Local Government Energy Audit:
Energy Audit Report

Dr. JP Cleary Elementary School

1501 Central Ave

Minotola, NJ 08341

Buena Regional School District

October 12, 2018

Final Report by:

TRC Energy Services

Disclaimer

The intent of this energy analysis report is to identify energy savings opportunities and recommend upgrades to the facility's energy using equipment and systems. Approximate saving are included in this report to help make decisions about reducing energy use at the facility. This report, however, is not intended to serve as a detailed engineering design document. Further design and analysis may be necessary in order to implement some of the measures recommended in this report.

The energy conservation measures and estimates of energy savings have been reviewed for technical accuracy. However, estimates of final energy savings are not guaranteed, because final savings may depend on behavioral factors and other uncontrollable variables. TRC Energy Services (TRC) and New Jersey Board of Public Utilities (NJBPU) shall in no event be liable should the actual energy savings vary.

Estimated installation costs are based on TRC's experience at similar facilities, pricing from local contractors and vendors, and/or cost estimates from *RS Means*. The owner of the facility is encouraged to independently confirm these cost estimates and to obtain multiple estimates when considering measure installations. Since actual installed costs can vary widely for certain measures and conditions, TRC and NJBPU do not guarantee installed cost estimates and shall in no event be held liable should actual installed costs vary from estimates.

New Jersey's Clean Energy Program (NJCEP) incentive values provided in this report are estimates based on program information available at the time of the report. Incentive levels are not guaranteed. The NJBPU reserves the right to extend, modify, or terminate programs without prior notice. The owner of the facility should review available program incentives and eligibility requirements prior to selecting and installing any energy conservation measures.

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1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Dr. JP Cleary Elementary School.

The goal of an LGEA report is to provide you with information on how your facility uses energy, identify energy conservation measures (ECMs) that can reduce your energy use, and provide information and assistance to help facilities implement ECMs. The LGEA report also contains valuable information on financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing ECMs.

This study was conducted by TRC Energy Services (TRC), as part of a comprehensive effort to assist New Jersey public schools in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

1.1 Facility Summary

Dr. JP Cleary Elementary School is a 56,700 square foot, one-story facility comprised of various space types including classrooms, offices, a gymnasium, a media center, a cafeteria, a small commercial kitchen, and various mechanical and storage spaces.

Lighting at Dr. JP Cleary Elementary School consists of aging and inefficient fluorescent lighting as well as some exterior metal halide fixtures. Heating is supplied by two gas-fired hot water boilers feeding water-source heat pumps throughout the building. Cooling is provided by a mixture of split-systems, ductless mini-split units, and water-source heat pumps throughout the building. Domestic hot water is supplied by three gas-fired storage water heaters. A thorough description of the facility and our observations are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated 11 measures, and recommends nine priority measures, which represent an opportunity for Dr. JP Cleary Elementary School to reduce annual energy costs by $27,659 and annual greenhouse gas emissions by 188,992 lbs CO_2e. We estimate that if measures were implemented as recommended, the project would pay for itself in 3.9 years. The breakdown of existing and potential utility costs after project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce Dr. JP Cleary Elementary School's annual energy use by 16%.

Figure 1 – Previous 12 Month Utility Costs

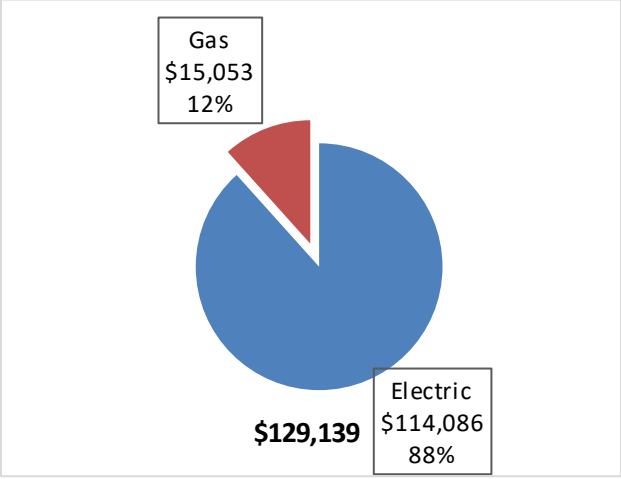
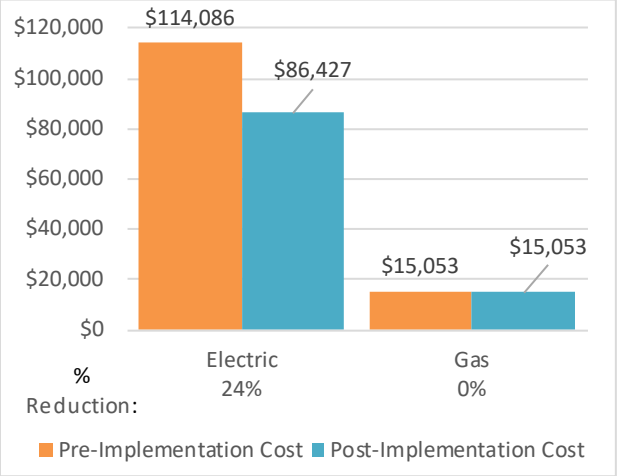


Figure 2 – Potential Post-Implementation Costs



A detailed description of Dr. JP Cleary Elementary School's existing energy use can be found in Section 3.

Estimates of the total cost, energy savings, and financial incentives for the proposed energy efficient upgrades are summarized below in Figure 3. A brief description of each category can be found below and a description of savings opportunities can be found in Section 4.

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			79,193	19.0	0.0	$11,671.00	$62,345.48	$12,490.00	$49,855.48	4.3	79,747
ECM 1	Install LED Fixtures	Yes	8,054	3.1	0.0	$1,186.87	$14,845.73	$3,800.00	$11,045.73	9.3	8,110
ECM 2	Retrofit Fixtures with LED Lamps	Yes	71,140	16.0	0.0	$10,484.12	$47,499.76	$8,690.00	$38,809.76	3.7	71,637
Lighting Control Measures			12,102	1.8	0.0	$1,783.57	$12,060.00	$1,525.00	$10,535.00	5.9	12,187
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	5,342	1.1	0.0	$787.30	$5,810.00	$805.00	$5,005.00	6.4	5,380
ECM 4	Install Daylight Dimming Controls	Yes	4,121	0.3	0.0	$607.28	$3,250.00	$720.00	$2,530.00	4.2	4,150
ECM 5	Install High/Low Lighitng Controls	Yes	2,639	0.4	0.0	$388.98	$3,000.00	$0.00	$3,000.00	7.7	2,658
Motor Upgrades			1,467	0.3	0.0	$216.27	$33,068.40	$0.00	$33,068.40	152.9	1,478
	Premium Efficiency Motors	No	1,467	0.3	0.0	$216.27	$33,068.40	$0.00	$33,068.40	152.9	1,478
Variable Frequency Drive (VFD) Measures			46,138	4.4	0.0	$6,799.49	$17,063.96	$1,160.00	$15,903.96	2.3	46,460
ECM 6	Install VFDs on Constant Volume (CV) HVAC	Yes	7,281	1.9	0.0	$1,073.10	$9,448.06	$1,160.00	$8,288.06	7.7	7,332
ECM 7	Install VFDs on Hot Water Pumps	Yes	38,856	2.5	0.0	$5,726.39	$7,615.90	$0.00	$7,615.90	1.3	39,128
Electric Unitary HVAC Measures			53,004	26.5	0.0	$7,811.37	$68,696.94	$4,404.68	$64,292.27	8.2	53,374
	Install High Efficiency Electric AC	No	4,369	5.0	0.0	$643.90	$34,913.10	$2,190.00	$32,723.10	50.8	4,400
ECM 8	Install High Efficiency Heat Pumps	Yes	48,635	21.6	0.0	$7,167.47	$33,783.84	$2,214.68	$31,569.17	4.4	48,975
Plug Load Equipment Control - Vending Machine			1,612	0.0	0.0	$237.54	$230.00	$0.00	$230.00	1.0	1,623
ECM 9	Vending Machine Control	Yes	1,612	0.0	0.0	$237.54	$230.00	$0.00	$230.00	1.0	1,623
TOTALS FOR HIGH PRIORITY MEASURES			187,680	46.8	0.0	$27,659.07	$125,483.28	$17,389.68	$108,093.61	3.9	188,992
TOTALS FOR ALL EVALUATED MEASURES			193,516	52.1	0.0	$28,519.23	$193,464.79	$19,579.68	$173,885.11	6.1	194,870

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

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

Lighting Upgrades generally involve the replacement of existing lighting components such as lamps and ballasts (or the entire fixture) with higher efficiency lighting components. These measures save energy by reducing the power used by the lighting components due to improved electrical efficiency.

Lighting Controls measures generally involve the installation of automated controls to turn off lights or reduce light output when not needed. Automated control reduces reliance on occupant behavior for adjusting lights. These measures save energy by reducing the amount of time lights are on.

Motor Upgrades generally involve replacing older standard efficiency motors with high efficiency standard (NEMA Premium). Motors replacements generally assume the same size motors, just higher efficiency. Although occasionally additional savings can be achieved by downsizing motors to better meet current load requirements. This measure saves energy by reducing the power used by the motors, due to improved electrical efficiency.

Variable Frequency Drives (VFDs) are motor control devices. These measures control the speed of a motor so that the motor spins at peak efficiency during partial load conditions. Sensors adapt the speed to flow, temperature, or pressure settings which is much more efficient that usage a valve or damper to control flow rates, or running the motor at full speed when only partial power is needed. These measures save energy by controlling motor usage more efficiently.

Electric Unitary HVAC measures generally involve replacing older inefficient air conditioning systems with modern energy efficient systems. New air conditioning systems can provide equivalent cooling to older air condition systems at a reduced energy cost. These measures save energy by reducing the power used by the air conditioning systems, due to improved electrical efficiency.

Plug Load Equipment control measures generally involve installing automated devices that limit the power usage or operation of equipment that is plugged into an electric outlets when not in use.

Energy Efficient Practices

TRC also identified nine low cost (or no cost) energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral or operational adjustments and by performing better routine maintenance on building systems. These practices can extend equipment lifetime, improve occupant comfort, provide better health and safety, as well as reduce annual energy and O&M costs. Potential opportunities identified at Dr. JP Cleary Elementary School include:

- Reduce Air Leakage
- Close Doors and Windows
- Use Window Treatments/Coverings
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Check for and Seal Duct Leakage
- Perform Proper Water Heater Maintenance
- Install Plug Load Controls
- Water Conservation

For details on these energy efficient practices, please refer to Section 5.

On-Site Generation Measures

TRC evaluated the potential for installing on-site generation for Dr. JP Cleary Elementary School. Based on the configuration of the site and its loads there is a moderate potential for installing a photovoltaic (PV) array.

Figure 4 – Photovoltaic Potential

Potential	Medium	
System Potential	197	kW DC STC
Electric Generation	148,232	kWh/yr
Displaced Cost	$12,900	/yr
Installed Cost	$768,300	

For details on our evaluation and on-site generation potential, please refer to Section 6.

1.3 Implementation Planning

To realize the energy savings from the ECMs listed in this report, a project implementation plan must be developed. Available capital must be considered and decisions need to be made whether it is best to pursue individual ECMs separately, groups of ECMs, or a comprehensive approach where all ECMs are implemented together, possibly in conjunction with other facility upgrades or improvements.

Rebates, incentives, and financing are available from NJCEP, as well as other sources, to help reduce the costs associated with the implementation of energy efficiency projects. Prior to implementing any measure, please review the relevant incentive program guidelines before proceeding. This is important because in most cases you will need to submit applications for the incentives prior to purchasing materials or commencing with installation.

The ECMs outlined in this report may qualify under the following program(s):

- SmartStart
- Pay for Performance - Existing Building (P4P)
- SREC (Solar Renewable Energy Certificate) Registration Program (SRP)
- Energy Savings Improvement Program (ESIP)

For facilities wanting to pursue only selected individual measures (or planning to phase implementation of selected measures over multiple years), incentives are available through the SmartStart program. To participate in this program you may utilize internal resources, or an outside firm or contractor, to do the final design of the ECM(s) and do the installation. Program pre-approval is required for some SmartStart incentives, so only after receiving pre-approval should you proceed with ECM installation. The incentive estimates listed above in Figure 3 are based on the SmartStart program. More details on this program and others are available in Section 8.

Larger facilities with an interest in a more comprehensive whole building approach to energy conservation should consider participating in the Pay for Performance (P4P) program. Projects eligible for this project program must meet minimum savings requirements. Final incentives are calculated based on actual measured performance achieved at the end of the project. The application process is more involved, and it requires working with a qualified P4P contractor, but the process may result in greater energy savings overall and more lucrative incentives, up to 50% of project's total cost.

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the Energy Savings Improvement Program (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. An LGEA report (or other approved energy audit) is required for participation in ESIP. Please refer to Section 8.4 for additional information on the ESIP Program.

Additional information on relevant incentive programs is located in Section 8. You may also check the following website for more details: www.njcleanenergy.com/ci.

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 5 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Joe Biluck	Interim Building and Grounds Supervisor	jbiluck@buena.k12.nj.us	856-697-0800
Designated Representative			
Walt Loshenko	Maintenance Supervisor	N/A	856-697-8080 ext. 6102
TRC Energy Services			
Alexander Klieverik	Auditor	aklieverik@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On May 24, 2018, TRC performed an energy audit at Dr. JP Cleary Elementary School located in Minotola, New Jersey. TRC's team met with Walt Loshenko, Maintenance Supervisor to review the facility operations and help focus our investigation on specific energy-using systems.

Dr. JP Cleary Elementary School is a 56,700 square foot, on-story facility comprised of various space types including classrooms, offices, a gymnasium, a media center, a cafeteria, a small commercial kitchen, and various mechanical and storage spaces.

The building was originally constructed in 1958. The last year of major renovations was in 2012.

2.3 Building Occupancy

The school building is open Monday through Friday. The typical schedule is presented in the table below. The entire facility is open for 11 months, and closed during August for repairs and preparation for the following school year. During a typical day, the facility is occupied by 150 staff and 550 students.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Dr JP Cleary Elementary School	Weekday	6:00 AM to 11:30 PM
Dr JP Cleary Elementary School	Weekend	Closed

2.4 Building Envelope

The building is constructed of concrete block and structural steel with a brick facade. The building has flat roofs covered with black membrane and stone ballast that is in good condition. The building has double-pane windows which are in good condition and show little sign of excessive infiltration. The exterior doors are constructed of aluminum and in good condition.



2.5 On-Site Generation

Dr. JP Cleary Elementary School does not have any on-site electric generation capacity.

2.6 Energy-Using Systems

Please see Appendix A: Equipment Inventory & Recommendations for an inventory of the facility's equipment.

Lighting System

Lighting at the facility is provided mostly by 32-Watt linear fluorescent T8 lamps with electronic ballasts as well as some compact fluorescent lamps (CFL). Most of the fixtures are 2-lamp or 3-lamp, 4-foot long troffers with diffusers.

Lighting control in most spaces is provided by occupancy sensors. The occupancy sensors are either wall or ceiling mounted depending on the space layout. Stairwells, elevator lobbies and main lobby areas do not contain any occupancy sensors and are on for 13 hours per day.

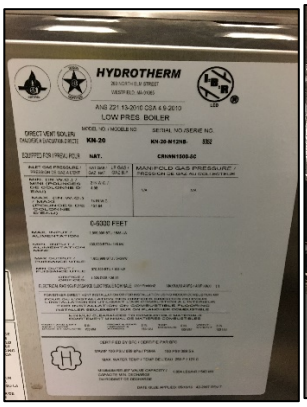
The building's exterior lighting consists of metal halide that are controlled by photocells. There are several compact fluorescent fixtures above doorways and in the entry canopy that are on 24 hours per day.






Hot Water Heating System

The hot water system consists of two Hydrotherm 1,854 kBtu/hr output, forced draft, fully modulating, condensing boilers. The boilers have a nominal combustion efficiency of 93%. Each boiler has a 0.5 hp forced draft fan. The boilers are configured in a constant flow primary distribution with two distribution pumps which alternate weekly. The distribution pumps are 10 HP each, have an efficiency of 91.7%. Each boiler is supplied by a dedicated 1.5 HP return pump, which only operates when the boilers are running. Hot water is supplied at 180°F when the outside air temperature is below 50°F and the setpoint is reset to 155°F when the outside air is above 65°F. The boilers provide hot water to heat pumps throughout the building.

The boilers operate in a lead/lag configuration. Both boilers may be required during cold weather. The lead boiler is rotated weekly.

The boilers are in good condition and well maintained.

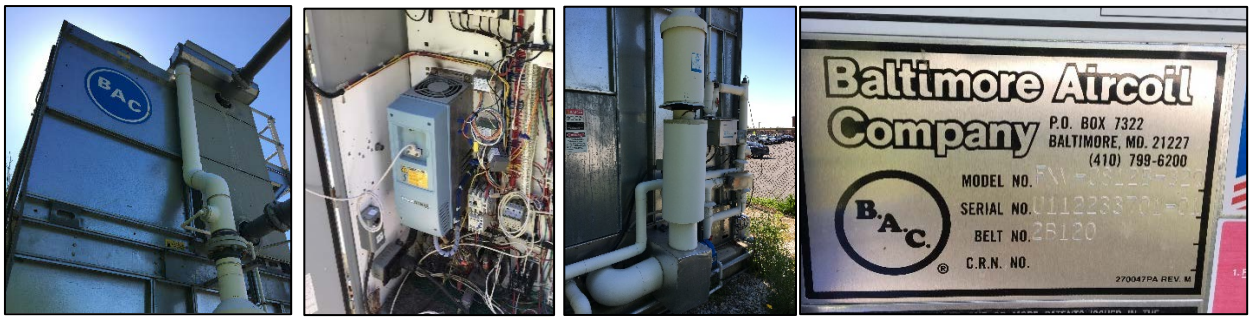
Direct Expansion Air Conditioning System (DX)

There are 37 water-source heat pump units (WSHPs) of various sizes supplying heating, cooling, and ventilation to most of the building. There are five heat pumps located in the boiler room serving the kitchen area (4 tons), cafeteria and teacher's lounge (16 tons), boiler room (2 tons), art room (5 tons), and the adjacent restrooms, janitor room, and storage room (3 tons). On the roof of the building there are 30 heat pumps serving the classrooms (3 tons), and two large heat pump units serving the media center (10 tons) and gymnasium (15 tons). As needed, heat is added to the water loop by the boilers or removed with the cooling tower. The WSHPs are constant air volume units with a single 1 hp supply fan and no return fan. All of the WSHPs use direct-expansion (DX) coils. The WSHPs utilize scroll compressors.

The units are controlled by individual thermostats located in zones. The heat pumps are connected to the building EMS and operate based on temperature to maintain the zone space temperature setpoint around 72°F (adjustable by tenants). The units operate between 7:00 AM and 5:00 PM Monday through Friday.



The cooling tower is a BAC model FXV-08123-320 which is located on the north side of the property, and has two 1 HP fans, and a 5 HP condenser water pump. The pump has an Eaton HVX9000 variable frequency drive installed.



There are four classrooms which are not served by heat pumps. Rooms 311, 314, 315, and 316 are cooled by individual split systems, and heated by a shared air handler with hot water coils located in the ceiling of mechanical room 317. The split systems supplying cooling are four identical 7.5-ton York model H5CE090 units with the fan and evaporator located in the ceiling of the room, and the compressor and condensing unit located on the roof. The units are controlled by a thermostat located in the individual rooms.

There are three server rooms in this building which are cooled by ductless mini-split air conditioners. The two smaller server rooms are cooled by two 1-ton Mitsubishi Mr. Slim units, and the main server room is cooled by a 2-ton Mitsubishi Mr. Slim unit. The units are approximately two years old and in good condition.

Domestic Hot Water Heating System

The domestic hot water heating system for the facility consists of three A.O. Smith gas fired condensing hot water heaters with an input rating of 300 kBtu/hr each and a nominal efficiency of 94%. Each water heater has a 100 gallon storage tank. Two recirculation pumps distribute 120°F water to the entire site. The recirculation pumps operate continuously.

Food Service & Laundry Equipment

The school has a small kitchen that is used to prepare lunches for the students. Most of the cooking is done using the two convection ovens and the single large stove. There is also a large gas-fired kettle that is used to prepare pasta and soup.

Refrigeration

The facility has two different storage cold storage areas: a walk-in cooler area and a walk-in freezer area. The cooler area is maintained at a constant temperature of 35°F, and the freezer area is maintained at a constant -13°F. The cooler area is served by two evaporators and the freezer area is served by two evaporators each having a single 1/3 HP fan. There are two 2-ton condensing units with reciprocating compressors connected to evaporators serving the cooler section and the freezer area.

Building Plug Load

There are 104 computer work stations throughout the facility. Ninety-five percent of the computers are desktop units with LCD monitors. There are also four Chromebook charging carts with 30 Chromebooks each.

Additional equipment that contributes to a major portion of the building's plug load includes 19 desk printers, 26 projectors and smartboards, and seven refrigerators.

There is one refrigerated beverage vending machine located in the teacher's lounge.

2.7 Water-Using Systems

There are 16 restrooms at this facility. A sampling of restrooms found that the faucets are rated for 2.0 gallons per minute (gpm) or lower, the toilets are rated at 2 gallons per flush (gpf) and the urinals are rated at 1.6 gpf.

3 SITE ENERGY USE AND COSTS

Utility data for electricity and natural gas was analyzed to identify opportunities for savings. In addition, data for electricity and natural gas was evaluated to determine the annual energy performance metrics for the building in energy cost per square foot and energy usage per square foot. These metrics are an estimate of the relative energy efficiency of this building. There are a number of factors that could cause the energy use of this building to vary from the "typical" energy usage profile for facilities with similar characteristics. Local weather conditions, building age and insulation levels, equipment efficiency, daily occupancy hours, changes in occupancy throughout the year, equipment operating hours, and energy efficient behavior of occupants all contribute to benchmarking scores. Please refer to the Benchmarking section within Section 3.4 for additional information.

3.1 Total Cost of Energy

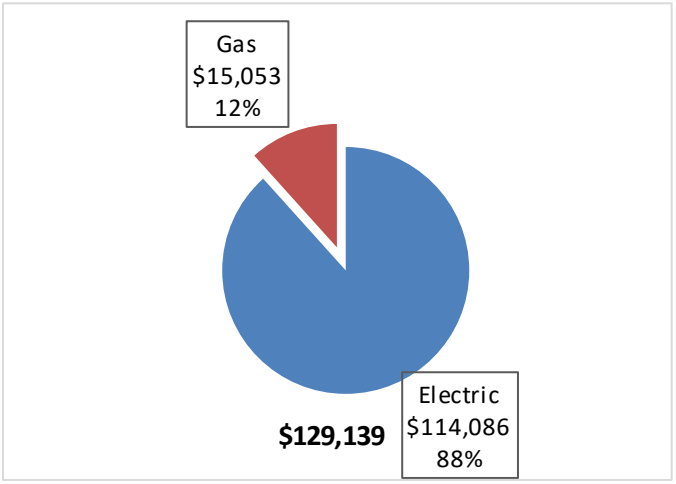
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 7 - Utility Summary

Utility Summary for Dr. JP Cleary Elementary School		
Fuel	Usage	Cost
Electricity	774,130 kWh	$114,086
Natural Gas	13,531 Therms	$15,053
Total		$129,139

The current annual energy cost for this facility is $129,139 as shown in the chart below.

Figure 8 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by Atlantic City Electric. The average electric cost over the past 12 months was $0.147/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 9 - Electric Usage & Demand

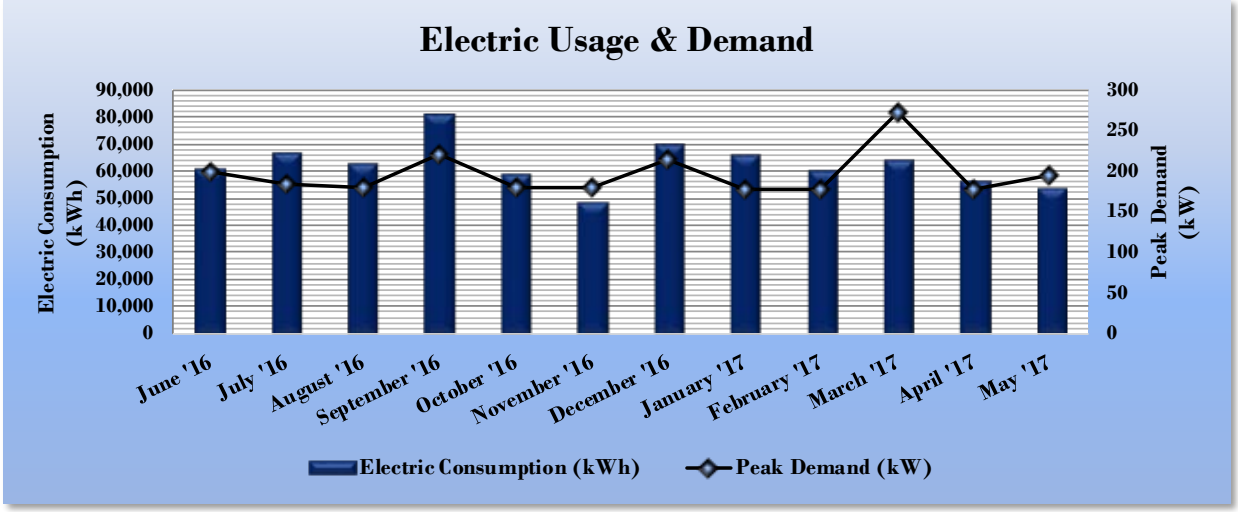


Figure 10 - Electric Usage & Demand

Electric Billing Data for Dr. JP Cleary Elementary School					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
6/27/16	32	60,960	200	$1,685	$9,151
7/28/16	30	66,880	185	$1,463	$9,642
8/25/16	27	62,720	179	$1,295	$8,891
9/28/16	33	80,960	222	$2,218	$12,017
10/27/16	28	58,800	180	$1,536	$8,554
11/23/16	26	48,800	179	$1,424	$7,276
12/27/16	33	70,320	214	$2,138	$10,508
1/26/17	29	66,240	177	$1,564	$9,407
2/22/17	26	60,640	177	$1,407	$8,529
3/24/17	29	64,160	273	$2,406	$10,012
4/27/17	33	56,400	178	$1,783	$8,565
5/26/17	28	53,920	194	$1,657	$8,097
Totals	354	750,800	272.8	$20,577	$110,648
Annual	365	774,130	272.8	$21,216	$114,086

3.3 Natural Gas Usage

Natural gas is provided by South Jersey Gas. The average gas cost for the past 12 months is $1.112/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below.

Figure 11 - Natural Gas Usage

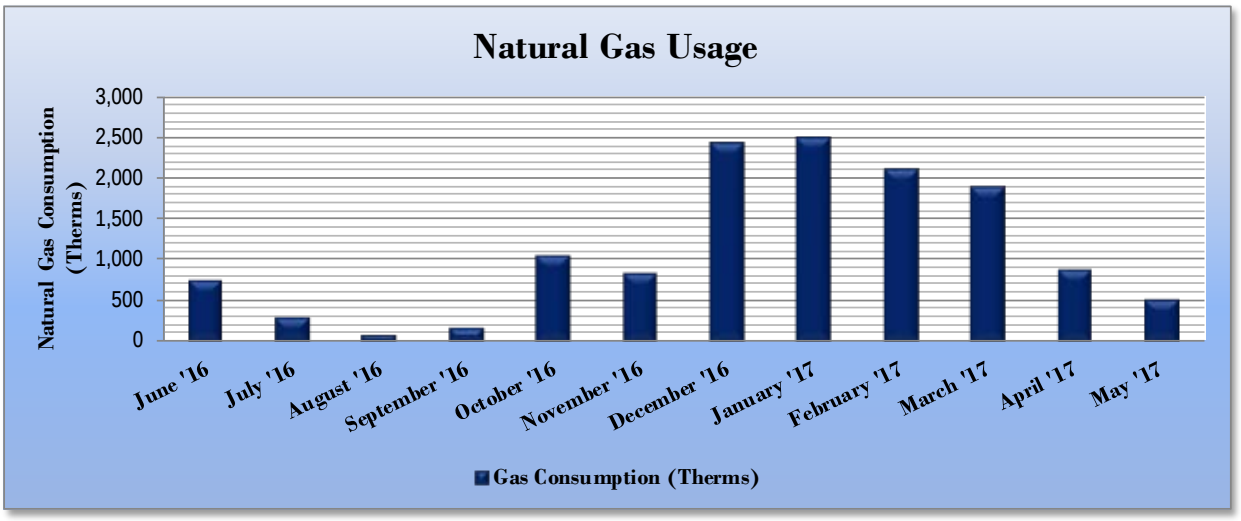


Figure 12 - Natural Gas Usage

Gas Billing Data for Dr. JP Cleary Elementary School			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
6/27/16	33	753	$654
7/28/16	31	306	$310
8/25/16	30	93	$75
9/28/16	34	187	$205
10/27/16	29	1,065	$1,118
11/23/16	27	839	$890
12/27/16	34	2,446	$2,758
1/26/17	30	2,509	$3,038
2/22/17	27	2,121	$2,435
3/24/17	30	1,912	$2,085
4/27/17	34	884	$996
5/26/17	29	529	$612
Totals	368	13,642	$15,177
Annual	365	13,531	$15,053

3.4 Benchmarking

This facility was benchmarked using Portfolio Manager®, an online tool created and managed by the United States Environmental Protection Agency (EPA) through the ENERGY STAR® program. Portfolio Manager® analyzes your building's consumption data, cost information, and operational use details and then compares its performance against a national median for similar buildings of its type. Metrics provided by this analysis are Energy Use Intensity (EUI) and an ENERGY STAR® score for select building types.

The EUI is a measure of a facility's energy consumption per square foot, and it is the standard metric for comparing buildings' energy performance. Comparing the EUI of a building with the national median EUI for that building type illustrates whether that building uses more or less energy than similar buildings of its type on a square foot basis. 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.

Figure 13 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Dr. JP Cleary Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	171.3	141.4
Site Energy Use Intensity (kBtu/ft^2)	70.4	58.2

Implementation of all recommended measures in this report would improve the building's estimated EUI significantly, as shown in the table below:

Figure 14 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Dr. JP Cleary Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	135.9	141.4
Site Energy Use Intensity (kBtu/ft^2)	59.2	58.2

Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75% of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. This facility has a current score of 43.

A Portfolio Manager® Statement of Energy Performance (SEP) was generated for this facility, see **Appendix B: ENERGY STAR® Statement of Energy Performance**.

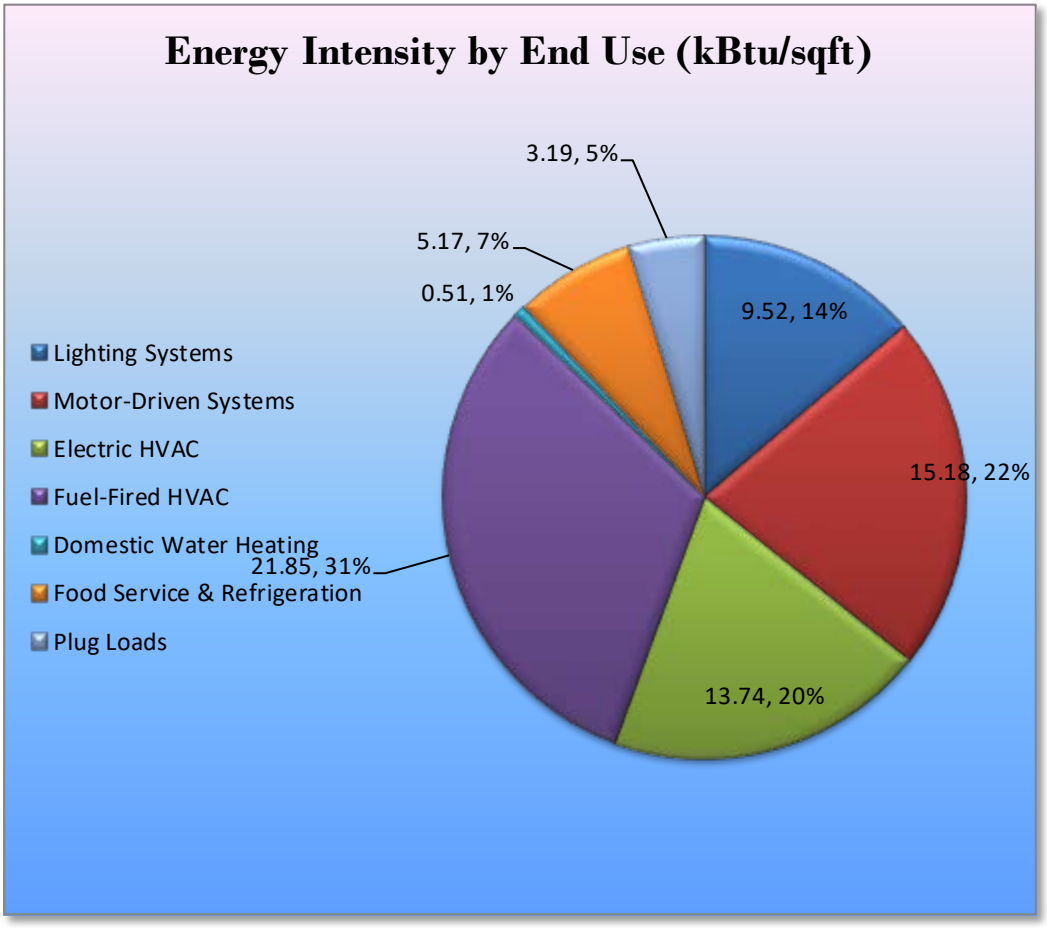
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

A Portfolio Manager® account has been created online for your facility and you will be provided with the login information for the account. We encourage you to update your utility information in Portfolio Manager® regularly, so that you can keep track of your building's performance. 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.

3.5 Energy End-Use Breakdown

In order to provide a complete overview of energy consumption across building systems, an energy balance was performed at this facility. An energy balance utilizes standard practice engineering methods to evaluate all components of the various electric and fuel-fired systems found in a building to determine their proportional contribution to overall building energy usage. This chart of energy end uses highlights the relative contribution of each equipment category to total energy usage. This can help determine where the greatest benefits might be found from energy efficiency measures.

Figure 15 - Energy Balance (% and kBtu/SF)



4 ENERGY CONSERVATION MEASURES

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information to the Dr. JP Cleary Elementary School regarding financial incentives for which they may qualify to implement the recommended measures. For this audit report, most measures have received only a preliminary analysis of feasibility which identifies expected ranges of savings and costs. This level of analysis is usually considered sufficient to demonstrate project cost-effectiveness and help prioritize energy measures. Savings are based on the New Jersey Clean Energy Program Protocols to Measure Resource Savings dated June 29, 2016, approved by the New Jersey Board of Public Utilities. Further analysis or investigation may be required to calculate more precise savings based on specific circumstances. A higher level of investigation may be necessary to support any custom SmartStart or Pay for Performance, or Direct Install incentive applications. Financial incentives for the ECMs identified in this report have been calculated based the NJCEP prescriptive SmartStart program. Some measures and proposed upgrade projects may be eligible for higher incentives than those shown below through other NJCEP programs as described in Section 8.

The following sections describe the evaluated measures.

4.1 Recommended ECMs

The measures below have been evaluated by the auditor and are recommended for implementation at the facility.

Figure 16 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		79,193	19.0	0.0	$11,671.00	$62,345.48	$12,490.00	$49,855.48	4.3	79,747
ECM 1	Install LED Fixtures	8,054	3.1	0.0	$1,186.87	$14,845.73	$3,800.00	$11,045.73	9.3	8,110
ECM 2	Retrofit Fixtures with LED Lamps	71,140	16.0	0.0	$10,484.12	$47,499.76	$8,690.00	$38,809.76	3.7	71,637
Lighting Control Measures		12,102	1.8	0.0	$1,783.57	$12,060.00	$1,525.00	$10,535.00	5.9	12,187
ECM 3	Install Occupancy Sensor Lighting Controls	5,342	1.1	0.0	$787.30	$5,810.00	$805.00	$5,005.00	6.4	5,380
ECM 4	Install Daylight Dimming Controls	4,121	0.3	0.0	$607.28	$3,250.00	$720.00	$2,530.00	4.2	4,150
ECM 5	Install High/Low Lighitng Controls	2,639	0.4	0.0	$388.98	$3,000.00	$0.00	$3,000.00	7.7	2,658
Variable Frequency Drive (VFD) Measures		46,138	4.4	0.0	$6,799.49	$17,063.96	$1,160.00	$15,903.96	2.3	46,460
ECM 6	Install VFDs on Constant Volume (CV) HVAC	7,281	1.9	0.0	$1,073.10	$9,448.06	$1,160.00	$8,288.06	7.7	7,332
ECM 7	Install VFDs on Hot Water Pumps	38,856	2.5	0.0	$5,726.39	$7,615.90	$0.00	$7,615.90	1.3	39,128
Electric Unitary HVAC Measures		48,635	21.6	0.0	$7,167.47	$33,783.84	$2,214.68	$31,569.17	4.4	48,975
ECM 8	Install High Efficiency Heat Pumps	48,635	21.6	0.0	$7,167.47	$33,783.84	$2,214.68	$31,569.17	4.4	48,975
Plug Load Equipment Control - Vending Machine		1,612	0.0	0.0	$237.54	$230.00	$0.00	$230.00	1.0	1,623
ECM 9	Vending Machine Control	1,612	0.0	0.0	$237.54	$230.00	$0.00	$230.00	1.0	1,623
TOTALS		187,680	46.8	0.0	$27,659.07	$125,483.28	$17,389.68	$108,093.61	3.9	188,992

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

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

4.1.1 Lighting Upgrades

Our recommendations for upgrades to existing lighting fixtures are summarized in Figure 17 below.

Figure 17 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		79,193	19.0	0.0	$11,671.00	$62,345.48	$12,490.00	$49,855.48	4.3	79,747
ECM 1	Install LED Fixtures	8,054	3.1	0.0	$1,186.87	$14,845.73	$3,800.00	$11,045.73	9.3	8,110
ECM 2	Retrofit Fixtures with LED Lamps	71,140	16.0	0.0	$10,484.12	$47,499.76	$8,690.00	$38,809.76	3.7	71,637

During lighting upgrade planning and design, we recommend a comprehensive approach that considers both the efficiency of the lighting fixtures and how they are controlled.

ECM 1: Install LED Fixtures

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0
Exterior	8,054	3.1	0.0	$1,186.87	$14,845.73	$3,800.00	$11,045.73	9.3	8,110

Measure Description

We recommend replacing existing fixtures containing metal halide lamps with new high performance LED light fixtures. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of fluorescent tubes and more than ten times longer than many incandescent lamps.

ECM 2: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	67,494	15.7	0.0	$9,946.79	$45,870.12	$8,690.00	$37,180.12	3.7	67,966
Exterior	3,646	0.3	0.0	$537.33	$1,629.63	$0.00	$1,629.63	3.0	3,672

Measure Description

We recommend retrofitting existing incandescent or fluorescent lighting technologies with LED lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed while leaving the fluorescent fixture ballast in place. LED bulbs can be used in existing fixtures as a direct replacement for most other lighting technologies. This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of fluorescent tubes and more than ten times longer than many incandescent lamps.

4.1.2 Lighting Control Measures

Our recommendations for upgrades to existing lighting control measures are summarized in Figure 18 below.

Figure 18 – Summary of Lighting Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		12,102	1.8	0.0	$1,783.57	$12,060.00	$1,525.00	$10,535.00	5.9	12,187
ECM 3	Install Occupancy Sensor Lighting Controls	5,342	1.1	0.0	$787.30	$5,810.00	$805.00	$5,005.00	6.4	5,380
ECM 4	Install Daylight Dimming Controls	4,121	0.3	0.0	$607.28	$3,250.00	$720.00	$2,530.00	4.2	4,150
ECM 5	Install High/Low Lighitng Controls	2,639	0.4	0.0	$388.98	$3,000.00	$0.00	$3,000.00	7.7	2,658

During lighting upgrade planning and design, we recommend a comprehensive approach that considers both the efficiency of the lighting fixtures and how they are controlled.

ECM 3: Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
5,342	1.1	0.0	$787.30	$5,810.00	$805.00	$5,005.00	6.4	5,380

Measure Description

We recommend installing occupancy sensors to control lighting fixtures that are currently controlled by manual switches in most restrooms, storage rooms, classrooms, offices areas, media center, and kitchen. Lighting sensors detect occupancy using ultrasonic and/or infrared sensors. For most spaces, we recommend lighting controls use dual technology sensors, which can eliminate the possibility of any lights turning off unexpectedly. Lighting systems are enabled when an occupant is detected. Fixtures are automatically turned off after an area has been vacant for a preset period. Some controls also provide dimming options and all modern occupancy controls can be easily over-ridden by room occupants to allow them to manually turn fixtures on or off, as desired. Energy savings results from only operating lighting systems when they are required.

Occupancy sensors may be mounted on the wall at existing switch locations, mounted on the ceiling, or in remote locations. In general, wall switch replacement sensors are recommended for single occupant offices and other small rooms. Ceiling-mounted or remote mounted sensors are used in locations without local switching or where wall switches are not in the line-of-sight of the main work area and in large spaces. We recommend a comprehensive approach to lighting design that upgrades both the lighting fixtures and the controls together for maximum energy savings and improved lighting for occupants.

ECM 4: Install Daylight Dimming Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
4,121	0.3	0.0	$607.28	$3,250.00	$720.00	$2,530.00	4.2	4,150

Measure Description

We recommend installing daylight dimming controls that use photosensors to reduce electric lighting in areas when ample daylight lighting is present. Photosensor controls are recommended for fixtures that are adjacent to windows that receive lots of sunlight. As sunlight level increase in the room, fixture lighting is decreased or turned off. This measure reduces energy use in spaces where sufficient lighting levels can be met by ambient daylight.

Optimum light levels and the method of dimming should be determined during lighting design. We recommend a comprehensive approach to lighting design that upgrades both the lighting fixtures and the controls together for maximum energy savings and improved lighting for occupants.

ECM 5: Install High/Low Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
2,639	0.4	0.0	$388.98	$3,000.00	$0.00	$3,000.00	7.7	2,658

Measure Description

We recommend installing 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. Typical areas for such lighting control are stairwells, interior corridors, parking lots, and parking garages.

Lighting fixtures with these controls operate at default low levels when the area is not occupied to provide minimal lighting to meet security or safety requirements. Sensors detect occupancy using ultrasonic and/or infrared sensors. The lighting systems are switched to full lighting levels whenever an occupant is detected. Fixtures are automatically switched back to low level after an area has been vacant for a preset period of time. Energy savings results from only providing full lighting levels when it is required.

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

Additional savings from reduced lighting maintenance may also result from this measure, due to reduced lamp operation.

4.1.3 Variable Frequency Drive Measures

Our recommendations for variable frequency drive (VFD) measures are summarized in Figure 19 below.

Figure 19 – Summary of Variable Frequency Drive ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		46,138	4.4	0.0	$6,799.49	$17,063.96	$1,160.00	$15,903.96	2.3	46,460
ECM 6	Install VFDs on Constant Volume (CV) HVAC	7,281	1.9	0.0	$1,073.10	$9,448.06	$1,160.00	$8,288.06	7.7	7,332
ECM 7	Install VFDs on Hot Water Pumps	38,856	2.5	0.0	$5,726.39	$7,615.90	$0.00	$7,615.90	1.3	39,128

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

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
7,281	1.9	0.0	$1,073.10	$9,448.06	$1,160.00	$8,288.06	7.7	7,332

Measure Description

We recommend installing variable frequency drives (VFDs) on the heat pump units serving the media center and gymnasium to control supply fan motor speeds to convert 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 will cause the VFD to modulate fan speed to maintain the appropriate temperature in the zone, while maintaining a constant supply air temperature. Energy savings results from reducing fan speed (and power) when there is a reduced load required for the zone. The magnitude of energy savings is based on the estimated amount of time that fan motors operate at partial load.

For air handlers with direct expansion (DX) cooling systems, the minimum air flow across the cooling coil required to prevent the coil from freezing will have to be determined during the final project design. The control system should be programmed to maintain the minimum air flow whenever the compressor is operating.

ECM 7: Install VFDs on Hot Water Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
38,856	2.5	0.0	$5,726.39	$7,615.90	$0.00	$7,615.90	1.3	39,128

Measure Description

We recommend installing a variable frequency drives (VFD) to control hot water pumps. This measure requires that a majority of the hot water coils be served by 2-way valves and that a differential pressure sensor is installed in the hot water loop. As the hot water valves close, the differential pressure increases. The VFD modulates pump speed to maintain a differential pressure setpoint. Energy savings results from reducing pump motor speed (and power) as hot water valves close. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

4.1.4 Electric Unitary HVAC Measures

Our recommendation for unitary HVAC measures is summarized in Figure 20 below.

Figure 20 - Summary of Unitary HVAC ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Electric Unitary HVAC Measures		48,635	21.6	0.0	$7,167.47	$33,783.84	$2,214.68	$31,569.17	4.4	48,975
ECM 8	Install High Efficiency Heat Pumps	48,635	21.6	0.0	$7,167.47	$33,783.84	$2,214.68	$31,569.17	4.4	48,975

ECM 8: Install High Efficiency Heat Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
48,635	21.6	0.0	$7,167.47	$33,783.84	$2,214.68	$31,569.17	4.4	48,975

Measure Description

We recommend replacing the standard efficiency heat pumps serving the gymnasium, and cafeteria and teacher's lounge, with high efficiency heat pumps. There have been significant improvements in both compressor and fan motor efficiencies over the past several years. Therefore, electricity savings can be achieved by replacing older units with new high efficiency units. A higher EER or SEER rating indicates a more efficient cooling system and a higher HPSF rating indicates more efficient heating mode. The magnitude of energy savings for this measure depends on the relative efficiency of the older unit versus the new high efficiency unit, the average heating and cooling loads, and the estimated annual operating hours.

4.1.5 Plug Load Equipment Control - Vending Machines

Our recommendation for upgrades to plug load equipment controls – vending machines is summarized in Figure 21 below.

Figure 21 - Summary of Unitary HVAC ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Plug Load Equipment Control - Vending Machine		1,612	0.0	0.0	$237.54	$230.00	$0.00	$230.00	1.0	1,623
ECM 9	Vending Machine Control	1,612	0.0	0.0	$237.54	$230.00	$0.00	$230.00	1.0	1,623

ECM 9: Vending Machine Control

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,612	0.0	0.0	$237.54	$230.00	$0.00	$230.00	1.0	1,623

Measure Description

Vending machines operate continuously, even during non-business hours. We recommend installing occupancy sensor controls to reduce the energy use. These controls power down vending machines when the vending machine area has been vacant for some time, then power up at regular intervals, as needed, to turn machine lights on or keep the product cool. Energy savings are a dependent on vending machine and activity level in the area surrounding the machines.

4.2 ECMs Evaluated But Not Recommended

The measures below have been evaluated by the auditor but are not recommended for implementation at the facility. Reasons for exclusion can be found in each measure description section.

Figure 22 – Summary of Measures Evaluated, But Not Recommended

Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Motor Upgrades	1,467	0.3	0.0	$216.27	$33,068.40	$0.00	$33,068.40	152.9	1,478
Premium Efficiency Motors	1,467	0.3	0.0	$216.27	$33,068.40	$0.00	$33,068.40	152.9	1,478
Electric Unitary HVAC Measures	4,369	5.0	0.0	$643.90	$34,913.10	$2,190.00	$32,723.10	50.8	4,400
Install High Efficiency Electric AC	4,369	5.0	0.0	$643.90	$34,913.10	$2,190.00	$32,723.10	50.8	4,400
TOTALS	5,837	5.3	0.0	$860.16	$67,981.50	$2,190.00	$65,791.50	76.5	5,877

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

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

Premium Efficiency Motors

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,467	0.3	0.0	$216.27	$33,068.40	$0.00	$33,068.40	152.9	1,478

Measure Description

We recommend replacing standard efficiency motors with *NEMA Premium™* efficiency motors. Our evaluation assumes that existing motors will be replaced with motors of equivalent size and type. Although occasionally additional savings can be achieved by downsizing motors to better meet the motor's current load requirements. The base case motor efficiencies are estimated from nameplate information and our best estimates of motor run hours. Efficiencies of proposed motor upgrades are obtained from the *New Jersey's Clean Energy Program Protocols to Measure Resource Savings (2016)*. Savings are based on the difference between baseline and proposed efficiencies and the assumed annual operating hours.

Reasons for not Recommending

Due to the long payback period, we do not currently recommend replacing motors with NEMA Premium efficiency motors.

Install High Efficiency Air Conditioning Units

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
4,369	5.0	0.0	$643.90	$34,913.10	$2,190.00	$32,723.10	50.8	4,400

Measure Description

We recommend replacing standard efficiency packaged air conditioning units with high efficiency packaged air conditioning units. There have been significant improvements in both compressor and fan motor efficiencies over the past several years. Therefore, electricity savings can be achieved by replacing older units with new high efficiency units. A higher EER or SEER rating indicates a more efficient cooling system. 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 load, and the estimated annual operating hours.

Reasons for not Recommending

Due to the long payback period, we do not currently recommend replacing existing split-system air conditioners with new high-efficiency units.

5 ENERGY EFFICIENT PRACTICES

In addition to the quantifiable savings estimated in Section 4, a facility's energy performance can also be improved through application of many low cost or no-cost energy efficiency strategies. By employing certain behavioral and operational changes and performing routine maintenance on building systems, equipment lifetime can be extended; occupant comfort, health and safety can be improved; and energy and O&M costs can be reduced. The recommendations below are provided as a framework for developing a whole building maintenance plan that is customized to your facility. Consult with qualified equipment specialists for details on proper maintenance and system operation.

Reduce Air Leakage

Air leakage, or infiltration, occurs when outside air enters a building uncontrollably through cracks and openings. Properly sealing such cracks and openings can significantly reduce heating and cooling costs, improve building durability, and create a healthier indoor environment. This includes caulking or installing weather stripping around leaky doors and windows allowing for better control of indoor air quality through controlled ventilation.

Close Doors and Windows

Ensure doors and windows are closed in conditioned spaces. Leaving doors and windows open leads to a significant increase in heat transfer between conditioned spaces and the outside air. Reducing a facility's air changes per hour (ACH) can lead to increased occupant comfort as well as significant heating and cooling savings, especially when combined with proper HVAC controls and adequate ventilation.

Use Window Treatments/Coverings

A substantial amount of heat gain can occur through uncovered or untreated windows, especially older single pane windows and east or west-facing windows. Treatments such as high-reflectivity films or covering windows with shades or shutters can reduce solar heat gain and, consequently, cooling load and can reduce internal heat loss and the associated heating load.

Clean Evaporator/Condenser Coils on AC Systems

Dirty evaporators and condensers coils cause a restriction to air flow and restrict heat transfer. This results in increased evaporator and condenser fan load and a decrease in cooling system performance. Keeping the coils clean allows the fans and cooling system to operate more efficiently.

Clean and/or Replace HVAC Filters

Air filters work to reduce the amount of indoor air pollution and increase occupant comfort. Over time, filters become less and less effective as particulate buildup increases. In addition to health concerns related to clogged filters, filters that have reached saturation also restrict air flow through the facility's air conditioning or heat pump system, increasing the load on the distribution fans and decreasing occupant comfort levels. Filters should be checked monthly and cleaned or replaced when appropriate.

Check for and Seal Duct Leakage

Duct leakage in commercial buildings typically accounts for 5% to 25% of the supply airflow. In the case of rooftop air handlers, duct leakage can occur to the outside of the building, significantly increasing cooling and heating costs. By sealing sources of leakage, cooling, heating, and ventilation energy use can be reduced significantly, depending on the severity of air leakage.

Perform Proper Water Heater Maintenance

At least once a year, drain a few gallons out of the water heater using the drain valve. If there is a lot of sediment or debris, then a full flush is recommended. Turn the temperature down and then completely drain the tank. Once a year check for any leaks or heavy corrosion on the pipes and valves. For gas water heaters, check the draft hood and make sure it is placed properly, with a few inches of air space between the tank and where it connects to the vent. Look for any corrosion or wear on the gas line and on the piping. If you noticed any black residue, soot or charred metal, this is a sign you may be having combustion issues and you should have the unit serviced by a professional. For electric water heaters, look for any signs of leaking such as rust streaks or residue around the upper and lower panels covering the electrical components on the tank. For water heaters over three to four years old have a technician inspect the sacrificial anode annually.

Plug Load Controls

There are a variety of ways to limit the energy use of plug loads including increasing occupant awareness, removing under-utilized equipment, installing hardware controls, and using software controls. Some control steps to take are to enable the most aggressive power settings on existing devices or install load sensing or occupancy sensing (advanced) power strips. For additional information refer to "Plug Load Best Practices Guide" http://www.advancedbuildings.net/plug-load-best-practices-guide-offices.

Water Conservation

Installing low-flow faucets or faucet aerators, low-flow showerheads, and kitchen sink pre-rinse spray valves saves both energy and water. These devices save energy by reducing the overall amount of hot water used hence reducing the energy used to heat the water. The flow ratings for EPA WaterSense™ (http://www3.epa.gov/watersense/products) labeled devices are 1.5 gpm for bathroom faucets, 2.0 gpm for showerheads, and 1.28 gpm for pre-rinse spray valves.

Installing dual flush or low-flow toilets and low-flow or waterless urinals are additional ways to reduce the sites water use, however, these devices do not provide energy savings at the site level. Any reduction in water use does however ultimately reduce grid level electricity use since a significant amount of electricity is used to deliver water from reservoirs to end users. The EPA WaterSense™ ratings for urinals is 0.5 gpf and toilets that use as little as 1.28 gpf (this is lower than the current 1.6 gpf federal standard).

6 On-Site Generation Measures

On-site generation measure options include both renewable (e.g., solar, wind) and non-renewable (e.g., fuel cells) on-site technologies that generate power to meet all or a portion of the electric energy needs of a facility, often repurposing any waste heat where applicable. Also referred to as distributed generation, these systems contribute to Greenhouse Gas (GHG) emission reductions, demand reductions and reduced customer electricity purchases, resulting in the electric system reliability through improved transmission and distribution system utilization.

The State of New Jersey's Energy Master Plan (EMP) encourages new distributed generation of all forms and specifically focuses on expanding use of combined heat and power (CHP) by reducing financial, regulatory and technical barriers and identifying opportunities for new entries. The EMP also outlines a goal of 70% of the State's electrical needs to be met by renewable sources by 2050.

Preliminary screenings were performed to determine the potential that a generation project could provide a cost-effective solution for your facility. Before making a decision to implement, a feasibility study should be conducted that would take a detailed look at 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.

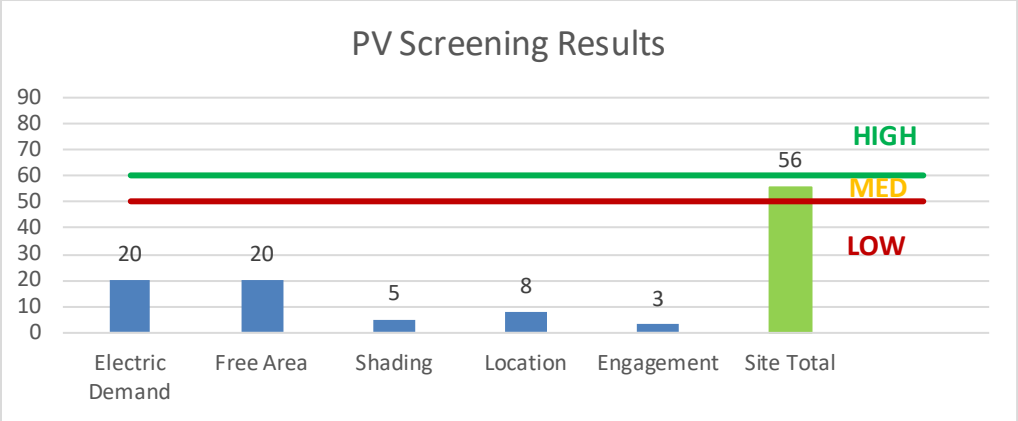
6.1 Photovoltaic

Sunlight can be converted into electricity using photovoltaics (PV) modules. Modules are racked together into an array that produces direct current (DC) electricity. The DC current is converted to alternating current (AC) through an inverter. The inverter is interconnected to the facility's electrical distribution system. The amount of unobstructed area available determines how large of a solar array can be installed. The size of the array combined with the orientation, tilt, and shading elements determines the energy produced.

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

The amount of free area, ease of installation (location), and the lack of shading elements contribute to the Medium potential for PV at the site. A PV array located on the roof of the main building/ground next to the building/over the main parking lot may be feasible. If Cleary Elementary School is interested in pursuing the installation of PV, we recommended a full feasibility study be conducted.

Figure 23 - Photovoltaic Screening



Potential	Medium	
System Potential	197	kW DC STC
Electric Generation	148,232	kWh/yr
Displaced Cost	$12,900	/yr
Installed Cost	$768,300	

Solar projects must register their projects in the SREC (Solar Renewable Energy Certificate) Registration Program (SRP) prior to the start of construction in order to establish the project's eligibility to earn SRECs. Registration of the intent to participate in New Jersey's solar marketplace provides market participants with information about developed new solar projects and insight into future SREC pricing. Refer to Section 8.3 for additional information.

For more information on solar PV technology and commercial solar markets in New Jersey, or to find a qualified solar installer, who can provide a more detailed assessment of the specific costs and benefits of solar develop of the site, please visit the following links below:

- **Basic Info on Solar PV in NJ**: http://www.njcleanenergy.com/whysolar
- **NJ Solar Market FAQs**: http://www.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) is the on-site generation of electricity along with the recovery of heat energy, which is put to beneficial use. Common technologies for CHP include reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines. Electric generation from a CHP system is typically interconnected to local power distribution systems. Heat is recovered from exhaust and ancillary cooling systems and interconnected to the existing hot water (or steam) distribution systems.

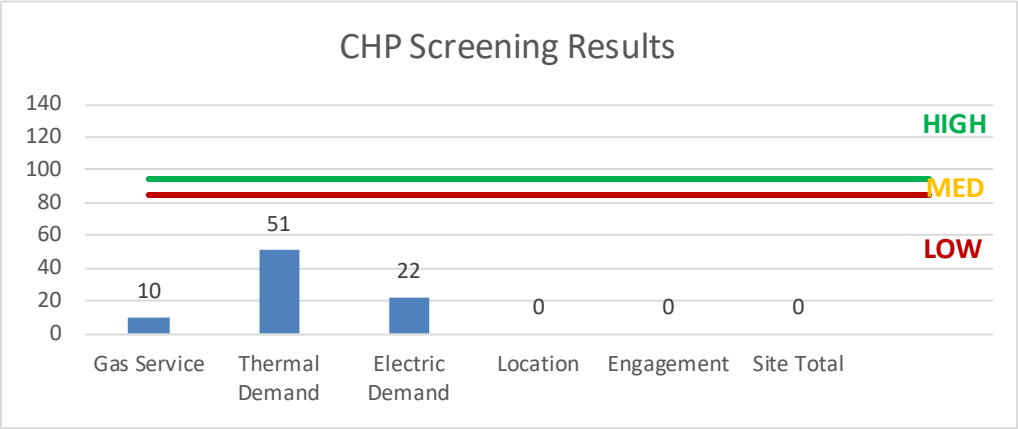
CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste heat can also be routed through absorption chillers for the purpose of space cooling. The key criteria used for screening, however, is the amount of time the system operates at full load and the facility's ability to use the recovered heat. Facilities with continuous use 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 a Low potential for installing a cost-effective CHP system.

Lack of gas service, low or infrequent thermal load, and lack of space near the existing boilers are the most significant factors contributing to the Low potential for CHP at the site. In our opinion, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation.

For a list of qualified firms in New Jersey specializing in commercial CHP cost assessment and installation, go to: http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/.

Figure 24 - Combined Heat and Power Screening



7 DEMAND RESPONSE

Demand Response (DR) is a program designed to reduce the electric load of commercial facilities when electric wholesale prices are high or when the reliability of the electric grid is threatened due to peak demand. Demand Response service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability.

By enabling grid operators to call upon Curtailment Service Providers and commercial facilities to reduce electric usage 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 DR programs. Program participation is voluntary and participants receive payments whether or not their facility is called upon to curtail their electric usage.

Typically an electric customer needs to 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 a greater capability to quickly curtail their demand during peak hours will receive higher payments. Customers with back-up generators onsite 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 a 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 set points 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, in order 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 demand response 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 PJM's website and it includes contact information for each company, as well as the states where they have active business (http://www.pjm.com/markets-and-operations/demand-response/csps.aspx). PJM also posts training materials that are developed for program members interested in specific rules and requirements regarding DR activity (http://www.pjm.com/training/training%20material.aspx), along with a variety of other DR program information.

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 may also install controls or remote monitoring equipment of their own to help ensure compliance with all terms and conditions of a DR contract.

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund, your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 24 for a list of the eligible programs identified for each recommended ECM.

Figure 25 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Install LED Fixtures	X			X		
ECM 2	Retrofit Fixtures with LED Lamps	X			X		
ECM 3	Install Occupancy Sensor Lighting Controls	X			X		
ECM 4	Install Daylight Dimming Controls	X			X		
ECM 5	Install High/Low Lighitng Controls				X		
ECM 6	Install VFDs on Constant Volume (CV) HVAC	X			X		
ECM 7	Install VFDs on Hot Water Pumps				X		
ECM 8	Install High Efficiency Heat Pumps	X			X		
ECM 9	Vending Machine Control	X			X		

SmartStart is generally well-suited for implementation of individual measures or small group of measures. It provides flexibility to install measures at your own pace using in-house staff or a preferred contractor. Direct Install caters to small to mid-size facilities that can bundle multiple ECMs together. This can greatly simplify participation and may lead to higher incentive amounts, but requires the use of pre-approved contractors. The Pay for Performance (P4P) program is a "whole-building" energy improvement program designed for larger facilities. It requires implementation of multiple measures meeting minimum savings thresholds, as well as use of pre-approved consultants. The Large Energy Users Program (LEUP) is available to New Jersey's largest energy users giving them flexibility to install as little or as many measures, in a single facility or several facilities, with incentives capped based on the entity's annual energy consumption. LEUP applicants can use in-house staff or a preferred contractor.

Generally, the incentive values provided throughout the report assume the SmartStart program is utilized because it provides a consistent basis for comparison of available incentives for various measures, though in many cases incentive amounts may be higher through participation in other programs.

Brief descriptions of all relevant financing and incentive programs are located in the sections below. Further information, including most current program availability, requirements, and incentive levels can be found at: www.njcleanenergy.com/ci.

8.1 SmartStart

Overview

The SmartStart program offers incentives for installing prescriptive and custom energy efficiency measures at your facility. Routinely the program adds, removes or modifies incentives from year to year for various energy efficiency equipment based on market trends and new technologies.

Equipment with Prescriptive Incentives Currently Available:

Electric Chillers
Electric Unitary HVAC
Gas Cooling
Gas Heating
Gas Water Heating
Ground Source Heat Pumps
Lighting
Lighting Controls
Refrigeration Doors
Refrigeration Controls
Refrigerator/Freezer Motors
Food Service Equipment
Variable Frequency Drives

Most equipment sizes and types are served by this program. This program provides an effective mechanism for securing incentives for energy efficiency measures installed individually or as part of a package of energy upgrades.

Incentives

The SmartStart prescriptive incentive program provides fixed incentives for specific energy efficiency measures, whereas the custom SmartStart program provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentive offerings for specific devices.

Since your facility is an existing building, only the retrofit incentives have been applied in this report. Custom measure incentives are calculated at $0.16/kWh and $1.60/therm based on estimated annual savings, capped at 50% of the total installed incremental project cost, or a project cost buy down to a one year payback (whichever is less). Program incentives are capped at $500,000 per electric account and $500,000 per natural gas account, per fiscal year.

How to Participate

To participate in the SmartStart program you will need to submit an application for the specific equipment to be installed. Many applications are designed as rebates, although others require application approval prior to installation. Applicants may work with a contractor of their choosing and can also utilize internal personnel, which provides added flexibility to the program. Using internal personnel also helps improve the economics of the ECM by reducing the labor cost that is included in the tables in this report.

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

8.2 Pay for Performance - Existing Buildings

Overview

The Pay for Performance – Existing Buildings (P4P EB) program is designed for larger customers with a peak demand over 200 kW in any of the preceding 12 months. Under this program the minimum installed scope of work must include at least two unique measures resulting in at least 15% energy savings, where lighting cannot make up the majority of the savings. P4P is a generally a good option for medium to large sized facilities looking to implement as many measures as possible under a single project in order to achieve deep energy savings. This program has an added benefit of evaluating a broad spectrum of measures that may not otherwise qualify under other programs. Many facilities pursuing an Energy Savings Improvement Program (ESIP) loan also utilize the P4P program.

Incentives

Incentives are calculated based on estimated and achieved energy savings ranging from $0.18-$0.22/kWh and $1.80-$2.50/therm, capped at the lesser of 50% total project cost, or $1 million per electric account and $1 million per natural gas account, per fiscal year, not to exceed $2 million per project. An incentive of $0.15/square foot is also available to offset the cost of developing the Energy Reduction Plan (see below) contingent on the project moving forward with measure installation.

How to Participate

To participate in the P4B EB program you will need to contact one of the pre-approved consultants and contractors ("Partners"). Under direct contract to you, the Partner will help further evaluate the measures identified in this report through development of the Energy Reduction Plan (ERP), assist you in implementing selected measures, and verify actual savings one year after the installation. At each of these three milestones your Partner will also facilitate securing program incentives.

Approval of the final scope of work is required by the program prior to installation completion. Although installation can be accomplished by a contractor of your choice (some P4P Partners are also contractors) or by internal personnel, the Partner must remain involved to ensure compliance with the program guidelines and requirements.

Detailed program descriptions, instructions for applying, applications and list of Partners can be found at: www.njcleanenergy.com/P4P.

8.3 SREC Registration Program

The SREC (Solar Renewable Energy Certificate) Registration Program (SRP) is used to register the intent to install solar projects in New Jersey. Rebates are not available for solar projects, but owners of solar projects MUST register their projects in the SRP prior to the start of construction in order to establish the project's eligibility to earn SRECs. Registration of the intent to participate in New Jersey's solar marketplace provides market participants with information about the pipeline of anticipated new solar capacity and insight into future SREC pricing.

After the registration is accepted, construction is complete, and final paperwork has been submitted and is deemed complete, the project is issued a New Jersey certification number which enables it to generate New Jersey SRECs. SRECs are generated once the solar project has been authorized to be energized by the Electric Distribution Company (EDC).

Each time a solar installation generates 1,000 kilowatt-hours (kWh) of electricity, an SREC is earned. Solar project owners report the energy production to the SREC Tracking System. This reporting allows SRECs to be placed in the customer's electronic account. SRECs can then be sold on the SREC Tracking System, providing revenue for the first 15 years of the project's life.

Electricity suppliers, the primary purchasers of SRECs, are required to pay a Solar Alternative Compliance Payment (SACP) if they do not meet the requirements of New Jersey's Solar RPS. One way they can meet the RPS requirements is by purchasing SRECs. As SRECs are traded in a competitive market, the price may vary significantly. The actual price of an SREC during a trading period can and will fluctuate depending on supply and demand.

Information about the SRP can be found at: www.njcleanenergy.com/srec.

8.4 Energy Savings Improvement Program

The Energy Savings Improvement Program (ESIP) is an alternate method for New Jersey's government agencies to finance the implementation of energy conservation measures. An ESIP is a type of "performance contract," whereby school districts, counties, municipalities, housing authorities and other public and state entities enter in to contracts to help finance building energy upgrades. This is done in a manner that ensures that annual payments are lower than the savings projected from the ECMs, ensuring that ESIP projects are cash flow positive in year one, and every year thereafter. 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 can be leveraged to help further reduce the total project cost of eligible measures.

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 utilized for some services and independent engineers, or other specialists or qualified staff, are used to deliver other requirements of the program.

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

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Entities should carefully consider all alternatives to develop an approach that best meets their needs. A detailed program description and application can be found at: www.njcleanenergy.com/ESIP.

Please note that ESIP is a program delivered directly by the NJBPU and is not an NJCEP incentive program. As mentioned above, you may utilize NJCEP incentive programs to help further reduce costs when developing the ESP. You should refer to the ESIP guidelines at the link above for further information and guidance on next steps.

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

In 1999, New Jersey State Legislature passed the Electric Discount & Energy Competition Act (EDECA) to restructure the electric power industry in New Jersey. This law deregulated the retail electric markets, allowing all consumers to shop for service from competitive electric suppliers. The intent was to create a more competitive market for electric power supply in New Jersey. As a result, utilities were allowed to charge Cost of Service and customers were given the ability to choose a third party (i.e., non-utility) energy supplier.

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

If your facility is not purchasing electricity from a third party supplier, consider shopping for a reduced rate from third party electric suppliers. If your facility is purchasing electricity from a third party supplier, review and compare prices at the end of the current contract or every couple years.

A list of third party electric suppliers, who are licensed by the state to provide service in New Jersey, can be found online at: www.state.nj.us/bpu/commercial/shopping.html.

9.2 Retail Natural Gas Supply Options

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

A customer's decision about whether to buy natural gas from a retail supplier is typically dependent upon whether a customer seeks 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 is not purchasing natural gas from a third party supplier, consider shopping for a reduced rate from third party natural gas suppliers. If your facility is purchasing natural gas from a third party supplier, review and compare prices at the end of the current contract or every couple years.

A list of third party natural gas suppliers, who are licensed by the state to provide service in New Jersey, can be found online at: 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	Watts per Fixture	Annual Operating Hours	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	7	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.13	693	0.0	$102.13	$409.50	$70.00	3.32
Boiler Room	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Maintenance Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.06	239	0.0	$35.23	$150.40	$30.00	3.42
Kitchen	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,200	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	840	0.43	912	0.0	$134.35	$1,396.20	$250.00	8.53
Kitchen	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,200	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,200	0.04	77	0.0	$11.39	$95.13	$20.00	6.60
Kitchen Wash Area	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,200	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,200	0.04	91	0.0	$13.42	$117.00	$20.00	7.23
Kitchen Serving Area	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,200	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	840	0.16	345	0.0	$50.88	$570.80	$95.00	9.35
Kitchen Locker Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.02	114	0.0	$16.78	$58.50	$10.00	2.89
Kitchen RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.02	114	0.0	$16.78	$58.50	$10.00	2.89
Kitchen Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,000	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.08	432	0.0	$63.61	$420.40	$65.00	5.59
Walk-In Refrigerator	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.04	228	0.0	$33.56	$117.00	$20.00	2.89
Walk-In Freezer	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.04	228	0.0	$33.56	$117.00	$20.00	2.89
Cafeteria	25	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,000	Relamp	Yes	25	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,100	1.20	6,331	0.0	$932.99	$3,258.33	$640.00	2.81
Cafeteria	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Faculty Break Room	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.29	1,076	0.0	$158.56	$676.80	$135.00	3.42
IDF Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.04	228	0.0	$33.56	$117.00	$20.00	2.89
104 Storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.10	359	0.0	$52.85	$225.60	$45.00	3.42
Boys RR	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,100	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.06	239	0.0	$35.23	$175.50	$30.00	4.13
105 Janitopr Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.02	114	0.0	$16.78	$58.50	$10.00	2.89
Girls RR	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,100	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.06	239	0.0	$35.23	$175.50	$30.00	4.13
CR 109 (Art)	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	114	2,100	Relamp	No	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,100	0.44	1,623	0.0	$239.17	$1,141.60	$240.00	3.77
CR 109 Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,100	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.04	159	0.0	$23.49	$117.00	$20.00	4.13
Faculty Women's RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.02	114	0.0	$16.78	$58.50	$10.00	2.89
111 CST Office	3	Compact Fluorescent: Pin-Style: (42W) - 2L	Wall Switch	84	3,000	Relamp	Yes	3	LED Screw-In Lamps: Pin-Style: (29W) - 2L	Occupancy Sensor	59	2,100	0.08	443	0.0	$65.34	$534.31	$35.00	7.64

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
111 CST Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.08	432	0.0	$63.61	$445.50	$65.00	5.98
111A Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.06	239	0.0	$35.23	$150.40	$30.00	3.42
111B Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.06	239	0.0	$35.23	$150.40	$30.00	3.42
111C Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.06	239	0.0	$35.23	$150.40	$30.00	3.42
111D Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.06	239	0.0	$35.23	$150.40	$30.00	3.42
111E Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.02	114	0.0	$16.78	$58.50	$10.00	2.89
111F File/Copy Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.06	239	0.0	$35.23	$150.40	$30.00	3.42
111G Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.06	239	0.0	$35.23	$150.40	$30.00	3.42
111H Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.02	114	0.0	$16.78	$58.50	$10.00	2.89
Nurse's Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.13	478	0.0	$70.47	$300.80	$60.00	3.42
Nurse's Office RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.02	114	0.0	$16.78	$58.50	$10.00	2.89
Nurse's Office RR	1	Compact Fluorescent: Pin-Style: (42W) - 2L	Wall Switch	84	3,000	Relamp	No	1	LED Screw-In Lamps: Pin-Style: (29W) - 2L	Wall Switch	59	3,000	0.02	87	0.0	$12.81	$88.10	$0.00	6.88
Nurse's Office Storage Closet	1	Compact Fluorescent: Pin-Style: (42W) - 2L	Wall Switch	84	3,000	Relamp	No	1	LED Screw-In Lamps: Pin-Style: (29W) - 2L	Wall Switch	59	3,000	0.02	87	0.0	$12.81	$88.10	$0.00	6.88
Nurse's Office Storage Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.02	114	0.0	$16.78	$58.50	$10.00	2.89
112 Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.06	239	0.0	$35.23	$150.40	$30.00	3.42
CST Conf. Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.13	478	0.0	$70.47	$300.80	$60.00	3.42
113 Conf. Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,100	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.09	319	0.0	$46.98	$234.00	$40.00	4.13
113B Storage	1	Compact Fluorescent: Pin-Style: (42W) - 2L	Wall Switch	84	3,000	Relamp	No	1	LED Screw-In Lamps: Pin-Style: (29W) - 2L	Wall Switch	59	3,000	0.02	87	0.0	$12.81	$88.10	$0.00	6.88
113A Storage	1	Compact Fluorescent: Pin-Style: (42W) - 2L	Wall Switch	84	3,000	Relamp	No	1	LED Screw-In Lamps: Pin-Style: (29W) - 2L	Wall Switch	59	3,000	0.02	87	0.0	$12.81	$88.10	$0.00	6.88
116 Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.06	239	0.0	$35.23	$150.40	$30.00	3.42
Main Office (117)	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	7	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.23	837	0.0	$123.32	$526.40	$105.00	3.42
Main Office Security	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	114	2,100	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,100	0.04	135	0.0	$19.93	$95.13	$20.00	3.77
117B Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,100	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.04	159	0.0	$23.49	$117.00	$20.00	4.13
119 Principal's Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.06	239	0.0	$35.23	$150.40	$30.00	3.42
119 Principal's Office	1	Compact Fluorescent: Pin-Style: (42W) - 2L	Occupancy Sensor	84	2,100	Relamp	No	1	LED Screw-In Lamps: Pin-Style: (29W) - 2L	Occupancy Sensor	59	2,100	0.02	61	0.0	$8.97	$88.10	$0.00	9.82

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
120 Principal's Office Closet	1	Compact Fluorescent: Pin-Style: (42W) - 2L	Wall Switch	84	3,000	Relamp	No	1	LED Screw-In Lamps: Pin-Style: (29W) - 2L	Wall Switch	59	3,000	0.02	87	0.0	$12.81	$88.10	$0.00	6.88
117C Closet	1	Compact Fluorescent: Pin-Style: (42W) - 2L	Wall Switch	84	3,000	Relamp	No	1	LED Screw-In Lamps: Pin-Style: (29W) - 2L	Wall Switch	59	3,000	0.02	87	0.0	$12.81	$88.10	$0.00	6.88
Media Center	27	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	Yes	27	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.74	3,884	0.0	$572.45	$2,659.50	$410.00	3.93
Media Center	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Janitor Room / Roof Access	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.02	114	0.0	$16.78	$58.50	$10.00	2.89
Men's RR 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.02	114	0.0	$16.78	$58.50	$10.00	2.89
Men's RR 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.02	114	0.0	$16.78	$58.50	$10.00	2.89
CR 207	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.26	956	0.0	$140.94	$601.60	$120.00	3.42
CR 207 Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.02	114	0.0	$16.78	$58.50	$10.00	2.89
CR 209	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.26	956	0.0	$140.94	$601.60	$120.00	3.42
CR 211	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,100	Relamp	No	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.19	717	0.0	$105.70	$526.50	$90.00	4.13
Computer Lab (210)	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.26	956	0.0	$140.94	$601.60	$120.00	3.42
Tech Ofice (210A)	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,100	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.09	319	0.0	$46.98	$234.00	$40.00	4.13
Main Server Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,100	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.09	319	0.0	$46.98	$234.00	$40.00	4.13
CR 213	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	114	2,100	Relamp	No	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,100	0.33	1,217	0.0	$179.38	$856.20	$180.00	3.77
CR 212	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	114	2,100	Relamp	No	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,100	0.15	541	0.0	$79.72	$380.53	$80.00	3.77
Storage 215	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,000	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,000	0.04	193	0.0	$28.47	$95.13	$20.00	2.64
CR 217	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	114	2,100	Relamp	No	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,100	0.33	1,217	0.0	$179.38	$856.20	$180.00	3.77
CR 214 (Music)	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	114	2,100	Relamp	No	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,100	0.33	1,217	0.0	$179.38	$856.20	$180.00	3.77
CR 214 Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,100	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.04	159	0.0	$23.49	$117.00	$20.00	4.13
CR 222	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	114	2,100	Relamp	No	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,100	0.15	541	0.0	$79.72	$380.53	$80.00	3.77
Boys RR	1	Compact Fluorescent: Pin-Style: (42W) - 2L	Occupancy Sensor	84	2,100	Relamp	No	1	LED Screw-In Lamps: Pin-Style: (29W) - 2L	Occupancy Sensor	59	2,100	0.02	61	0.0	$8.97	$88.10	$0.00	9.82
Boys RR	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.06	239	0.0	$35.23	$150.40	$30.00	3.42
Janitor Closet 218	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.02	114	0.0	$16.78	$58.50	$10.00	2.89
Girls RR	1	Compact Fluorescent: Pin-Style: (42W) - 2L	Occupancy Sensor	84	2,100	Relamp	No	1	LED Screw-In Lamps: Pin-Style: (29W) - 2L	Occupancy Sensor	59	2,100	0.02	61	0.0	$8.97	$88.10	$0.00	9.82

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Girls RR	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.06	239	0.0	$35.23	$150.40	$30.00	3.42
Storage 219	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,000	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,100	0.10	506	0.0	$74.64	$460.27	$75.00	5.16
Office 221	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,000	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,000	0.04	193	0.0	$28.47	$95.13	$20.00	2.64
Office 221A RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.02	114	0.0	$16.78	$58.50	$10.00	2.89
Gym	30	Linear Fluorescent - T8: 4' T8 (32W) - 6L	Wall Switch	176	3,000	Relamp	Yes	30	LED - Linear Tubes: (6) 4' Lamps	Occupancy Sensor	87	2,100	2.26	11,913	0.0	$1,755.64	$4,906.70	$1,040.00	2.20
Gym	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
225A Gym Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,000	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,000	0.04	193	0.0	$28.47	$95.13	$20.00	2.64
Storage 120	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,000	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.08	432	0.0	$63.61	$420.40	$65.00	5.59
Electrical 122	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.02	114	0.0	$16.78	$58.50	$10.00	2.89
CR 121	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	114	2,100	Relamp	No	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,100	0.33	1,217	0.0	$179.38	$856.20	$180.00	3.77
CR 121 Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.02	114	0.0	$16.78	$58.50	$10.00	2.89
Storage 123	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,000	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,000	0.03	171	0.0	$25.17	$75.20	$15.00	2.39
CR 124	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.29	1,076	0.0	$158.56	$676.80	$135.00	3.42
CR 126	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.29	1,076	0.0	$158.56	$676.80	$135.00	3.42
CR 127	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	114	2,100	Relamp	No	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,100	0.33	1,217	0.0	$179.38	$856.20	$180.00	3.77
CR 125	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	114	2,100	Relamp	No	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,100	0.33	1,217	0.0	$179.38	$856.20	$180.00	3.77
Faculty Workroom 128	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.19	717	0.0	$105.70	$451.20	$90.00	3.42
Faculty Workroom 128	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,100	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.04	159	0.0	$23.49	$117.00	$20.00	4.13
128A IDF	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.04	228	0.0	$33.56	$117.00	$20.00	2.89
CR 301	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	114	2,100	Relamp	No	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,100	0.44	1,623	0.0	$239.17	$1,141.60	$240.00	3.77
CR 303	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.29	1,076	0.0	$158.56	$676.80	$135.00	3.42
CR 305	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.29	1,076	0.0	$158.56	$676.80	$135.00	3.42
CR 302	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.29	1,076	0.0	$158.56	$676.80	$135.00	3.42
Boys RR	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.10	359	0.0	$52.85	$225.60	$45.00	3.42
Boys RR	1	Compact Fluorescent: Pin-Style: (42W) - 2L	Occupancy Sensor	84	2,100	Relamp	No	1	LED Screw-In Lamps: Pin-Style: (29W) - 2L	Occupancy Sensor	59	2,100	0.02	61	0.0	$8.97	$88.10	$0.00	9.82

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Janitor Closet 306	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.04	228	0.0	$33.56	$117.00	$20.00	2.89
Girls RR (308)	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.13	478	0.0	$70.47	$300.80	$60.00	3.42
CR 307	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.29	1,076	0.0	$158.56	$676.80	$135.00	3.42
Storage 310	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,100	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.06	239	0.0	$35.23	$175.50	$30.00	4.13
CR 309	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.29	1,076	0.0	$158.56	$676.80	$135.00	3.42
CR 312	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.29	1,076	0.0	$158.56	$676.80	$135.00	3.42
CR 314	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.39	1,435	0.0	$211.41	$902.40	$180.00	3.42
CR 314	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,000	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.08	432	0.0	$63.61	$420.40	$65.00	5.59
CR 314	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR 314 RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.02	114	0.0	$16.78	$58.50	$10.00	2.89
CR 314 Storage Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.02	114	0.0	$16.78	$58.50	$10.00	2.89
CR 311	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	114	2,100	Relamp	No	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,100	0.44	1,623	0.0	$239.17	$1,141.60	$240.00	3.77
CR 311	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,000	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.08	432	0.0	$63.61	$420.40	$65.00	5.59
CR 311	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR 311 RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.02	114	0.0	$16.78	$58.50	$10.00	2.89
CR 311 Storage Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.02	114	0.0	$16.78	$58.50	$10.00	2.89
CR 316	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	114	2,100	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,100	0.04	135	0.0	$19.93	$95.13	$20.00	3.77
CR 316	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.36	1,315	0.0	$193.79	$827.20	$165.00	3.42
CR 316	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,000	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.08	432	0.0	$63.61	$420.40	$65.00	5.59
CR 316	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR 316 Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.02	114	0.0	$16.78	$58.50	$10.00	2.89
CR 316 RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.02	114	0.0	$16.78	$58.50	$10.00	2.89
313 M/W Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.02	114	0.0	$16.78	$58.50	$10.00	2.89
CR 315	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,100	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.19	717	0.0	$105.70	$451.20	$90.00	3.42
CR 315	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Mech Room 317	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.04	228	0.0	$33.56	$117.00	$20.00	2.89
Mech Room 317 (Back)	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.04	228	0.0	$33.56	$117.00	$20.00	2.89
Hallway: Receiving Area	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,380	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,366	0.08	486	0.0	$71.66	$375.50	$30.00	4.82
Hallway: Receiving Area	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway: 100 Corrdior (Main)	28	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,380	Relamp	Yes	28	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,366	0.77	4,538	0.0	$668.85	$2,438.00	$280.00	3.23
Hallway: 100 Corrdior (Main)	2	Compact Fluorescent: Pin-Style: (42W) - 2L	Wall Switch	84	3,380	Relamp	No	2	LED Screw-In Lamps: Pin-Style: (29W) - 2L	Wall Switch	59	3,380	0.03	196	0.0	$28.87	$176.20	$0.00	6.10
Hallway: 100 Corrdior (Main)	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway: Main Entry Foyer	2	Compact Fluorescent: Screw-In: (18W) - 1L	Wall Switch	18	3,380	Relamp	No	2	LED Screw-In Lamps: Screw-In: (13W) - 1L	Wall Switch	13	3,380	0.01	42	0.0	$6.19	$107.51	$0.00	17.38
Hallway: Main Entry Foyer	1	LED Screw-In Lamps: Screw-In: (9W) - 1L	Wall Switch	9	3,380	None	No	1	LED Screw-In Lamps: Screw-In: (9W) - 1L	Wall Switch	9	3,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway: Main Entry Foyer	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway: Main Entry Foyer	1	Compact Fluorescent: Pin-Style: (42W) - 2L	Wall Switch	84	3,380	Relamp	No	1	LED Screw-In Lamps: Pin-Style: (29W) - 2L	Wall Switch	59	3,380	0.02	98	0.0	$14.44	$88.10	$0.00	6.10
Hallway: Main Entry Foyer	8	Compact Fluorescent: Pin-Style: (56W) - 1L	Wall Switch	56	3,380	Relamp	Yes	8	LED Screw-In Lamps: Pin-Style: (39W) - 1L	High/Low Control	39	2,366	0.15	892	0.0	$131.52	$776.32	$0.00	5.90
Hallway: 300 Corridor	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway: 300 Corridor	22	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,380	Relamp	Yes	22	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,366	0.60	3,566	0.0	$525.52	$2,087.00	$220.00	3.55
Hallway: 200 Corridor	26	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,380	Relamp	Yes	26	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,366	0.71	4,214	0.0	$621.07	$2,321.00	$260.00	3.32
Hallway: 200 Corridor	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior Door Lights	12	Compact Fluorescent: Pin-Style: (42W) - 2L	None	84	8,760	Relamp	Yes	12	LED Screw-In Lamps: Pin-Style: (29W) - 2L	Daylight Dimming	59	4,380	0.43	6,600	0.0	$972.74	$4,057.22	$540.00	3.62
Exterior Door Lights	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	None	20	8,760	None	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	None	20	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Building Lighting	20	Metal Halide: (1) 150W Lamp	Daylight Dimming	190	1,500	Fixture Replacement	No	20	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	57	1,500	1.74	4,589	0.0	$676.22	$7,813.54	$2,000.00	8.60
Parking Lot	18	Metal Halide: (1) 175W Lamp	Daylight Dimming	215	1,500	Fixture Replacement	No	18	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	65	1,500	1.78	4,673	0.0	$688.68	$7,032.19	$1,800.00	7.60
Sign	2	Linear Fluorescent - T8: 8' T8 (59W) - 2L	Daylight Dimming	110	1,500	Relamp	No	2	LED - Linear Tubes: (2) 8' Lamps	Daylight Dimming	72	1,500	0.05	131	0.0	$19.32	$220.00	$0.00	11.39
Canopy Entry	4	Compact Fluorescent: Pin-Style: (42W) - 2L	None	84	8,760	Relamp	Yes	4	LED Screw-In Lamps: Pin-Style: (29W) - 2L	Daylight Dimming	59	4,380	0.14	2,200	0.0	$324.25	$602.41	$180.00	1.30

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?	Annual Operating Hours	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Building HW/CHW Distribution	1	Water-Source Heat Pump Circulation Pump	10.0	91.7%	No	5,490	No	91.7%	Yes	1	1.23	19,428	0.0	$2,863.20	$3,807.95	$0.00	1.33
Boiler Room	Building HW/CHW Distribution	1	Water-Source Heat Pump Circulation Pump	10.0	91.7%	No	5,490	No	91.7%	Yes	1	1.23	19,428	0.0	$2,863.20	$3,807.95	$0.00	1.33
Boiler Room	Building HW/CHW Distribution	1	Heating Hot Water Pump	3.0	87.5%	No	3,391	Yes	89.5%	No		0.03	145	0.0	$21.42	$804.84	$0.00	37.57
Boiler Room	Building HW/CHW Distribution	1	Heating Hot Water Pump	3.0	87.5%	No	3,391	Yes	89.5%	No		0.03	145	0.0	$21.42	$804.84	$0.00	37.57
Roof	Classroom HPs	30	Supply Fan	1.0	85.5%	No	5,490	Yes	85.5%	No		0.00	0	0.0	$0.00	$22,401.90	$0.00	0.00
Roof	Media Center HP	1	Supply Fan	3.0	89.5%	No	3,391	No	89.5%	Yes	1	0.41	1,526	0.0	$224.94	$3,007.65	$240.00	12.30
Roof	Gym RTU	1	Supply Fan	10.0	89.5%	No	3,391	Yes	91.7%	Yes	1	1.42	5,423	0.0	$799.25	$5,375.00	$800.00	5.72
Roof	Gym RTU	1	Exhaust Fan	1.5	84.0%	No	3,391	Yes	86.5%	Yes	1	0.23	878	0.0	$129.36	$3,380.15	$120.00	25.20
Boiler Room	Boiler Room HP	1	Supply Fan	0.5	75.0%	No	3,391	Yes	78.2%	No		0.01	52	0.0	$7.63	$505.13	$0.00	66.22
Boiler Room	Art Room HP	1	Supply Fan	1.0	84.0%	No	3,391	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Restrooms, Janitor Closet, Storage Room HP	1	Supply Fan	0.5	75.0%	No	3,391	Yes	78.2%	No		0.01	52	0.0	$7.63	$505.13	$0.00	66.22
Boiler Room	Cafeteria, Teacher's Lounge HP	1	Supply Fan	3.0	89.5%	No	3,391	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Kitchen Area HP	1	Supply Fan	1.0	84.0%	No	3,391	Yes	85.5%	No		0.01	40	0.0	$5.84	$746.73	$0.00	127.87
Cooling Tower	Cooling Tower	2	Cooling Tower Fan	1.0	84.0%	No	3,391	Yes	85.5%	No		0.02	79	0.0	$11.68	$1,493.46	$0.00	127.87
Cooling Tower	Chilled Water Loop	1	Condenser Water Pump	5.0	87.5%	Yes	3,391	Yes	89.5%	No		0.05	242	0.0	$35.70	$921.06	$0.00	25.80
Roof	Whole Building	4	Exhaust Fan	0.3	70.0%	No	2,745	Yes	73.4%	No		0.04	134	0.0	$19.77	$1,823.84	$0.00	92.25
Roof	Kitchen	1	Makeup Air Fan	1.0	84.0%	No	2,745	Yes	85.5%	No		0.01	32	0.0	$4.73	$746.73	$0.00	157.96

Electric 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 (kBtu/hr)	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 (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Boiler Room	1	Water Source HP	2.00	30.40	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Art Room	1	Water Source HP	5.00	73.20	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Restrooms, Janitor Closet, Storage Room	1	Water Source HP	3.00	39.90	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Cafeteria, Teacher's Lounge	1	Water Source HP	16.00	211.60	Yes	1	Water Source HP	16.00	211.60	14.00	4.50	No	17.61	14,024	0.0	$2,066.83	$19,769.88	$1,296.00	8.94
Boiler Room	Kitchen Area	1	Water Source HP	4.00	57.70	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Classrooms	30	Water Source HP	3.00	35.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Media Center	1	Water Source HP	10.00	149.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Gym	1	Water Source HP	15.00	170.60	Yes	1	Water Source HP	11.34	170.60	14.00	4.50	No	3.97	34,610	0.0	$5,100.64	$14,013.96	$918.68	2.57
Roof	Server Rooms	2	Ductless Mini-Split AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	CR 311, 312, 315, 316	4	Split-System AC	7.50		Yes	4	Split-System AC	7.50		11.50		No	4.96	4,369	0.0	$643.90	$34,913.10	$2,190.00	50.82
Roof	Server Room	1	Ductless Mini-Split AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Fuel Heating 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)	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Whole Building	1	Condensing Hot Water Boiler	2,000.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Whole Building	1	Condensing Hot Water Boiler	2,000.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

DHW Inventory & Recommendations

		Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Whole Building	3	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions		Proposed Conditions			Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen Area	1	Medium Temp Freezer (0F to 30F)	No	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen Area	1	Cooler (35F to 55F)	No	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	2	Refrigerator Chest	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	2	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Cooking Equipment Inventory & Recommendations

	Existing Conditions			Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	High Efficiency Equipement?	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	0	Gas Convection Oven (Half Size)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Insulated Food Holding Cabinet (Full Size)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	0	Gas Rack Oven (Double)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Electric Steamer	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Dishwasher Inventory & Recommendations

	Existing Conditions					Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Dishwasher Type	Water Heater Fuel Type	Booster Heater Fuel Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Payback w/ Incentives in Years
Kitchen	1	Door Type (Low Temp)	Natural Gas	Electric	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Whole Building	97	Desktop Computer	150.0	Yes
Whole Building	19	Desk Printer	40.0	Yes
Whole Building	26	Projectors	150.0	Yes
Whole Building	26	Smartboard	50.0	Yes
Whole Building	5	Mini Fridge	153.0	Yes
Whole Building	7	Laptop	45.0	Yes
Whole Building	120	Chromebooks	35.0	Yes
Whole Building	2	Refrigerators	172.0	Yes
Whole Building	3	Photocopier	600.0	Yes
Whole Building	3	Microwave	1,000.0	No
Whole Building	3	Paper Shredder	150.0	Yes
Whole Building	3	Toaster Oven	1,200.0	No
Whole Building	2	Dehumidifier	180.0	No
Kitchen	1	Refrigerated serving table	560.0	No

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Teacher's Lounge	1	Refrigerated	Yes	0.00	1,612	0.0	$237.54	$230.00	$0.00	0.97

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

J.P. Cleary Elementary School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 56,700
Built: 1958

For Year Ending: April 30, 2017
Date Generated: June 11, 2018

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
J.P. Cleary Elementary School 1501 Central Avenue Minotola, New Jersey 08341	Buena Regional School District 914 Main Avenue Richland, NJ 08350 (856) 697-0800	Joe Biluck, Jr. 914 Main Avenue Richland, NJ 08350 (856) 697-0800 jbiluck@buena.k12.nj.us

Property ID: 6358236

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
68.9 kBtu/ft²

Source EUI
166.3 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	1,360,882 (35%)
Electric - Grid (kBtu)	2,547,369 (65%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	65.1
National Median Source EUI (kBtu/ft²)	157
% Diff from National Median Source EUI	6%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	355

Signature & Stamp of Verifying Professional

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

Signature: _____ Date: _____

Licensed Professional

___ _____
,
(___)___-_____
_____

Professional Engineer Stamp
(if applicable)