constant Volume (CV) Fans	Yes	31,532	8.7	0	$3,210	$20,600	$2,400	$18,200	5.7	31,753
Unitary HVAC Measures			**4,969**	**3.7**	**0**	**$507**	**$23,000**	**$1,300**	**$21,700**	**42.8**	**5,013**
ECM 7	Install High Efficiency Air Conditioning Units	No	4,969	3.7	0	$507	$23,000	$1,300	$21,700	42.8	5,013
HVAC System Improvements			**0**	**0.0**	**7**	**$119**	**$300**	**$40**	**$260**	**2.2**	**820**
ECM 8	Install Pipe Insulation	Yes	0	0.0	7	$119	$300	$40	$260	2.2	820
Domestic Water Heating Upgrade			**0**	**0.0**	**52**	**$882**	**$2,450**	**$770**	**$1,680**	**1.9**	**6,059**
ECM 9	Install Low-Flow DHW Devices	Yes	0	0.0	52	$882	$2,450	$770	$1,680	1.9	6,059
Food Service & Refrigeration Measures			**5,588**	**0.5**	**0**	**$569**	**$6,430**	**$420**	**$6,010**	**10.6**	**5,627**
ECM 10	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	1,054	0.1	0	$107	$1,500	$160	$1,340	12.5	1,062
ECM 11	Refrigeration Controls	No	1,370	0.0	0	$139	$4,120	$160	$3,960	28.4	1,380
ECM 12	Vending Machine Control	Yes	3,163	0.4	0	$322	$810	$100	$710	2.2	3,185
TOTALS			**89,806**	**24.9**	**50**	**$9,988**	**$114,340**	**$17,320**	**$97,020**	**9.7**	**96,250**

* - 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		**12,294**	**2.0**	**-2**	**$1,222**	**$7,870**	**$890**	**$6,980**	**5.7**	**12,175**
ECM 1	Install LED Fixtures	2,260	0.0	0	$230	$1,590	$150	$1,440	6.3	2,276
ECM 2	Retrofit Fixtures with LED Lamps	7,721	1.9	-1	$764	$5,400	$740	$4,660	6.1	7,627
Lighting Control Measures		**35,423**	**9.9**	**-7**	**$3,480**	**$53,690**	**$11,500**	**$42,190**	**12.1**	**34,804**
ECM 4	Install Occupancy Sensor Lighting Controls	31,298	8.8	-7	$3,074	$44,680	$5,120	$39,560	12.9	30,751
ECM 5	Install High/Low Lighting Controls	4,125	1.1	-1	$405	$9,010	$6,380	$2,630	6.5	4,053
Variable Frequency Drive (VFD) Measures		**31,532**	**8.7**	**0**	**$3,210**	**$20,600**	**$2,400**	**$18,200**	**5.7**	**31,753**
ECM 6	Install VFDs on Constant Volume (CV) Fans	31,532	8.7	0	$3,210	$20,600	$2,400	$18,200	5.7	31,753
HVAC System Improvements		**0**	**0.0**	**7**	**$119**	**$300**	**$40**	**$260**	**2.2**	**820**
ECM 8	Install Pipe Insulation	0	0.0	7	$119	$300	$40	$260	2.2	820
Domestic Water Heating Upgrade		**0**	**0.0**	**52**	**$882**	**$2,450**	**$770**	**$1,680**	**1.9**	**6,059**
ECM 9	Install Low-Flow DHW Devices	0	0.0	52	$882	$2,450	$770	$1,680	1.9	6,059
Food Service & Refrigeration Measures		**4,217**	**0.5**	**0**	**$429**	**$2,310**	**$260**	**$2,050**	**4.8**	**4,247**
ECM 10	Refrigerator/Freezer Case Electrically Commutated Motors	1,054	0.1	0	$107	$1,500	$160	$1,340	12.5	1,062
ECM 12	Vending Machine Control	3,163	0.4	0	$322	$810	$100	$710	2.2	3,185
TOTALS		**83,467**	**21.2**	**50**	**$9,341**	**$87,220**	**$15,860**	**$71,360**	**7.6**	**89,857**

* - 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		**12,294**	**2.0**	**-2**	**$1,222**	**$7,870**	**$890**	**$6,980**	**5.7**	**12,175**
ECM 1	Install LED Fixtures	2,260	0.0	0	$230	$1,590	$150	$1,440	6.3	2,276
ECM 2	Retrofit Fixtures with LED Lamps	7,721	1.9	-1	$764	$5,400	$740	$4,660	6.1	7,627
ECM 3	Install LED Exit Signs	2,313	0.2	0	$227	$880	$0	$880	3.9	2,272

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, fluorescent, or incandescent lamps with new LED light fixtures. This measure saves energy by installing LEDs, which use less power than other technologies with a comparable light output.

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

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

Affected Building Areas: gymnasium, cafeteria, library, lobby, and exterior fixtures

ECM 2: Retrofit Fixtures with LED Lamps

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

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

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

ECM 3: Install LED Exit Signs

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

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**35,423**	**9.9**	**-7**	**$3,480**	**$53,690**	**$11,500**	**$42,190**	**12.1**	**34,804**
ECM 4	Install Occupancy Sensor Lighting Controls	31,298	8.8	-7	$3,074	$44,680	$5,120	$39,560	12.9	30,751
ECM 5	Install High/Low Lighting Controls	4,125	1.1	-1	$405	$9,010	$6,380	$2,630	6.5	4,053

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

ECM 4: Install Occupancy Sensor Lighting Controls

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

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

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

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

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

ECM 5: Install High/Low Lighting Controls

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

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

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

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

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

Affected Building Areas: hallways, stairwells

4.3 Variable Frequency Drives (VFD)

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**31,532**	**8.7**	**0**	**$3,210**	**$20,600**	**$2,400**	**$18,200**	**5.7**	**31,753**
ECM 6	Install VFDs on Constant Volume (CV) Fans	31,532	8.7	0	$3,210	$20,600	$2,400	$18,200	5.7	31,753

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

ECM 6: Install VFDs on Constant Volume (CV) Fans

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

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

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

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

Affected Air Handlers: gymnasium air handling unit

4.4 Unitary HVAC

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Unitary HVAC Measures		**4,969**	**3.7**	**0**	**$507**	**$23,000**	**$1,300**	**$21,700**	**42.8**	**5,013**
ECM 7	Install High Efficiency Air Conditioning Units	4,969	3.7	0	$507	$23,000	$1,300	$21,700	42.8	5,013

ECM 7: Install High Efficiency Air Conditioning Units

We evaluated replacing standard efficiency packaged air conditioning units with high efficiency packaged air conditioning units. All of the replacement units will incorporate efficient gas furnaces. 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: 15-ton Trane Package unit

4.5 HVAC Improvements

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
HVAC System Improvements		**0**	**0.0**	**7**	**$119**	**$300**	**$40**	**$260**	**2.2**	**820**
ECM 8	Install Pipe Insulation	0	0.0	7	$119	$300	$40	$260	2.2	820

ECM 8: Install Pipe Insulation

Install insulation on domestic hot water system piping. Distribution system thermal losses are dependent on system fluid temperature, the size of the distribution system, and the extent and condition of piping insulation. When the insulation has been damaged due to exposure to water, when the insulation has been removed from some areas of the pipe, or when valves have not been properly insulated, system thermal efficiency can be significantly reduced. This measure saves energy by reducing heat transfer in the distribution system.

Affected Systems: domestic hot water piping

4.6 Domestic Water Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**52**	**$882**	**$2,450**	**$770**	**$1,680**	**1.9**	**6,059**
ECM 9	Install Low-Flow DHW Devices	0	0.0	52	$882	$2,450	$770	$1,680	1.9	6,059

ECM 9: 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		**5,588**	**0.5**	**0**	**$569**	**$6,430**	**$420**	**$6,010**	**10.6**	**5,627**
ECM 10	Refrigerator/Freezer Case Electrically Commutated Motors	1,054	0.1	0	$107	$1,500	$160	$1,340	12.5	1,062
ECM 11	Refrigeration Controls	1,370	0.0	0	$139	$4,120	$160	$3,960	28.4	1,380
ECM 12	Vending Machine Control	3,163	0.4	0	$322	$810	$100	$710	2.2	3,185

ECM 10: 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 11: Refrigeration Controls

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

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

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

ECM 12: Vending Machine Control

Vending machines operate continuously, even during unoccupied hours. Install occupancy sensor controls to reduce energy use. These controls power down vending machines when the vending machine area has been vacant for some time, and 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.

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[5]. Your account has already been established. Now you can continue to keep tabs on your energy performance every month.

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.

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

6 On-Site Generation

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

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

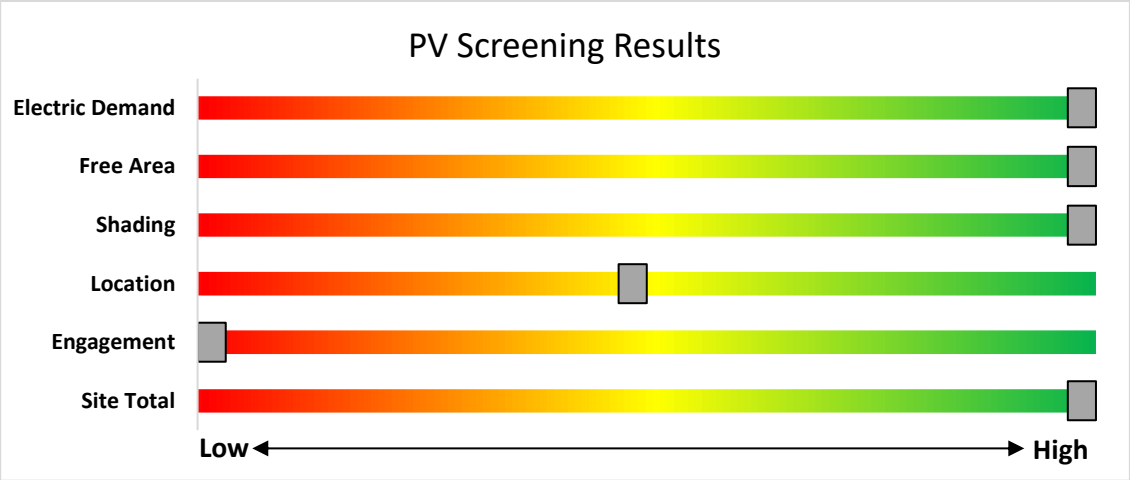
6.1 Solar Photovoltaic

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

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

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

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



Potential	High	
System Potential	161	kW DC STC
Electric Generation	191,811	kWh/yr
Displaced Cost	$19,520	/yr
Installed Cost	$627,900	

Photovoltaic Screening

Successor Solar Incentive Program (SuSI)

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

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

- **Successor Solar Incentive Program (SuSI):** https://www.njcleanenergy.com/renewable-energy/programs/susi-program
- **Basic Info on Solar PV in NJ**: 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

6.2 Combined Heat and Power

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

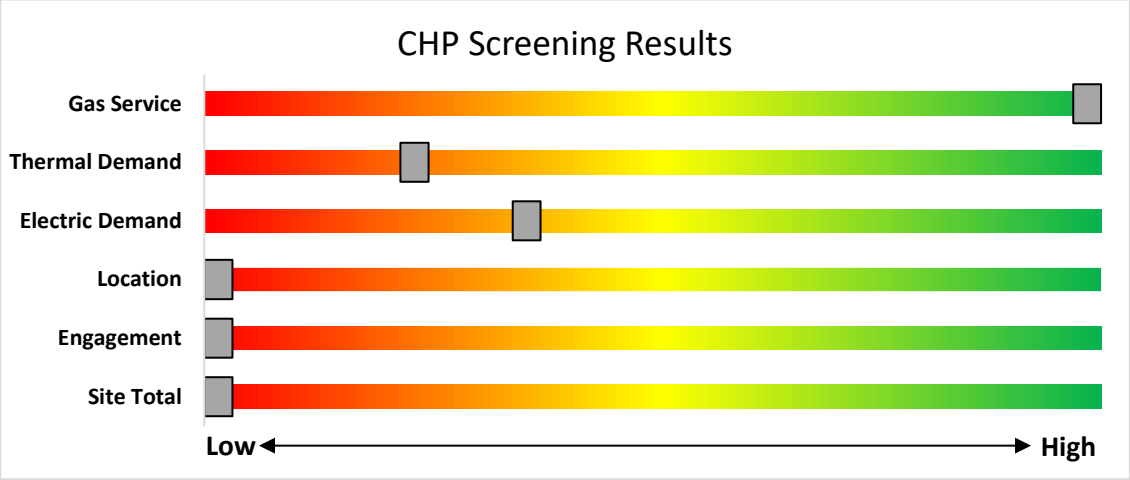
CHP systems typically produce a portion of the electric power used on-site, with the balance of electric power needs supplied by the local utility company. The heat is used to supplement (or replace) existing boilers and provide space heating and/or domestic hot water heating. Waste heat can also be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

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

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

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

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



Combined Heat and Power Screening

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

7 Electric Vehicles

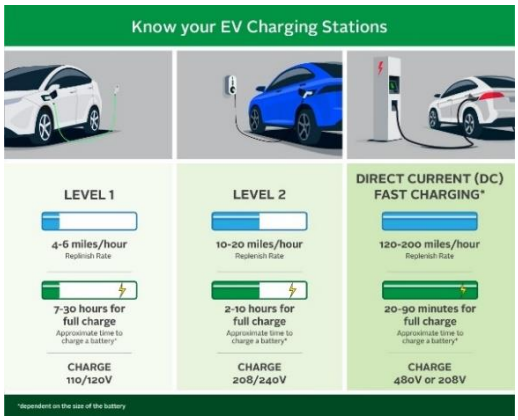
All electric vehicles (EVs) have an electric motor instead of an internal combustion engine. EVs function by plugging into a charge point, taking electricity from the grid, and then storing it in rechargeable batteries. Although electricity production may contribute to air pollution, the U.S. EPA categorizes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

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

7.1 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.

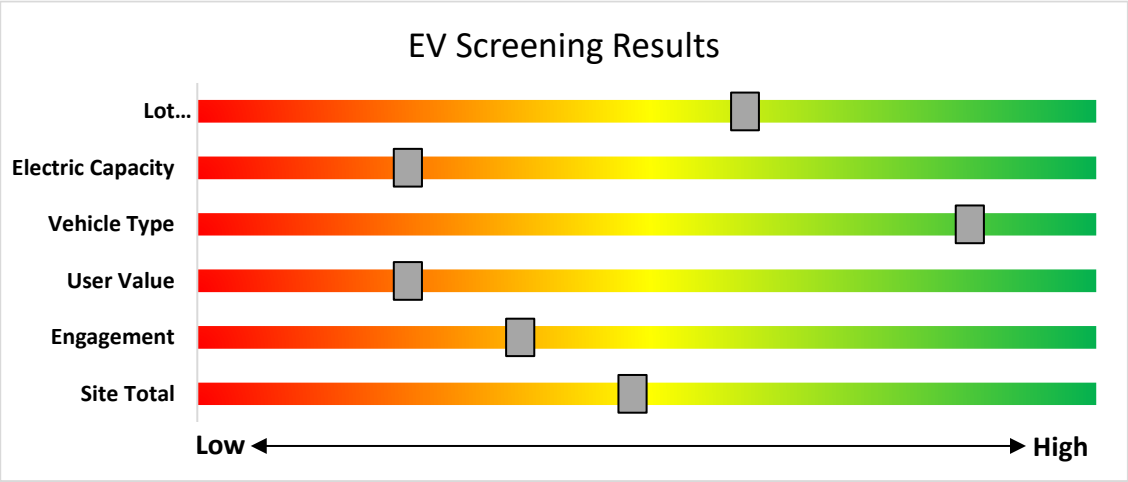
The primary costs associated with installing EV charging are the charger hardware and the cost to extend power from the facility to parking spaces. This may include upgrades to electric panels to serve increased loads.

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

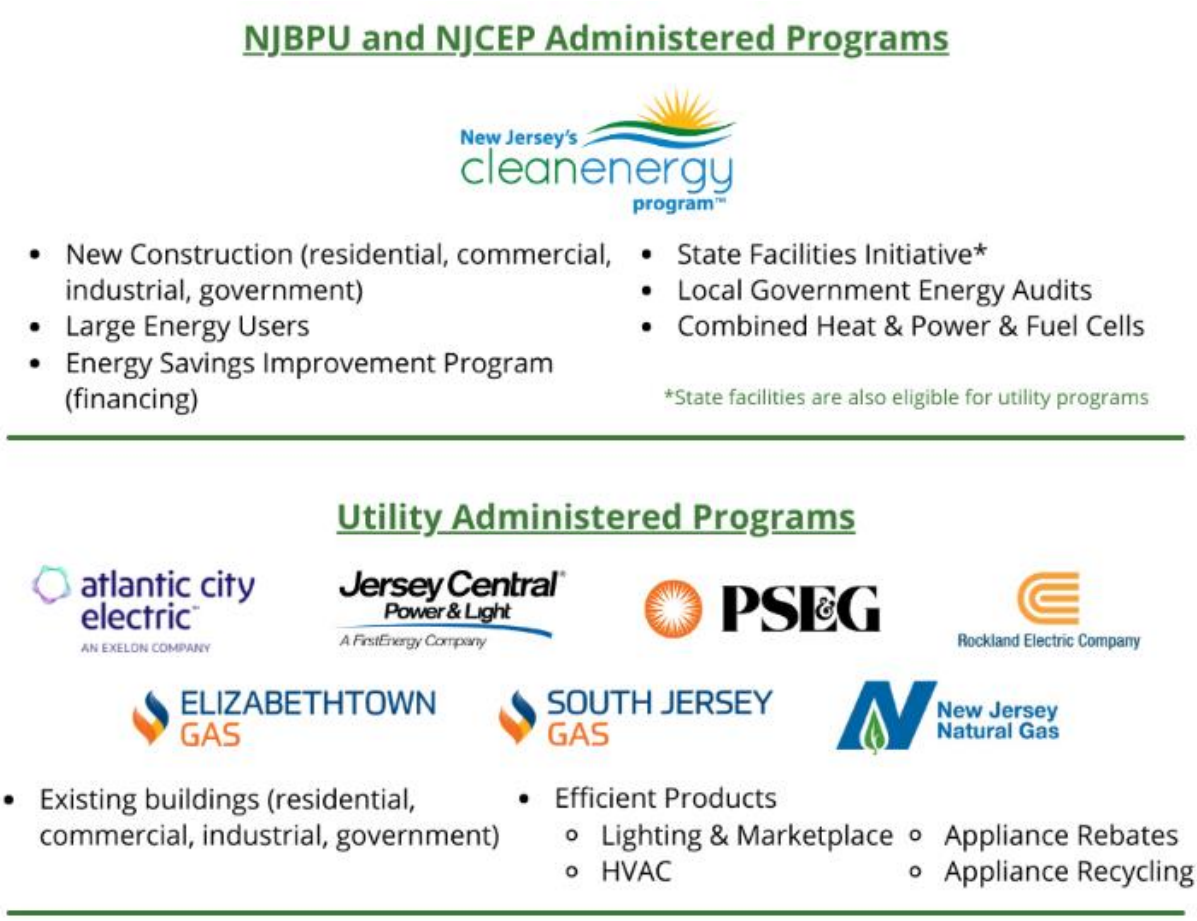
New Jersey is leading the way on electric vehicle (EV) adoption on the East Coast. There are several programs designed to encourage EV adoption in New Jersey, which is crucial to reaching a 100% clean energy future.

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

8 Project Funding and Incentives

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



8.1 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[6]

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

[6]

[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[7]. 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[8].

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.

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

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

8.2 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.

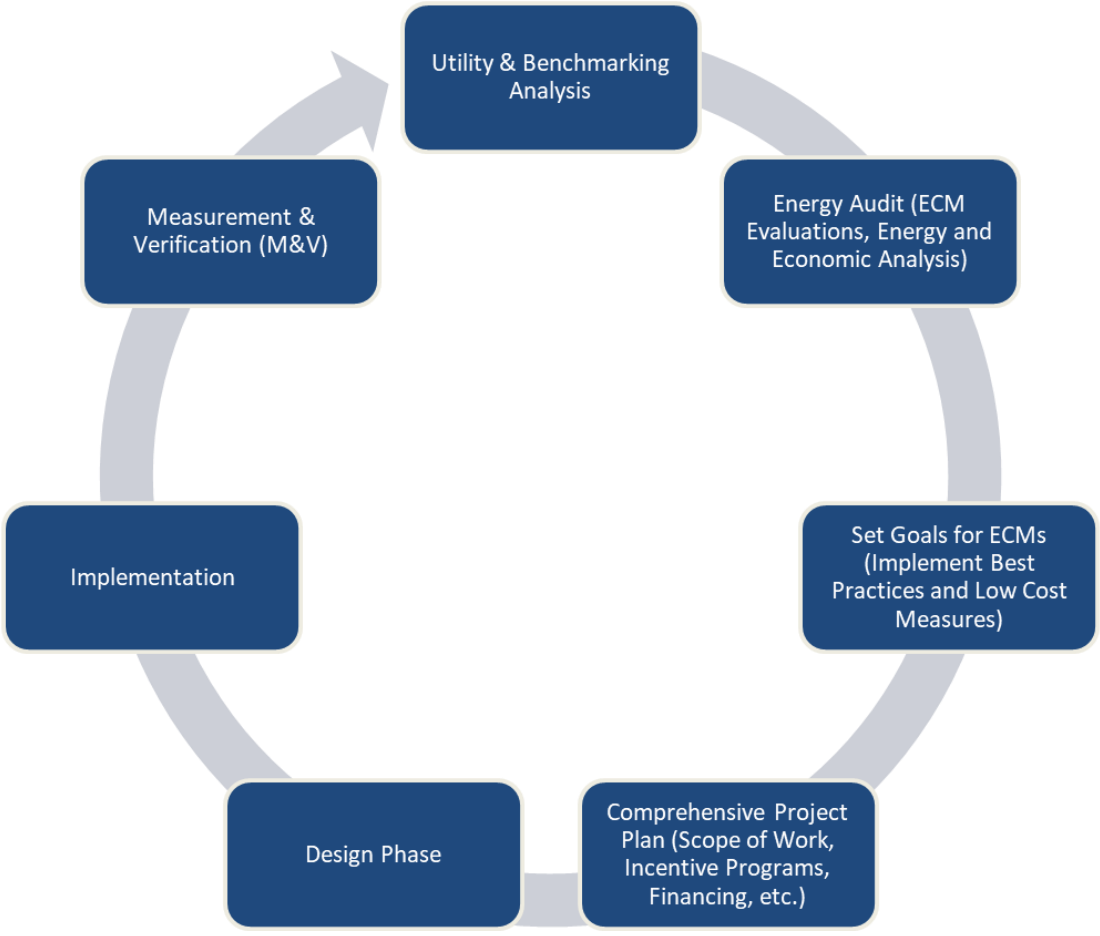
Engineered Solutions

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.

9 PROJECT DEVELOPMENT

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



Project Development Cycle

10 Energy Purchasing and Procurement Strategies

10.1 Retail Electric Supply Options

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

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

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

10.2 Retail Natural Gas Supply Options

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

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

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

A list of licensed third-party natural gas suppliers is available at the NJBPU website[10].

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

[10] 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
101	11	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	257	0	$25	$330	$40	11.5
102	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	280	0	$28	$330	$40	10.5
103	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	280	0	$28	$330	$40	10.5
104	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	210	0	$21	$330	$40	14.1
105	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	280	0	$28	$330	$40	10.5
106	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	210	0	$21	$330	$40	14.1
107	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	210	0	$21	$330	$40	14.1
108	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	210	0	$21	$330	$40	14.1
109	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	210	0	$21	$330	$40	14.1
110	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	210	0	$21	$330	$40	14.1
111	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.0	70	0	$7	$330	$40	42.2
113	20	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	467	0	$46	$660	$70	12.9
114	20	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	467	0	$46	$660	$70	12.9
115	15	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	350	0	$34	$330	$40	8.4
116	30	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	30	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.2	700	0	$69	$660	$70	8.6
117	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	280	0	$28	$330	$40	10.5
118	14	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	327	0	$32	$330	$40	9.0
122	14	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	45	2,360	4	None	Yes	14	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	45	1,628	0.1	507	0	$50	$330	$40	5.8
122	44	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	44	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.3	1,027	0	$101	$990	$110	8.7
123	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	280	0	$28	$330	$40	10.5
125	24	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.2	560	0	$55	$660	$70	10.7
130	21	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	21	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	490	0	$48	$660	$70	12.3
131	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	233	0	$23	$330	$40	12.7
132	21	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	21	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	490	0	$48	$660	$70	12.3
133	31	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	31	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.2	723	0	$71	$990	$110	12.4

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Conference room	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.0	93	0	$9	$330	$40	31.6
Corridor 1	19	Compact Fluorescent: (1) 30W Triple Biaxial Plug-In Lamp	Wall Switch	S	30	2,360	2, 5	Relamp	Yes	19	LED Lamps: GX23 (Plug-In) Lamps	High/Low Control	21	1,628	0.2	765	0	$75	$1,370	$690	9.0
Corridor 1	12	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	12	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor 1	115	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	5	None	Yes	115	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,628	0.7	2,684	-1	$264	$5,630	$4,030	6.1
Dining Area 1	4	Exit Signs: Incandescent	None		30	8,760	3	Fixture Replacement	No	4	LED Exit Signs: 2 W Lamp	None	6	8,760	0.1	925	0	$91	$350	$0	3.9
Dining Area 1	23	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	2,360	4	None	Yes	23	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	1,628	0.1	185	0	$18	$660	$70	32.5
Dining Area 1	83	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,360	4	None	Yes	83	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,628	0.3	1,136	0	$112	$1,980	$210	15.9
Dining Area 1	21	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	21	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	490	0	$48	$660	$70	12.3
Exterior 1	9	Incandescent: (2) 25W PAR36 Screw-In Lamps	Timeclock		50	4,380	2	Relamp	No	9	LED Lamps: Screw-in lamps	Timeclock	8	4,380	0.0	1,656	0	$169	$340	$20	1.9
Exterior 1	12	LED Lamps: (1) 10W A19 Screw-In Lamp	Timeclock		10	4,380		None	No	12	LED Lamps: (1) 10W A19 Screw-In Lamp	Timeclock	10	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 1	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock		100	4,380		None	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	100	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 1	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock		15	4,380		None	No	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	15	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 1	6	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock		50	4,380		None	No	6	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	50	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 1	3	Metal Halide: (1) 200W Lamp	Timeclock		232	4,380	1	Fixture Replacement	No	3	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	60	4,380	0.0	2,260	0	$230	$1,590	$150	6.3
Faculty Room	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.0	70	0	$7	$330	$40	42.2
Faculty Room 2	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.0	70	0	$7	$330	$40	42.2
Front Office	37	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	37	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.2	864	0	$85	$990	$110	10.4
Gymnasium 1	3	Compact Fluorescent: (1) 30W Double Biaxial Plug-In Lamp	Wall Switch	S	30	2,360	2, 4	Relamp	Yes	3	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	21	1,628	0.0	121	0	$12	$370	$40	27.8
Gymnasium 1	6	Exit Signs: Incandescent	None		30	8,760	3	Fixture Replacement	No	6	LED Exit Signs: 2 W Lamp	None	6	8,760	0.1	1,388	0	$136	$530	$0	3.9
Gymnasium 1	16	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	45	2,360	4	None	Yes	16	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	45	1,628	0.2	579	0	$57	$660	$70	10.4
Gymnasium 1	24	LED - Fixtures: High-Bay	Wall Switch	S	150	2,360	4	None	Yes	24	LED - Fixtures: High-Bay	Occupancy Sensor	150	1,628	0.8	2,897	-1	$285	$540	$70	1.7
Gymnasium 1	7	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.0	163	0	$16	$330	$40	18.1
Gymnasium 1	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,360	2, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.5	1,744	0	$171	$1,470	$230	7.2
Gymnasium 1	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,360	2, 4	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.5	1,962	0	$193	$1,570	$250	6.8
Lounge 2	8	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	45	2,360	4	None	Yes	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	45	1,628	0.1	290	0	$28	$330	$40	10.2

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Maintenance Room	1	Compact Fluorescent: (1) 20W Double Biaxial Plug-In Lamp	Wall Switch	S	20	2,360	2	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	14	2,360	0.0	16	0	$2	$10	$0	6.5
Maintenance Room	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	187	0	$18	$330	$40	15.8
Mechanical 1	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.0	47	0	$5	$150	$20	28.4
Multipurpose 1	6	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Multipurpose 1	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	2,360		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	2,360	0.0	0	0	$0	$0	$0	0.0
Multipurpose 1	96	LED Lamps: (1) 15W A19 Screw-In Lamp	Wall Switch	S	15	2,360	4	None	Yes	96	LED Lamps: (1) 15W A19 Screw-In Lamp	Occupancy Sensor	15	1,628	0.3	1,159	0	$114	$2,320	$250	18.2
Multipurpose 1	10	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	2,360	4	None	Yes	10	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,628	0.0	117	0	$11	$330	$40	25.3
Nurses Office	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	210	0	$21	$330	$40	14.1
Restroom - Female 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,000	2, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,380	0.1	277	0	$27	$280	$50	8.4
Restroom - Female 2	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,000	2	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,000	0.0	64	0	$6	$90	$10	12.8
Restroom - Female 3	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,000	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,000	0.0	109	0	$11	$60	$20	3.7
Restroom - Female 3	5	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,000	2, 4	Relamp	Yes	5	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,380	0.1	432	0	$42	$770	$90	16.0
Restroom - Female 4	4	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	35	2,000	4	None	Yes	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	1,380	0.0	95	0	$9	$330	$40	30.9
Restroom - Female 4	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,000	2	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,000	0.0	64	0	$6	$90	$10	12.8
Restroom - Male 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,000	2, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,380	0.1	277	0	$27	$280	$50	8.4
Restroom - Male 2	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,000	2	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,000	0.0	64	0	$6	$90	$10	12.8
Restroom - Male 3	5	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,000	2, 4	Relamp	Yes	5	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,380	0.1	432	0	$42	$770	$90	16.0
Restroom - Male 4	4	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	35	2,000	4	None	Yes	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	1,380	0.0	95	0	$9	$330	$40	30.9
Restroom - Male 4	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,000	2	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,000	0.0	64	0	$6	$90	$10	12.8
Stairs 1	1	Incandescent: (1) 30W A19 Screw-In Lamp	Wall Switch	S	30	2,360	2	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	5	2,360	0.0	65	0	$6	$30	$0	4.7
Stairs 1	5	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,360	4	None	Yes	5	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,628	0.0	68	0	$7	$330	$40	43.2
Stairs 2	1	Incandescent: (1) 30W A19 Screw-In Lamp	Wall Switch	S	30	2,360	2	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	5	2,360	0.0	65	0	$6	$30	$0	4.7
Stairs 2	4	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,360	4	None	Yes	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,628	0.0	55	0	$5	$330	$40	53.9
Stairs 3	1	Incandescent: (1) 30W A19 Screw-In Lamp	Wall Switch	S	30	2,360	2	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	5	2,360	0.0	65	0	$6	$30	$0	4.7
Stairs 3	6	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,360	4	None	Yes	6	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,628	0.0	82	0	$8	$330	$40	36.0

	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 4	6	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,360	4	None	Yes	6	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,628	0.0	82	0	$8	$330	$40	36.0
Stairs 5	5	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,360	4	None	Yes	5	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,628	0.0	68	0	$7	$330	$40	43.2
Storage 1	3	Incandescent: (1) 30W A19 Screw-In Lamp	Wall Switch	S	30	800	2, 4	Relamp	Yes	3	LED Lamps: A19 Lamps	Occupancy Sensor	5	552	0.1	70	0	$7	$410	$40	53.7
Storage 11	4	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	800	4	None	Yes	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	552	0.0	19	0	$2	$330	$40	159.1
Storage 12	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	800		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	800	0.0	0	0	$0	$0	$0	0.0
Storage 13	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	800		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	800	0.0	0	0	$0	$0	$0	0.0
Storage 14	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	800	4	None	Yes	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	552	0.0	14	0	$1	$330	$40	212.2
Storage 2	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	800	4	None	Yes	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	552	0.0	9	0	$1	$150	$20	142.7
Storage 5	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	800		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	800	0.0	0	0	$0	$0	$0	0.0
Storage 8	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	800		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	800	0.0	0	0	$0	$0	$0	0.0
Storage 9	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	800		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	800	0.0	0	0	$0	$0	$0	0.0
200	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.0	140	0	$14	$330	$40	21.1
201	12	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	45	2,360	4	None	Yes	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	45	1,628	0.1	435	0	$43	$330	$40	6.8
202	9	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	45	2,360	4	None	Yes	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	45	1,628	0.1	326	0	$32	$330	$40	9.1
203	12	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	45	2,360	4	None	Yes	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	45	1,628	0.1	435	0	$43	$330	$40	6.8
204	12	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	45	2,360	4	None	Yes	12	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	45	1,628	0.1	435	0	$43	$330	$40	6.8
205	9	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	45	2,360	4	None	Yes	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	45	1,628	0.1	326	0	$32	$330	$40	9.1
206	9	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	45	2,360	4	None	Yes	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	45	1,628	0.1	326	0	$32	$330	$40	9.1
207	9	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	45	2,360	4	None	Yes	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	45	1,628	0.1	326	0	$32	$330	$40	9.1
208	9	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	45	2,360	4	None	Yes	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	45	1,628	0.1	326	0	$32	$330	$40	9.1
209	9	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	45	2,360	4	None	Yes	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	45	1,628	0.1	326	0	$32	$330	$40	9.1
210	9	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	45	2,360	4	None	Yes	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	45	1,628	0.1	326	0	$32	$330	$40	9.1
211	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.0	47	0	$5	$150	$20	28.4
213	1	LED Lamps: (5) 10W A19 Screw-In Lamps	Wall Switch	S	50	2,360		None	No	1	LED Lamps: (5) 10W A19 Screw-In Lamps	Wall Switch	50	2,360	0.0	0	0	$0	$0	$0	0.0
213	3	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	45	2,360	4	None	Yes	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	45	1,628	0.0	109	0	$11	$330	$40	27.2

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
219	20	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,360	4	None	Yes	20	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,628	0.1	274	0	$27	$660	$70	22.0
220	20	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	467	0	$46	$660	$70	12.9
221	20	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,360	4	None	Yes	20	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,628	0.1	274	0	$27	$660	$70	22.0
222	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	420	0	$41	$660	$70	14.3
223	14	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	327	0	$32	$330	$40	9.0
224	21	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	21	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	490	0	$48	$660	$70	12.3
225	14	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	327	0	$32	$330	$40	9.0
226	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	420	0	$41	$660	$70	14.3
229	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.0	140	0	$14	$330	$40	21.1
230	11	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	257	0	$25	$330	$40	11.5
232	11	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	257	0	$25	$330	$40	11.5
233	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	187	0	$18	$330	$40	15.8
234	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.0	140	0	$14	$330	$40	21.1
236	36	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	36	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.2	840	0	$83	$990	$110	10.7
237	21	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	21	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	490	0	$48	$660	$70	12.3
238	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	210	0	$21	$330	$40	14.1
239	3	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	45	2,360	4	None	Yes	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	45	1,628	0.0	109	0	$11	$330	$40	27.2
Corridor 2	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
Corridor 2	48	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	5	None	Yes	48	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,628	0.3	1,120	0	$110	$2,250	$1,680	5.2
Library	18	LED - Linear Tubes: (2) 4' Lamps	None	S	29	2,360	4	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.1	420	0	$41	$660	$70	14.3
Library	53	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	2,360	4	None	Yes	53	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,628	0.3	1,237	0	$122	$1,320	$140	9.7
Mechanical 2	6	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	2,360	4	None	Yes	6	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,628	0.0	82	0	$8	$330	$40	36.0
Restroom - Female 1	7	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,000	2, 4	Relamp	Yes	7	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,380	0.2	604	0	$59	$950	$110	14.2
Restroom - Male 1	7	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,000	2, 4	Relamp	Yes	7	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,380	0.2	604	0	$59	$950	$110	14.2
Storage 10	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	800	4	None	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	552	0.0	24	0	$2	$330	$40	124.4

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Storage 3	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	800	4	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	552	0.0	16	0	$2	$150	$20	83.6
Storage 4	1	Compact Fluorescent: (2) 30W Quadruple Biaxial Plug-In Lamps	Wall Switch	S	60	800	2	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	42	800	0.0	16	0	$2	$40	$0	25.7
Storage 6	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	800	4	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	552	0.0	32	0	$3	$330	$40	93.3
Storage 7	1	Compact Fluorescent: (2) 30W Quadruple Biaxial Plug-In Lamps	Wall Switch	S	60	800	2	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	42	800	0.0	16	0	$2	$40	$0	25.7

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
Gymnasium	Gymnasium	2	Supply Fan	15.00	92.0%	No	Unknown	Unknown	W	3,391	6	No	93.0%	Yes	2	8.7	31,532	0	$3,210	$20,600	$2,400	5.7
Mechanical 2	MP room	1	Supply Fan	10.00	91.7%	Yes	Daikin	CAH016GDAM	W	2,300		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 2	MP room	1	Exhaust Fan	5.00	87.0%	Yes	Daikin	CAH016GDAM	W	2,300		No	87.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 2	MP room	1	Supply Fan	2.00	865.0%	Yes	Daikin	CAH007GDAM	W	2,300		No	865.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 2	MP room	1	Exhaust Fan	1.50	85.0%	Yes	Daikin	CAH007GDAM	W	2,300		No	85.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 1	Various	1	Supply Fan	1.00	85.0%	No	Daikin	DPS006	W	1,800		No	85.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 1	Various	2	Supply Fan	1.00	85.0%	No	Daikin	RCS025	W	1,800		No	85.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 1	Various	2	Supply Fan	5.00	89.5%	No	Trane	TCD180 B	B	1,800		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Various	Various	99	Fan Coil Unit	0.25	60.0%	No			W	900		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 1	Mechanical 1	2	Air Compressor	5.00	84.0%	No	US Electricals	J132		1,800		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Dining Area 1	Dining Area 1	1	Exhaust Fan	0.50	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 1	Exterior 1	2	Exhaust Fan	0.50	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 1	Exterior 1	23	Exhaust Fan	0.50	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
236	236	1	Exhaust Fan	0.50	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 1	Mechanical 1	5	Heating Hot Water Pump	3.00	89.5%	Yes	Weg		W	580		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
122	122	2	Other	2.00	86.5%	No				2,745		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Gymnasium 1	Gymnasium 1	2	Other	0.20	60.0%	No				2,745		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Storage 1	Storage 1	1	Other	2.00	86.5%	No				2,745		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Storage 2	Storage 2	1	Other	15.00	92.0%	No				200		No	92.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 1	Mechanical 1	2	Process Pump	2.00	86.0%	No				500		No	86.0%	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	Various	1	Split-System Air-Source HP	13.71	108.00	13.40	4.34 COP	Mitsubishi Trane	TUHYE0963AN40AN	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1	Various	1	Split-System Air-Source HP	6.00	80.00	13.10	4.34 COP	Mitsubishi Trane	TUHYE0723AN40AN	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1	Various	1	Package Unit	7.00		13.40		Daikin	RCS07F090C	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1	Various	1	Split-System Air-Source HP	6.00	80.00	13.10	4.34 COP	Mitsubishi Trane	TUHYE0723AN40AN	W		No							0.0	0	0	$0	$0	$0	0.0
Lounge 2	Lounge 2	1	Ductless Mini-Split HP	2.00		12.00		Hatco	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1	Various	1	Package Unit	6.00	96.00	11.60	80 AFUE	Daikin	DPS006	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1	Various	1	Package Unit	25.00		11.00		Daikin	RCS025	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1	Various	1	Package Unit	15.00	203.00	9.70	81 AFUE	Trane	TCD180 B	B	7	Yes	1	Package Unit	15.00	203.00	16.00	85 AFUE	3.7	4,969	0	$507	$23,000	$1,300	42.8
101	101	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
102	102	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
103	103	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
104	104	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
105	105	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
106	106	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
107	107	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
108	108	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
109	109	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
110	110	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
111	111	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
113	113	1	Window AC	0.67		12.10				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
114	114	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
115	115	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
116	116	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
117	117	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
118	118	2	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
122	122	3	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
123	123	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
125	125	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
130	130	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
131	131	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
132	132	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
133	133	2	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
Dining Area 1	Dining Area 1	7	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
Faculty Room	Faculty Room	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
Front Office	Front Office	6	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
Maintenance Room	Maintenance Room	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
200	200	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
201	201	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
202	202	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
203	203	1	Window AC	0.67		12.10				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
204	204	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
205	205	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
206	206	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
207	207	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
208	208	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
209	209	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
210	210	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
211	211	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
213	213	1	Window AC	0.67		12.10		Electrolux	FFRE083ZA1	W		No							0.0	0	0	$0	$0	$0	0.0
219	219	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
220	220	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
221	221	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
222	222	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
223	223	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
224	224	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
225	225	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
226	226	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
230	230	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
232	232	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
233	233	1	Window AC	0.67		12.10				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
234	234	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
236	236	2	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
237	237	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
238	238	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
Storage 10	Storage 10	1	Window AC	0.67		12.10				W		No							0.0	0	0	$0	$0	$0	0.0

Space Heating Boiler Inventory & Recommendations

		Existing Conditions						Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical 1	All building	3	Condensing Hot Water Boiler	5,640	Aerco	BMK6000	W		No						0.0	0	0	$0	$0	$0	0.0

Pipe Insulation Recommendations

		Recommendation Inputs			Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	ECM #	Length of Uninsulated Pipe (ft)	Pipe Diameter (in)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical 1	Restrooms and kitchen	8	20	1.50	0.0	0	7	$119	$300	$40	2.2

DHW Inventory & Recommendations

		Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Manufacturer	Model	Remaining Useful Life	ECM #	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical 1	Restrooms and kitchen	1	Storage Tank Water Heater (> 50 Gal)	AO Smith	BT-100-400	W		No						0.0	0	0	$0	$0	$0	0.0

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
Dining Area 1	1	Cooler (35F to 55F)	Bohn		9, 10	Yes	No	Yes	0.1	1,168	0	$119	$2,810	$160	22.3
Dining Area 1	1	Medium Temp Freezer (0F to 30F)	RDI		9, 10	Yes	No	Yes	0.1	1,256	0	$128	$2,810	$160	20.7

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
Dining Area 1	1	Stand-Up Refrigerator, Glass Door (≤15 cu. ft.)	Habco		No		No	0.0	0	0	$0	$0	$0	0.0
Dining Area 1	2	Stand-Up Refrigerator, Glass Door (≤15 cu. ft.)	Beverage-Air		No		No	0.0	0	0	$0	$0	$0	0.0
Dining Area 1	4	Stand-Up Freezer, Solid Door (31 - 50 cu. ft.)	Koch		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
Dining Area	1	Self-Contained Unit (<175 lbs/day), Batch	Manitowoc	QY0215W	No		No	0.0	0	0	$0	$0	$0	0.0

Cooking Equipment Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	Manufacturer	Model	High Efficiency Equipement?	ECM #	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Dining Area 1	2	Gas Convection Oven (Full Size)	Garland		No		No	0.0	0	0	$0	$0	$0	0.0
Dining Area 1	2	Gas Conveyor Oven (<25")	Amana		No		No	0.0	0	0	$0	$0	$0	0.0
Dining Area 1	1	Gas Fryer	Lincoln		No		No	0.0	0	0	$0	$0	$0	0.0
Dining Area 1	5	Insulated Food Holding Cabinet (Full Size)			No		No	0.0	0	0	$0	$0	$0	0.0

Dishwasher Inventory & Recommendations

	Existing Conditions							Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Dishwasher Type	Manufacturer	Model	Water Heater Fuel Type	Booster Heater Fuel Type	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Payback w/ Incentives in Years
Dining Area	1	Single Tank Conveyor (Low Temp)	Hoshizaki	JWE-2400CUA-L-25B	Natural Gas	Electric	Yes		No	0.0	0	0	$0	$0	$0	0.0

Low Flow DHW Device Output

	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
Various	9	89	Faucet Aerator (Lavatory)	1.60	0.50	0.0	0	27	$466	$750	$360	0.8
Showers	9	11	Showerhead	2.20	1.50	0.0	0	6	$103	$1,150	$170	9.5
Various	9	58	Faucet Aerator (Lavatory)	1.60	0.50	0.0	0	18	$303	$490	$230	0.9
Various	9	7	Faucet Aerator (Kitchen)	1.80	1.50	0.0	0	1	$10	$60	$10	5.0

Plug Load Inventory

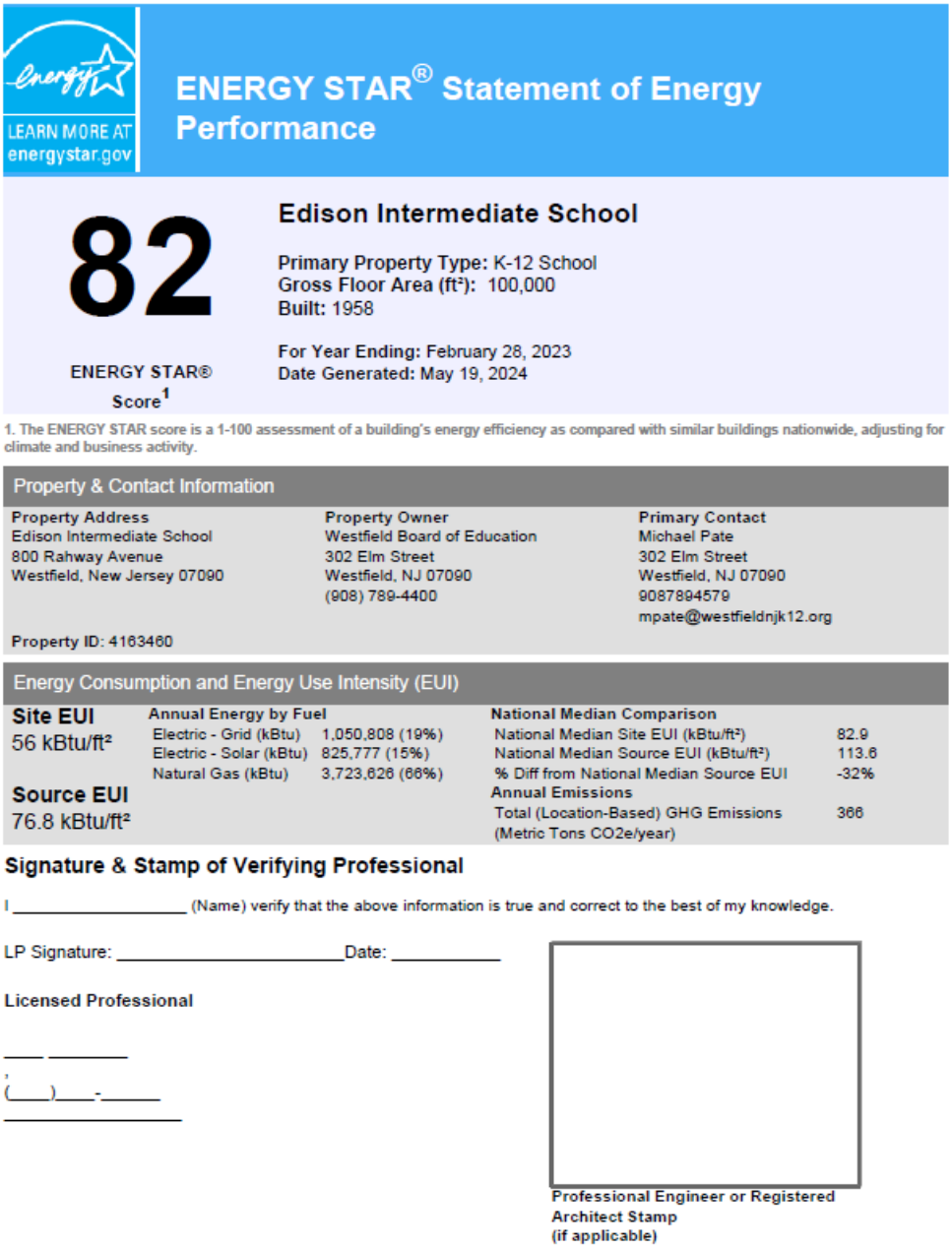
	Existing Conditions					
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified ?	Manufacturer	Model
Edison IS	1	Clothes Dryer	1,500			
Edison IS	1	Clothes Washer	900			
Edison IS	3	Coffee Machine	300			
Edison IS	90	Desktop	145			
Edison IS	4	Fan - large	120			
Edison IS	6	Microwave	900			
Edison IS	2	Kiln	11,000			
Edison IS	1	Paper Shredder	200			
Edison IS	32	Printer medium	100			
Edison IS	5	Printer/Copier (Large)	200			
Edison IS	53	Projector	200			
Edison IS	5	Refrigerator (Mini)	60			
Edison IS	6	Refrigerator (Residential)	220			
Edison IS	9	Television	100			
Edison IS	1	Toaster	900			
Edison IS	2	Toaster Oven	1,200			
Edison IS	2	Water cooler	280			

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
Dining Area 1	1	Glass Fronted Refrigerated	11	Yes	0.1	1,209	0	$123	$270	$50	1.8
Dining Area 1	1	Non-Refrigerated	11	Yes	0.0	343	0	$35	$270	$0	7.7
Lounge 2	1	Refrigerated	11	Yes	0.2	1,612	0	$164	$270	$50	1.3

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]

Edison Intermediate School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 100,000
Built: 1958

For Year Ending: February 28, 2023
Date Generated: May 19, 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
Edison Intermediate School 800 Rahway Avenue Westfield, New Jersey 07090	Westfield Board of Education 302 Elm Street Westfield, NJ 07090 (908) 789-4400	Michael Pate 302 Elm Street Westfield, NJ 07090 9087894579 mpate@westfieldnjk12.org

Property ID: 4163460

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
56 kBtu/ft²

Source EUI
76.8 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	1,050,808 (19%)
Electric - Solar (kBtu)	825,777 (15%)
Natural Gas (kBtu)	3,723,626 (66%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	82.9
National Median Source EUI (kBtu/ft²)	113.6
% Diff from National Median Source EUI	-32%
Annual Emissions	
Total (Location-Based) GHG Emissions (Metric Tons CO2e/year)	366

Signature & Stamp of Verifying Professional

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

LP Signature: _____ Date: _____

Licensed Professional

___ _____
,
(___)___-_____
_____

Professional Engineer or Registered Architect Stamp (if applicable)

APPENDIX C: GLOSSARY

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

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

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