Local Government Energy Audit:
Energy Audit Report

Joseph Shaner Elementary School

Hamilton Township School District
5801 Third Street
Mays Landing, NJ 08330

July 3, 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.

Table of Contents

Table of Figures

1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Joseph Shaner 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 Hamilton Township School District in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

1.1 Facility Summary

Joseph Shaner Elementary School is a 78,921 square foot facility. The one-story school building primarily includes classrooms, offices, gym, locker rooms, and mechanical spaces.

Lighting at Joseph Shaner Elementary School consists primarily of a mixture of T8 fluorescent sources, which are inefficient as compared to currently available alternatives. Cooling and ventilation are provided by a combination of split system air conditioning units and packaged units. The older units are less efficient and, close to or past retirement age of over 20 years. Heating is provided by the packaged units' natural gas-fired furnaces as well as unit ventilators located in the zones which receive heating hot water (HHW) from the boiler. The facility is equipped with rooftop mounted solar photovoltaic panels that can generate up to 50 kW. 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 nine measures. All nine were determined to be cost-effective ECMs. Together these nine measures represent an opportunity for Joseph Shaner Elementary School to reduce annual energy costs by $45,082 and annual greenhouse gas emissions by 280,527 lbs CO_2e. We estimate that if all measures are implemented as recommended, the project would pay for itself in 5.1 years. The breakdown of existing and potential utility costs and the estimated savings are shown in Figure 1 and Figure 2, respectively. Together these measures would reduce onsite energy usage by about 19%.

Figure 1 – Previous 12 Month Utility Costs

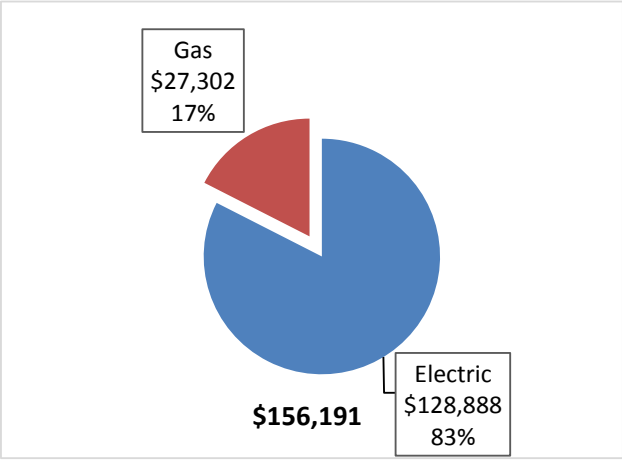
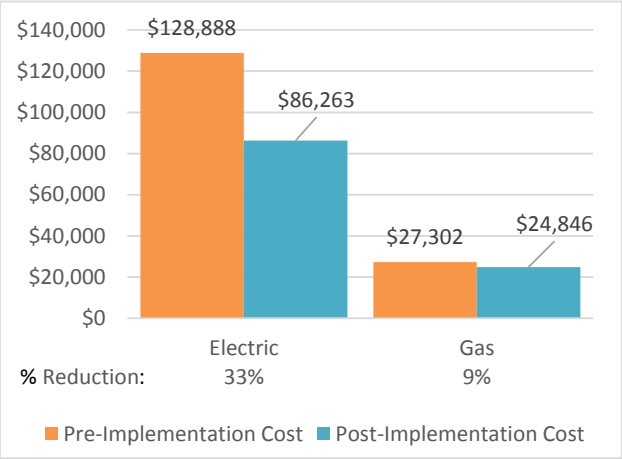


Figure 2 – Potential Post-Implementation Costs



A detailed description of Joseph Shaner Elementary School's existing energy use can be found in Section 3.

Estimates of the total cost, energy savings, and financial incentives for the evaluated 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		High Priority?	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			**168,446**	**24.6**	**0.0**	**$29,094.43**	**$72,556.28**	**$12,495.00**	**$60,061.28**	**2.1**	**169,624**
ECM 1	Install LED Fixtures	Yes	5,814	1.0	0.0	$1,004.28	$13,671.74	$1,500.00	$12,171.74	12.1	5,855
ECM 2	Retrofit Fixtures with LED Lamps	Yes	162,632	23.6	0.0	$28,090.15	$58,884.54	$10,995.00	$47,889.54	1.7	163,769
Lighting Control Measures			**40,549**	**5.9**	**0.0**	**$7,003.70**	**$23,160.00**	**$2,485.00**	**$20,675.00**	**3.0**	**40,832**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	34,142	5.0	0.0	$5,897.13	$18,360.00	$2,380.00	$15,980.00	2.7	34,381
ECM 4	Install High/Low Lighitng Controls	Yes	6,407	0.9	0.0	$1,106.57	$4,800.00	$105.00	$4,695.00	4.2	6,451
Motor Upgrades			**9,471**	**2.2**	**0.0**	**$1,635.79**	**$20,106.03**	**$0.00**	**$20,106.03**	**12.3**	**9,537**
ECM 5	Premium Efficiency Motors	Yes	9,471	2.2	0.0	$1,635.79	$20,106.03	$0.00	$20,106.03	12.3	9,537
Electric Unitary HVAC Measures			**26,709**	**15.8**	**0.0**	**$4,613.24**	**$108,023.38**	**$6,122.50**	**$101,900.88**	**22.1**	**26,896**
ECM 6	Install High Efficiency Electric AC	Yes	26,709	15.8	0.0	$4,613.24	$108,023.38	$6,122.50	$101,900.88	22.1	26,896
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**273.4**	**$2,456.52**	**$29,584.91**	**$2,600.00**	**$26,984.91**	**11.0**	**32,014**
ECM 7	Install High Efficiency Hot Water Boilers	Yes	0	0.0	71.8	$644.71	$9,193.31	$1,000.00	$8,193.31	12.7	8,402
ECM 8	Install High Efficiency Furnaces	Yes	0	0.0	201.7	$1,811.81	$20,391.60	$1,600.00	$18,791.60	10.4	23,612
Plug Load Equipment Control - Vending Machine			**1,612**	**0.0**	**0.0**	**$278.40**	**$460.00**	**$0.00**	**$460.00**	**1.7**	**1,623**
ECM 9	Vending Machine Control	Yes	1,612	0.0	0.0	$278.40	$460.00	$0.00	$460.00	1.7	1,623
TOTALS FOR HIGH PRIORITY MEASURES			**246,787**	**48.5**	**273.4**	**$45,082.08**	**$253,890.59**	**$23,702.50**	**$230,188.09**	**5.1**	**280,527**

* - 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 (IHP 2014). 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.

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.

Gas Heating (HVAC/Process) measures generally involve replacing older inefficient hydronic heating systems with modern energy efficient systems. Gas heating systems can provide equivalent heating compared to older systems at a reduced energy cost. These measures save energy by reducing the fuel demands for heating, due to improved combustion and heat transfer 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 ten 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 Joseph Shaner Elementary School include:

- Close Doors and Windows
- Use Window Treatments/Coverings
- Ensure Lighting Controls Are Operating Properly
- Perform Routine Motor Maintenance
- Use Fans to Reduce Cooling Load
- Use Thermostat Schedules and Temperature Resets
- Perform Boiler Maintenance
- Perform 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 Joseph Shaner Elementary School. Based on the configuration of the site and its loads there is a low potential for installing any PV and combined heat and power self-generation measures. 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
- Energy Savings Improvement Program (ESIP)
- Pay for Performance (P4P)

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.

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 8.3 for additional information on the ESIP Program.

The Demand Response Energy Aggregator is a (non-NJCEP) program designed to reduce electric loads at commercial facilities, when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak power demand. Demand Response (DR) 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 commercial facilities to reduce their 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 facilities receive payments whether or not they are called upon to curtail their load during times of peak demand. Refer to Section 7 for additional information on this 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 4 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Anne-Marie Fala	Business Administrator	falaa@hamiltonschools.org	609-476-6303
Designated Representative			
Bryan C. McGair	Account Executive	bryan.mcgair@schneider-electric.com	609-868-2750
TRC Energy Services			
Tom Page	Auditor	tpage@TRCsolutions.com	732-855-0033

2.2 General Site Information

On March 29, 2017, TRC performed an energy audit at Joseph Shaner Elementary School located in Mays Landing, New Jersey. TRC 's team met with Anne-Marie Fala, Business Administrator to review the facility operations and help focus our investigation on specific energy-using systems.

Joseph Shaner Elementary School is a 78,921 square foot facility constructed in 1957. The one-story school building primarily includes classrooms, offices, gym, locker rooms, and mechanical spaces.

Lighting consists primarily of a mixture of T8 fluorescent sources, which are inefficient as compared to currently available alternatives. Cooling and ventilation are provided by a combination of split system air conditioning units and packaged units. The older units are less efficient and, close to or past retirement age of over 20 years. Heating is provided by unit ventilators located in the zones which receive heating hot water (HHW) as well as from natural gas-fired furnaces in the packaged units. The facility is equipped with rooftop mounted solar photovoltaic panels that can generate up to 50 kW.

2.3 Building Occupancy

The school building is open Monday through Friday from approximately 6:00 AM through 10:00 PM during the school year, September through June. During a typical day, the facility is occupied by a total of 650 staff and students.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Joseph Shaner Elementary School	Weekday	6am - 10pm
Joseph Shaner Elementary School	Weekend	CLOSED

2.4 Building Envelope

The building is constructed of concrete block and structural steel with a brick façade. The perimeter of the building has pitched roofs covered with composite shingle tiles that are in good condition. The interior flat built-up roof is also 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 metal and are in good condition.

2.5 On-Site Generation

Joseph Shaner Elementary School has installed a 50 kW solar energy project. The project included photovoltaic (PV) arrays on the roof. The systems provide 8.5% of the electricity required by the facility. TRC noted that there is space available to increase the current system, but the site is not interested in expanding capacity at this time.

2.6 Energy-Using Systems

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

Lighting System

Interior lighting at the facility is provided mostly by T8 linear fluorescent lamps with electronic ballasts and compact fluorescent screw-in lamps. The linear fluorescent fixtures are located in all areas of the building. The site has upgraded some fixtures to more efficient LED technology including the building exit signs. The majority of the interior lighting controls use manually operated switches.

The building's exterior lighting consists primarily of pole and building mounted metal halide (MH) and high-pressure sodium (HPS) with manual controls.

Hot Water Heating System

The heating hot water system consists of one non-condensing hydronic boiler. The boiler is an H.B. Smith unit with a 383 MBh capacity operating at approximately 80% efficiency. The boiler provides hot water heating throughout the building via four pumps, two 1.5 hp and two 2 hp.

The boiler primarily operates during school operating hours and is controlled by facility staff. No setbacks or lockouts are in place. The boiler is in good condition and well maintained.

Direct Expansion Air Conditioning System (DX)

Space cooling is provided to all conditioned spaces using 16 packaged units and three split unit systems. These systems range in capacity from 0.75 tons to 17.5 tons with SEER efficiency ratings from 10 to 16. All of the units are controlled by independent programmable thermostats.

Domestic Hot Water Heating System

The domestic hot water heating system for the facility consists of one General Electric gas-fired, 40 gallon storage tank water heater and one State brand gas-fired, 75 gallon storage tank water heater; both are performing at an efficiency of approximately 83%. The gas water heaters serve the kitchen and restrooms.

Refrigeration

The facility has three commercial grade units that include two stand-up refrigerators and one freezer.

Building Plug Load

There are 50 computer work stations throughout the facility, the majority with LCD monitors. Classroom areas are equipped with smart boards and projectors. The facility plug load includes several copiers, printers, other office equipment, and a washer and dryer. A small breakroom includes a coffee machine, refrigerator, microwave, and toaster. The faculty room has a refrigerated beverage vending machine.

2.7 Water-Using Systems

There are 20 restrooms at this facility. A sampling of restrooms found that all fixtures meet current water-conservation guidelines for low-flow devices. The faucets are all rated below 2.2 gallons per minute (gpm). The toilets are all rated at less than 2.5 gallons per flush (gpf) and the urinals are rated at less than 2 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 0 for additional information.

3.1 Total Cost of Energy

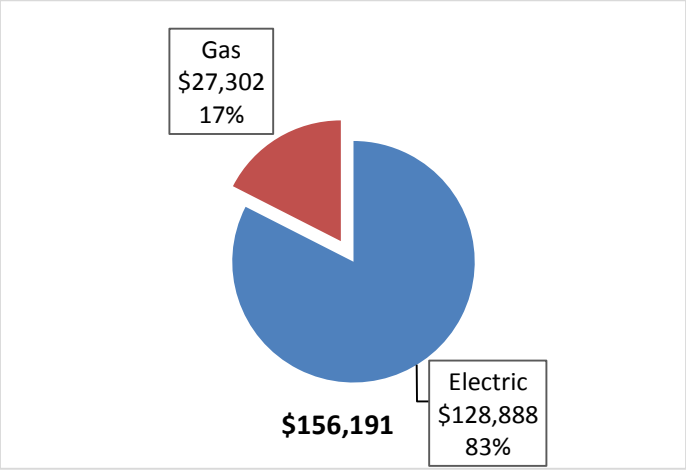
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 6 - Utility Summary

Utility Summary for Joseph Shaner Elementary School		
Fuel	**Usage**	**Cost**
Electricity	791,378 kWh	$128,888
Natural Gas	30,389 Therms	$27,302
Total		**$156,191**

The current annual energy cost for this facility is $156,191 as shown in the chart below.

Figure 7 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by Atlantic City Electric. The average electric cost over the past 12 months was $0.173/kWh, which is the blended rate that includes energy supply, distribution, and other charges including onsite solar generation. This rate is used throughout the analyses in this report to assess energy costs and savings. The monthly demand charges were included with the total electric cost. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 8 - Electric Usage & Demand

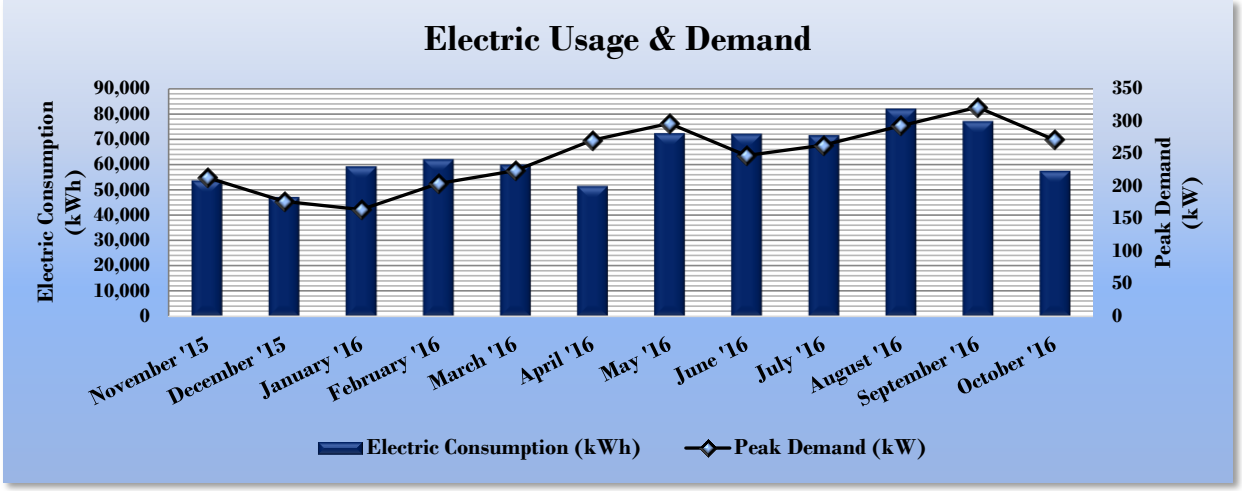


Figure 9 - Electric Usage & Demand

Electric Billing Data for Joseph Shaner Elementary School				
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Total Electric Cost
12/10/15	30	53,434	214	$9,331
1/9/16	29	46,948	177	$8,517
2/8/16	29	58,968	164	$9,905
3/9/16	29	61,870	204	$10,164
4/11/16	32	59,621	224	$10,187
5/6/16	24	51,345	271	$8,364
6/8/16	32	72,019	297	$11,884
7/11/16	32	71,843	247	$11,194
8/8/16	27	71,248	263	$10,639
9/8/16	30	81,723	293	$12,501
10/7/16	28	76,868	322	$12,074
11/7/16	30	57,304	271	$9,538
Totals	**352**	**763,191**	**321.6**	**$124,298**
Annual	**365**	**791,378**	**321.6**	**$128,888**

3.3 Natural Gas Usage

Natural gas is provided by South Jersey Gas. The average gas cost for the past 12 months is $0.898/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below.

Figure 10 - Natural Gas Usage

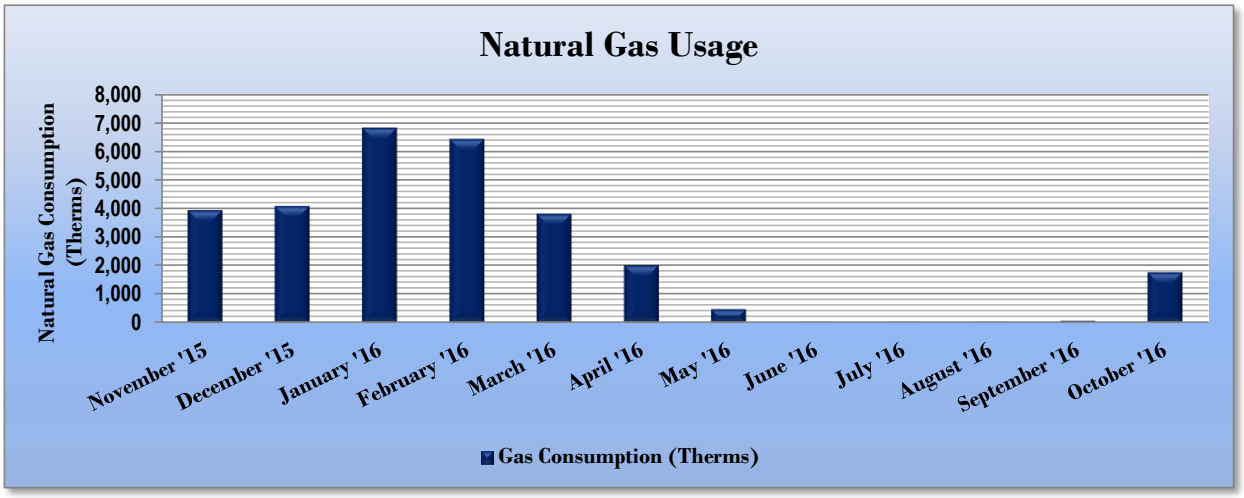


Figure 11 - Natural Gas Usage

Gas Billing Data for Joseph Shaner Elementary School			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
12/10/15	30	3,925	$3,486
1/9/16	29	4,066	$3,731
2/8/16	29	6,812	$6,217
3/9/16	29	6,412	$5,604
4/11/16	32	3,795	$3,170
5/6/16	24	2,001	$1,677
6/8/16	32	456	$410
7/11/16	32	10	$41
8/8/16	27	10	$37
9/8/16	30	10	$39
10/7/16	28	52	$78
11/7/16	30	1,754	$1,838
Totals	**352**	**29,306**	**$26,330**
Annual	**365**	**30,389**	**$27,302**

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 12 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Joseph Shaner Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	147.9	141.4
Site Energy Use Intensity (kBtu/ft^2)	72.7	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 13 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Joseph Shaner Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	110.7	141.4
Site Energy Use Intensity (kBtu/ft^2)	58.6	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 percent of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. Your building is one of the building categories that are eligible to receive a score. This facility has a current score of 76.

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

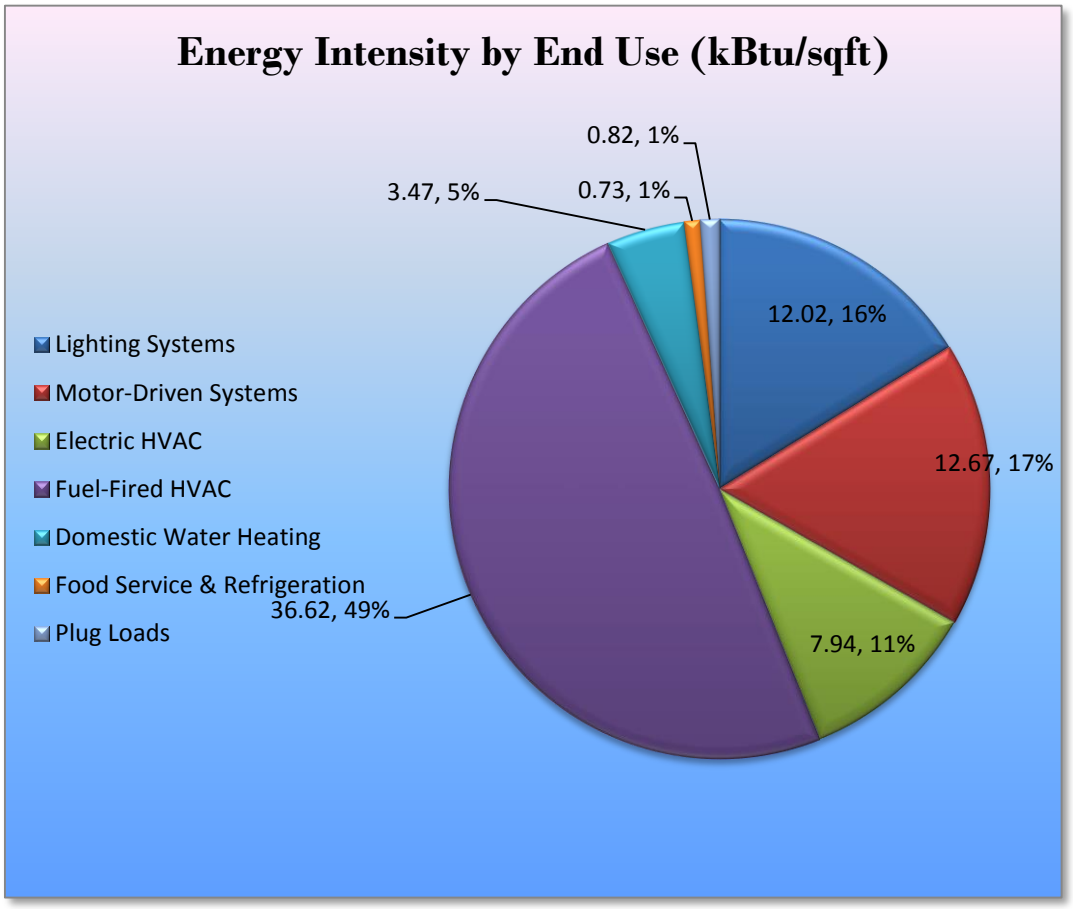
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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 14 - Energy Balance (kBtu/SF)



4 ENERGY CONSERVATION MEASURES

Level of Analysis

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information to the Joseph Shaner 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 7.

The following sections describe the evaluated measures.

4.1 High Priority ECMs

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

Figure 15 – Summary of High Priority 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		**168,446**	**24.6**	**0.0**	**$29,094.43**	**$72,556.28**	**$12,495.00**	**$60,061.28**	**2.1**	**169,624**
ECM 1	Install LED Fixtures	5,814	1.0	0.0	$1,004.28	$13,671.74	$1,500.00	$12,171.74	12.1	5,855
ECM 2	Retrofit Fixtures with LED Lamps	162,632	23.6	0.0	$28,090.15	$58,884.54	$10,995.00	$47,889.54	1.7	163,769
Lighting Control Measures		**40,549**	**5.9**	**0.0**	**$7,003.70**	**$23,160.00**	**$2,485.00**	**$20,675.00**	**3.0**	**40,832**
ECM 3	Install Occupancy Sensor Lighting Controls	34,142	5.0	0.0	$5,897.13	$18,360.00	$2,380.00	$15,980.00	2.7	34,381
ECM 4	Install High/Low Lighitng Controls	6,407	0.9	0.0	$1,106.57	$4,800.00	$105.00	$4,695.00	4.2	6,451
Motor Upgrades		**9,471**	**2.2**	**0.0**	**$1,635.79**	**$20,106.03**	**$0.00**	**$20,106.03**	**12.3**	**9,537**
ECM 5	Premium Efficiency Motors	9,471	2.2	0.0	$1,635.79	$20,106.03	$0.00	$20,106.03	12.3	9,537
Electric Unitary HVAC Measures		**26,709**	**15.8**	**0.0**	**$4,613.24**	**$108,023.38**	**$6,122.50**	**$101,900.88**	**22.1**	**26,896**
ECM 6	Install High Efficiency Electric AC	26,709	15.8	0.0	$4,613.24	$108,023.38	$6,122.50	$101,900.88	22.1	26,896
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**273.4**	**$2,456.52**	**$29,584.91**	**$2,600.00**	**$26,984.91**	**11.0**	**32,014**
ECM 7	Install High Efficiency Hot Water Boilers	0	0.0	71.8	$644.71	$9,193.31	$1,000.00	$8,193.31	12.7	8,402
ECM 8	Install High Efficiency Furnaces	0	0.0	201.7	$1,811.81	$20,391.60	$1,600.00	$18,791.60	10.4	23,612
Plug Load Equipment Control - Vending Machine		**1,612**	**0.0**	**0.0**	**$278.40**	**$460.00**	**$0.00**	**$460.00**	**1.7**	**1,623**
ECM 9	Vending Machine Control	1,612	0.0	0.0	$278.40	$460.00	$0.00	$460.00	1.7	1,623
TOTALS		**246,787**	**48.5**	**273.4**	**$45,082.08**	**$253,890.59**	**$23,702.50**	**$230,188.09**	**5.1**	**280,527**

* - 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

Recommended upgrades to existing lighting fixtures are summarized in Figure 16 below.

Figure 16 – 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		**168,446**	**24.6**	**0.0**	**$29,094.43**	**$72,556.28**	**$12,495.00**	**$60,061.28**	**2.1**	**169,624**
ECM 1	Install LED Fixtures	5,814	1.0	0.0	$1,004.28	$13,671.74	$1,500.00	$12,171.74	12.1	5,855
ECM 2	Retrofit Fixtures with LED Lamps	162,632	23.6	0.0	$28,090.15	$58,884.54	$10,995.00	$47,889.54	1.7	163,769

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	5,814	1.0	0.0	$1,004.28	$13,671.74	$1,500.00	$12,171.74	12.1	5,855

Measure Description

We recommend replacing existing fixtures containing fluorescent, HID, or incandescent 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 a 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	160,553	23.2	0.0	$27,731.03	$57,441.38	$10,985.00	$46,456.38	1.7	161,675
Exterior	2,079	0.4	0.0	$359.12	$1,443.16	$10.00	$1,433.16	4.0	2,094

Measure Description

We recommend retrofitting existing incandescent, halogen, HID or other 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 a fluorescent tubes and more than ten times longer than many incandescent lamps.

4.1.2 Lighting Control Measures

Figure 17 – 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		**40,549**	**5.9**	**0.0**	**$7,003.70**	**$23,160.00**	**$2,485.00**	**$20,675.00**	**3.0**	**40,832**
ECM 3	Install Occupancy Sensor Lighting Controls	34,142	5.0	0.0	$5,897.13	$18,360.00	$2,380.00	$15,980.00	2.7	34,381
ECM 4	Install High/Low Lighitng Controls	6,407	0.9	0.0	$1,106.57	$4,800.00	$105.00	$4,695.00	4.2	6,451

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)
34,142	5.0	0.0	$5,897.13	$18,360.00	$2,380.00	$15,980.00	2.7	34,381

Measure Description

We recommend installing occupancy sensors to control lighting fixtures that are currently controlled by manual switches in all restrooms, storage rooms, classrooms, offices areas, etc. 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.

Depending on space use type and wattage controlled, some sensor installations may not qualify for incentive.

ECM 4: 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)
6,407	0.9	0.0	$1,106.57	$4,800.00	$105.00	$4,695.00	4.2	6,451

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 Motor Upgrades

Figure 18– Summary of Motor Upgrades 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)
Motor Upgrades		**9,471**	**2.2**	**0.0**	**$1,635.79**	**$20,106.03**	**$0.00**	**$20,106.03**	**12.3**	**9,537**
ECM 5	Premium Efficiency Motors	9,471	2.2	0.0	$1,635.79	$20,106.03	$0.00	$20,106.03	12.3	9,537

ECM 5: 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)
9,471	2.2	0.0	$1,635.79	$20,106.03	$0.00	$20,106.03	12.3	9,537

Measure Description

We recommend replacing standard efficiency motors with IHP 2014 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 (2012). Savings are based on the difference between baseline and proposed efficiencies and the assumed annual operating hours.

4.1.4 Electric Unitary HVAC Measures

Our recommendations for unitary HVAC measures are summarized in Figure 19 below.

Figure 19- 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		**26,709**	**15.8**	**0.0**	**$4,613.24**	**$108,023.38**	**$6,122.50**	**$101,900.88**	**22.1**	**26,896**
ECM 6	Install High Efficiency Electric AC	26,709	15.8	0.0	$4,613.24	$108,023.38	$6,122.50	$101,900.88	22.1	26,896

ECM 6: 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)
26,709	15.8	0.0	$4,613.24	$108,023.38	$6,122.50	$101,900.88	22.1	26,896

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.

4.1.5 Gas-Fired Heating System Replacements

Our recommendations for gas-fired heating system replacements are summarized in Figure 20 below.

Figure 20 - Summary of Gas-Fired Heating Replacement 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)
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**273.4**	**$2,456.52**	**$29,584.91**	**$2,600.00**	**$26,984.91**	**11.0**	**32,014**
ECM 7	Install High Efficiency Hot Water Boilers	0	0.0	71.8	$644.71	$9,193.31	$1,000.00	$8,193.31	12.7	8,402
ECM 8	Install High Efficiency Furnaces	0	0.0	201.7	$1,811.81	$20,391.60	$1,600.00	$18,791.60	10.4	23,612

ECM 7: Install High Efficiency Hot Water Boilers

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)
0	0.0	71.8	$644.71	$9,193.31	$1,000.00	$8,193.31	12.7	8,402

Measure Description

We recommend replacing older inefficient hot water boilers with high efficiency hot water boilers. Significant improvements have been made in combustion technology resulting in increased overall boiler efficiency. Energy savings results from improved combustion efficiency and reduced standby losses at low loads.

The most notable efficiency improvement is condensing hydronic boilers that can achieve over 90% efficiency under the proper conditions. Condensing hydronic boilers typically operate at efficiencies between 85% and 87% (comparable to other high efficiency boilers) when the return water temperature is above 130°F. The boiler efficiency increases as the return water temperature drops below 130°F. Therefore, condensing hydronic boilers were only evaluated when the return water temperature is less than 130°F during most of the operating hours. As a result condensing hydronic boilers are not recommended for this site.

ECM 8: Install High Efficiency Furnaces

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)
0	0.0	201.7	$1,811.81	$20,391.60	$1,600.00	$18,791.60	10.4	23,612

Measure Description

We recommend replacing existing standard efficiency furnaces with condensing furnaces. Improved combustion technology and heat exchanger design optimize heat recovery from the combustion gases which can significantly improve furnace efficiency. Savings result from improved system efficiency.

4.1.6 Plug Load Equipment Control - Vending Machines

Figure 21 – Summary of Plug Load Equipment Control – Vending Machines 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**	**$278.40**	**$460.00**	**$0.00**	**$460.00**	**1.7**	**1,623**
ECM 9	Vending Machine Control	1,612	0.0	0.0	$278.40	$460.00	$0.00	$460.00	1.7	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	$278.40	$460.00	$0.00	$460.00	1.7	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.

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.

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.

Ensure Lighting Controls Are Operating Properly

Lighting controls are very cost effective energy efficient devices, when installed and operating correctly. As part of a lighting maintenance schedule, lighting controls should be tested annually to ensure proper functioning. For occupancy sensors, this requires triggering the sensor and verifying that the sensor's timer settings are correct. For daylight sensors, maintenance involves cleaning of sensor lenses and confirming setpoints and sensitivity are appropriately configured.

Perform Routine Motor Maintenance

Motors consist of many moving parts whose collective degradation can contribute to a significant loss of motor efficiency. In order to prevent damage to motor components, routine maintenance should be performed. This maintenance consists of cleaning surfaces and ventilation openings on motors to prevent overheating, lubricating moving parts to reduce friction, inspecting belts and pulleys for wear and to ensure they are at proper alignment and tension, and cleaning and lubricating bearings. Consult a licensed technician to assess these and other motor maintenance strategies.

Use Fans to Reduce Cooling Load

Utilizing ceiling fans to supplement cooling is a low cost strategy to reduce cooling load considerably. Thermostat settings can be increased by 4°F with no change in overall occupant comfort when the wind chill effect of moving air is employed for cooling.

Use Thermostat Schedules and Temperature Resets

Ensure thermostats are correctly set back. By employing proper set back temperatures and schedules, facility heating and cooling costs can be reduced dramatically during periods of low or no occupancy. As such, thermostats should be programmed for a setback of 5°F-10°F during low occupancy hours (reduce heating setpoints and increase cooling setpoints). Cooling load can be reduced further by increasing the facility's occupied setpoint temperature. In general, during the cooling season, thermostats should be set as high as possible without sacrificing occupant comfort.

Perform Boiler Maintenance

Many boiler problems develop slowly over time, so regular inspection and maintenance is essential to retain proper functionality and efficiency of the heating system. Fuel burning equipment should undergo yearly tune-ups to ensure they are operating as safely and efficiently as possible from a combustion standpoint. A tune-up should include a combustion analysis to analyze the exhaust from the boilers and to ensure the boiler is operating safely. Buildup of dirt, dust, or deposits on the internal surfaces of a boiler can greatly affect its heat transfer efficiency. These deposits can accumulate on the water side or fire side of the boiler. Boilers should be cleaned regularly according to the manufacturer's instructions to remove this build up in order to sustain efficiency and equipment life.

Perform 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.

The facility already has a PV array on a portion of the roof with some free space remaining. TRC noted that there is space available to increase the current system, but the site is reportedly not interested in expanding capacity at this time.

Solar projects must register their projects in the SREC Registration Program 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.

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.

Low or infrequent thermal load, and lack of space near the existing boilers are the most significant factors contributing to the 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/.

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 22 for a list of the eligible programs identified for each recommended ECM.

Figure 22 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings
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 High/Low Lighitng Controls	X			X
ECM 5	Premium Efficiency Motors				X
ECM 6	Install High Efficiency Electric AC	X			X
ECM 7	Install High Efficiency Hot Water Boilers	X			X
ECM 8	Install High Efficiency Furnaces	X			X
ECM 9	Vending Machine Control				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. This facility does not meet all of the criteria for participating in the P4P program based on the measures identified in this study. However, since additional measures may be identified during the P4P evaluation and the facility is close to meeting the P4P program criteria it is worth considering the P4P program for this site. 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 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

8.4 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.

8.5 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
Conf Rm	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.12	863	0.0	$149.09	$495.60	$80.00	2.79
4th Grade CS Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.06	455	0.0	$78.66	$175.50	$30.00	1.85
5th Grade CS Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.06	455	0.0	$78.66	$175.50	$30.00	1.85
Main Office	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.25	1,726	0.0	$298.18	$721.20	$125.00	2.00
Main Office	6	Compact Fluorescent: 2x 18W CFL (recessed cans)	Wall Switch	36	4,000	Relamp	Yes	6	LED Screw-In Lamps: LED screw-in 6W	Occupancy Sensor	6	2,800	0.13	878	0.0	$151.59	$797.44	$35.00	5.03
Inner Office	6	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	4,000	Relamp	Yes	6	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	2,800	0.14	970	0.0	$167.56	$640.20	$125.00	3.07
Teacher Dining Area	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,800	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,960	0.21	1,007	0.0	$173.94	$646.00	$110.00	3.08
Front Entrance Alcove	2	Compact Fluorescent: 2x 18W CFL (recessed cans)	Wall Switch	36	4,000	Relamp	No	2	LED Screw-In Lamps: LED screw-in 6W	Wall Switch	6	4,000	0.04	276	0.0	$47.67	$175.81	$0.00	3.69
Front Foyer	5	Compact Fluorescent: 2x 18W CFL (recessed cans)	Wall Switch	36	4,000	Relamp	No	5	LED Screw-In Lamps: LED screw-in 6W	Wall Switch	6	4,000	0.10	690	0.0	$119.18	$439.53	$0.00	3.69
Front Foyer	1	Compact Fluorescent: 4 x 17W CFLs	Wall Switch	68	4,000	Relamp	No	1	LED Screw-In Lamps: LED screw-in 6W	Wall Switch	6	4,000	0.04	285	0.0	$49.26	$175.81	$0.00	3.57
Corridor (Entrance to Door 3)	17	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	17	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,800	0.70	4,891	0.0	$844.86	$1,678.40	$255.00	1.68
Corridor (Entrance to Door 3)	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
Corridor (Door 3 to Door 4)	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,800	0.25	1,726	0.0	$298.18	$851.20	$90.00	2.55
Corridor (Door 3 to Door 4)	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
Corridor (Door 4 to Door 5)	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	Yes	11	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,800	0.30	2,110	0.0	$364.45	$1,043.50	$110.00	2.56
Corridor (Door 4 to Door 5)	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,000	0.02	133	0.0	$23.04	$63.20	$0.00	2.74
Corridor (Door 4 to Door 5)	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
Corridor (Door 5 to Door 6)	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,800	0.49	3,453	0.0	$596.37	$1,453.00	$180.00	2.13
Corridor (Door 5 to Door 6)	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
Door 6 Alcove	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	4,000	Relamp	No	4	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,000	0.04	294	0.0	$50.85	$192.80	$40.00	3.00
Nurse's Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.16	1,151	0.0	$198.79	$570.80	$95.00	2.39
Nurse's Inner Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.08	575	0.0	$99.39	$420.40	$65.00	3.58
Nurse's Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	4,000	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,000	0.01	81	0.0	$13.90	$35.90	$5.00	2.22
Nurse's Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,800	0.08	575	0.0	$99.39	$350.40	$30.00	3.22
Ramp near gym	13	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,000	None	Yes	13	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,800	0.04	305	0.0	$52.68	$540.00	$70.00	8.92

	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
Corridor around gym	30	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,000	None	Yes	30	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	2,800	0.10	704	0.0	$121.56	$800.00	$0.00	6.58
Corridor around gym	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Corridor (door 14)	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,800	0.41	2,877	0.0	$496.97	$952.00	$150.00	1.61
Corridor (door 14)	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
Custodial Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.02	152	0.0	$26.22	$58.50	$10.00	1.85
Men's Rm	3	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	4,000	Relamp	No	3	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	26	4,000	0.05	380	0.0	$65.55	$185.10	$45.00	2.14
Women's Rm	3	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	4,000	Relamp	No	3	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	26	4,000	0.05	380	0.0	$65.55	$185.10	$45.00	2.14
Pre-K Class Rm 1	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.16	1,151	0.0	$198.79	$570.80	$95.00	2.39
Pre-K Class Rm 2	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.16	1,151	0.0	$198.79	$570.80	$95.00	2.39
Time Out Rm	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,000	0.03	228	0.0	$39.33	$75.20	$15.00	1.53
Class Rm K-18	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.57	4,028	0.0	$695.76	$1,322.80	$245.00	1.55
Class Rm K-19	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.41	2,877	0.0	$496.97	$1,022.00	$185.00	1.68
Class Rm K-19	2	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	4,000	Relamp	No	2	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	26	4,000	0.04	253	0.0	$43.70	$123.40	$30.00	2.14
Class Rm K-20	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.41	2,877	0.0	$496.97	$1,022.00	$185.00	1.68
Class Rm K-20	2	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	4,000	Relamp	No	2	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	26	4,000	0.04	253	0.0	$43.70	$123.40	$30.00	2.14
Cafeteria Coat Area	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,000	None	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,000	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cafeteria Coat 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
Kitchen Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,000	0.03	228	0.0	$39.33	$75.20	$15.00	1.53
Corridor (Cafeteria to Corridor 9)	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,800	0.16	1,151	0.0	$198.79	$751.00	$60.00	3.48
Custodial Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.02	152	0.0	$26.22	$58.50	$10.00	1.85
Door 9 Alcove	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.02	152	0.0	$26.22	$58.50	$10.00	1.85
K Rm 101	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.49	3,453	0.0	$596.37	$1,172.40	$215.00	1.61
K Rm 101 Cloak Rm	1	Incandescent: 60W Bulb	Wall Switch	60	4,000	Relamp	No	1	LED Screw-In Lamps: LED screw-in 6W	Wall Switch	6	4,000	0.04	248	0.0	$42.90	$43.95	$5.00	0.91
K Rm 101 Restroom	1	Compact Fluorescent: 17W CFL	Occupancy Sensor	17	2,800	Relamp	No	1	LED Screw-In Lamps: LED screw-in 6W	Occupancy Sensor	6	2,800	0.01	35	0.0	$6.12	$43.95	$0.00	7.18
K Rm 101 Closet	1	Compact Fluorescent: 17W CFL	Wall Switch	17	4,000	Relamp	No	1	LED Screw-In Lamps: LED screw-in 6W	Wall Switch	6	4,000	0.01	51	0.0	$8.74	$43.95	$0.00	5.03

	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
K Rm 102	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.49	3,453	0.0	$596.37	$1,172.40	$215.00	1.61
K Rm 102 Cloak Rm	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.02	152	0.0	$26.22	$58.50	$10.00	1.85
K Rm 102 Restroom	1	Compact Fluorescent: 17W CFL	Occupancy Sensor	17	2,800	Relamp	No	1	LED Screw-In Lamps: LED screw-in 6W	Occupancy Sensor	6	2,800	0.01	35	0.0	$6.12	$43.95	$0.00	7.18
K Rm 102 Closet	1	Compact Fluorescent: 17W CFL	Wall Switch	17	4,000	Relamp	No	1	LED Screw-In Lamps: LED screw-in 6W	Wall Switch	6	4,000	0.01	51	0.0	$8.74	$43.95	$0.00	5.03
K Rm 103	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.45	3,165	0.0	$546.67	$1,097.20	$200.00	1.64
K Rm 103 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.02	152	0.0	$26.22	$58.50	$10.00	1.85
Comp Lab Rm 104	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.49	3,453	0.0	$596.37	$1,172.40	$215.00	1.61
Rm 104 Restroom	1	Compact Fluorescent: 17W CFL	Wall Switch	17	4,000	Relamp	No	1	LED Screw-In Lamps: LED screw-in 6W	Wall Switch	6	4,000	0.01	51	0.0	$8.74	$43.95	$0.00	5.03
Rm 104 Closet	1	Compact Fluorescent: 17W CFL	Wall Switch	17	4,000	Relamp	No	1	LED Screw-In Lamps: LED screw-in 6W	Wall Switch	6	4,000	0.01	51	0.0	$8.74	$43.95	$0.00	5.03
Boys Rm	6	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	4,000	Relamp	Yes	6	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,800	0.08	582	0.0	$100.59	$559.20	$95.00	4.61
Girls Rm	6	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	4,000	Relamp	Yes	6	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,800	0.08	582	0.0	$100.59	$559.20	$95.00	4.61
Electrical Rm	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,000	0.03	228	0.0	$39.33	$75.20	$15.00	1.53
Classroom 105	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.49	3,453	0.0	$596.37	$1,172.40	$215.00	1.61
Classroom 106	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.49	3,453	0.0	$596.37	$1,172.40	$215.00	1.61
Classroom 107	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.49	3,453	0.0	$596.37	$1,172.40	$215.00	1.61
Classroom 108	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.49	3,453	0.0	$596.37	$1,172.40	$215.00	1.61
Classroom 109	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.49	3,453	0.0	$596.37	$1,172.40	$215.00	1.61
Classroom 110	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.49	3,453	0.0	$596.37	$1,172.40	$215.00	1.61
Classroom 111	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.49	3,453	0.0	$596.37	$1,172.40	$215.00	1.61
Classroom 118	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.49	3,453	0.0	$596.37	$1,172.40	$215.00	1.61
Classroom 121	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.49	3,453	0.0	$596.37	$1,172.40	$215.00	1.61
Classroom 122	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.49	3,453	0.0	$596.37	$1,172.40	$215.00	1.61
Classroom 123	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,800	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,960	0.49	2,417	0.0	$417.46	$1,172.40	$215.00	2.29
Classroom 124	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.49	3,453	0.0	$596.37	$1,172.40	$215.00	1.61
Classroom 125	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.49	3,453	0.0	$596.37	$1,172.40	$215.00	1.61

	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
Classroom 126	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.49	3,453	0.0	$596.37	$1,172.40	$215.00	1.61
Classroom 127	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.49	3,453	0.0	$596.37	$1,172.40	$215.00	1.61
Classroom 114	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.16	1,151	0.0	$198.79	$570.80	$95.00	2.39
Classroom 115	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.16	1,151	0.0	$198.79	$570.80	$95.00	2.39
Classroom 116	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,800	0.16	1,151	0.0	$198.79	$621.00	$95.00	2.65
Classroom 117	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,800	0.16	1,151	0.0	$198.79	$621.00	$95.00	2.65
Copy Rm	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,800	0.16	1,151	0.0	$198.79	$621.00	$95.00	2.65
CST Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.02	152	0.0	$26.22	$58.50	$10.00	1.85
Fire Sprinkler Rm	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.02	152	0.0	$26.22	$58.50	$10.00	1.85
Electrical Rm	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.02	152	0.0	$26.22	$58.50	$10.00	1.85
Boys Rm	7	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	4,000	Relamp	Yes	7	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,800	0.10	679	0.0	$117.35	$607.40	$105.00	4.28
Girls Rm	7	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	4,000	Relamp	Yes	7	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,800	0.10	679	0.0	$117.35	$607.40	$105.00	4.28
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.02	152	0.0	$26.22	$58.50	$10.00	1.85
Class Rm K-8	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.16	1,151	0.0	$198.79	$570.80	$95.00	2.39
Class Rm K-9	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.16	1,151	0.0	$198.79	$570.80	$95.00	2.39
Storage Rm	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.02	152	0.0	$26.22	$58.50	$10.00	1.85
Class Rm K-5	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.53	3,740	0.0	$646.07	$1,247.60	$230.00	1.58
Class Rm K-5	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.04	304	0.0	$52.44	$117.00	$20.00	1.85
K-5 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.02	152	0.0	$26.22	$58.50	$10.00	1.85
Class Rm K-6	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.53	3,740	0.0	$646.07	$1,247.60	$230.00	1.58
Class Rm K-6	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.04	304	0.0	$52.44	$117.00	$20.00	1.85
Class Rm K-7	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.53	3,740	0.0	$646.07	$1,247.60	$230.00	1.58
Class Rm K-7	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.04	304	0.0	$52.44	$117.00	$20.00	1.85
K-7 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.02	152	0.0	$26.22	$58.50	$10.00	1.85
Class Rm K-10	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.53	3,740	0.0	$646.07	$1,247.60	$230.00	1.58

	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
Class Rm K-10	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.04	304	0.0	$52.44	$117.00	$20.00	1.85
K-10 Prep Rm	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.02	152	0.0	$26.22	$58.50	$10.00	1.85
Class Rm K-11	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.53	3,740	0.0	$646.07	$1,247.60	$230.00	1.58
Class Rm K-11	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.04	304	0.0	$52.44	$117.00	$20.00	1.85
Class Rm K-12	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.53	3,740	0.0	$646.07	$1,247.60	$230.00	1.58
Class Rm K-12	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.04	304	0.0	$52.44	$117.00	$20.00	1.85
K-12 Prep Rm	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.02	152	0.0	$26.22	$58.50	$10.00	1.85
Class Rm K-13	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.53	3,740	0.0	$646.07	$1,247.60	$230.00	1.58
Class Rm K-13	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.04	304	0.0	$52.44	$117.00	$20.00	1.85
DHW/ Roof Access Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,800	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,800	0.02	106	0.0	$18.35	$58.50	$10.00	2.64
Boiler Rm	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,800	0.08	575	0.0	$99.39	$575.50	$135.00	4.43
Boiler Rm	1	Compact Fluorescent: 23W CFL	Wall Switch	23	4,000	Relamp	No	1	LED Screw-In Lamps: LED screw-in 6W	Wall Switch	6	4,000	0.01	78	0.0	$13.51	$43.95	$0.00	3.25
Basement Storage Area	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,000	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	2,800	0.19	1,351	0.0	$233.27	$580.53	$80.00	2.15
Basement Storage 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
Basement Office 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,000	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,800	0.10	675	0.0	$116.64	$460.27	$75.00	3.30
Basement Office 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,000	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,800	0.10	675	0.0	$116.64	$460.27	$75.00	3.30
Basement Corridor	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,800	0.19	1,343	0.0	$231.92	$609.50	$70.00	2.33
Basement Corridor	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
Basement Storage Area 2	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,800	0.22	1,535	0.0	$265.05	$668.00	$80.00	2.22
Large Storage Area	17	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	Yes	17	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,800	0.46	3,261	0.0	$563.24	$1,194.50	$170.00	1.82
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.02	152	0.0	$26.22	$58.50	$10.00	1.85
File Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,800	0.11	767	0.0	$132.53	$434.00	$40.00	2.97
Break Rm	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,800	0.22	1,535	0.0	$265.05	$738.00	$115.00	2.35
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.02	152	0.0	$26.22	$58.50	$10.00	1.85
Basement Stairs & Loading Dock	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,800	0.22	1,535	0.0	$265.05	$668.00	$80.00	2.22

	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
Basement Stairs & Loading Dock	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
Multi-Purpose Rm	20	Linear Fluorescent - T5: 4' T5 (28W) - 4L	Wall Switch	120	4,000	Relamp	Yes	20	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,800	1.04	7,305	0.0	$1,261.70	$2,172.67	$435.00	1.38
Cafeteria	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,000	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,800	0.38	2,701	0.0	$466.54	$1,031.07	$195.00	1.79
Cafeteria Corridor	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,000	None	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,000	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.25	1,726	0.0	$298.18	$721.20	$125.00	2.00
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,000	0.02	152	0.0	$26.22	$58.50	$10.00	1.85
Pre-School Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,000	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,800	0.19	1,351	0.0	$233.27	$650.53	$115.00	2.30
Inner Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,000	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,800	0.19	1,351	0.0	$233.27	$650.53	$115.00	2.30
Library	21	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	21	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.86	6,042	0.0	$1,043.65	$1,849.20	$350.00	1.44
Library Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.12	863	0.0	$149.09	$495.60	$80.00	2.79
CST Office 1	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,800	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,960	0.25	1,208	0.0	$208.73	$721.20	$125.00	2.86
CST Office 2	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,800	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,960	0.25	1,208	0.0	$208.73	$721.20	$125.00	2.86
CST Office 3	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,800	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,960	0.25	1,208	0.0	$208.73	$721.20	$125.00	2.86
Book Rm	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.25	1,726	0.0	$298.18	$721.20	$125.00	2.00
Boys Rm	3	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	4,000	Relamp	No	3	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	26	4,000	0.05	380	0.0	$65.55	$185.10	$45.00	2.14
Boys Rm	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	4,000	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,000	0.01	81	0.0	$13.90	$35.90	$5.00	2.22
Girls Rm	3	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	4,000	Relamp	No	3	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	26	4,000	0.05	380	0.0	$65.55	$185.10	$45.00	2.14
Girls Rm	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	4,000	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,000	0.01	81	0.0	$13.90	$35.90	$5.00	2.22
Class Rm K-1	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.53	3,740	0.0	$646.07	$1,247.60	$230.00	1.58
Class Rm K-1	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	4,000	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,000	0.02	147	0.0	$25.42	$96.40	$20.00	3.00
Prep Rm K-1	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,000	0.03	228	0.0	$39.33	$75.20	$15.00	1.53
Class Rm K-2	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.53	3,740	0.0	$646.07	$1,247.60	$230.00	1.58
Class Rm K-2	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	4,000	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,000	0.02	147	0.0	$25.42	$96.40	$20.00	3.00
Class Rm K-3	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,800	0.53	3,740	0.0	$646.07	$1,247.60	$230.00	1.58
Class Rm K-3	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	4,000	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,000	0.02	147	0.0	$25.42	$96.40	$20.00	3.00

	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
Prep Rm K-3	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,000	0.03	228	0.0	$39.33	$75.20	$15.00	1.53
Front Sofit	6	Compact Fluorescent: 2x 18W CFL (recessed cans)	Wall Switch	36	3,200	Relamp	No	6	LED Screw-In Lamps: LED screw-in 6W	Wall Switch	6	3,200	0.12	662	0.0	$114.41	$527.44	$0.00	4.61
Door 2 Exterior	2	Compact Fluorescent: 2x 18W CFL (recessed cans)	Wall Switch	36	3,200	Relamp	No	2	LED Screw-In Lamps: LED screw-in 6W	Wall Switch	6	3,200	0.04	221	0.0	$38.14	$175.81	$0.00	4.61
Exterior Perimeter	25	LED - Fixtures: (1) 20W lamp	Wall Switch	20	3,200	None	No	25	LED - Fixtures: (1) 20W lamp	Wall Switch	20	3,200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior Perimeter	1	LED - Fixtures: (1) 25W lamp	Wall Switch	25	3,200	None	No	1	LED - Fixtures: (1) 25W lamp	Wall Switch	25	3,200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior Perimeter	6	High-Pressure Sodium: (1) 70W Lamp	Wall Switch	70	3,200	Fixture Replacement	No	6	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	20	3,200	0.20	1,104	0.0	$190.69	$2,344.06	$600.00	9.15
Exterior Perimeter	2	High-Pressure Sodium: (1) 100W Lamp	Wall Switch	100	3,200	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	20	3,200	0.10	589	0.0	$101.70	$781.35	$200.00	5.72
Door 3 Exterior	2	Compact Fluorescent: 2x 18W CFL (recessed cans)	Wall Switch	36	3,200	Relamp	No	2	LED Screw-In Lamps: LED screw-in 6W	Wall Switch	6	3,200	0.04	221	0.0	$38.14	$175.81	$0.00	4.61
Pre-K Entrance Sofit	8	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,200	Relamp	No	8	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,200	0.15	854	0.0	$147.46	$505.60	$0.00	3.43
Door 9 Exterior	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,200	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,200	0.02	121	0.0	$20.98	$58.50	$10.00	2.31
Loading Dock Exterior	2	High-Pressure Sodium: (1) 70W Lamp	Wall Switch	70	3,200	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	20	3,200	0.07	368	0.0	$63.56	$781.35	$200.00	9.15
Parking Lot	5	Metal Halide: (1) 250W Lamp	Wall Switch	250	3,200	Fixture Replacement	No	5	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Wall Switch	46	3,200	0.67	3,754	0.0	$648.33	$9,764.97	$500.00	14.29

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
Roof	Exhaust	5	Exhaust Fan	0.5	82.5%	No	3,360	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Exhaust	14	Exhaust Fan	0.3	82.5%	No	3,360	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Exhaust	2	Exhaust Fan	1.0	82.5%	No	3,360	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Lower roof	Exhaust	3	Exhaust Fan	0.5	82.5%	No	3,360	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Lower roof	Exhaust	9	Exhaust Fan	0.3	82.5%	No	3,200	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Lower roof	Exhaust	2	Exhaust Fan	2.0	82.5%	No	3,200	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler room	Boiler	1	Boiler Feed Water Pump	3.0	86.5%	No	3,200	Yes	89.5%	No		0.05	208	0.0	$35.95	$876.36	$0.00	24.38
Boiler room	Space heating	1	Heating Hot Water Pump	1.5	80.0%	No	3,200	Yes	86.5%	No		0.06	252	0.0	$43.57	$747.69	$0.00	17.16
Boiler room	Space heating	1	Heating Hot Water Pump	1.5	84.0%	No	3,200	Yes	86.5%	No		0.02	92	0.0	$15.96	$747.69	$0.00	46.85
Boiler room	Space heating	4	Heating Hot Water Pump	2.0	84.0%	No	3,200	Yes	86.5%	No		0.11	493	0.0	$85.12	$3,576.96	$0.00	42.02
Roof	Packaged units	3	Supply Fan	5.0	84.0%	No	3,200	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Packaged units	4	Supply Fan	7.5	86.5%	No	3,200	Yes	91.0%	No		0.71	3,071	0.0	$530.36	$4,525.76	$0.00	8.53
Roof	Packaged units	4	Supply Fan	10.0	87.5%	No	3,200	Yes	91.7%	No		0.87	3,749	0.0	$647.49	$5,374.20	$0.00	8.30
Roof	Packaged units	3	Other	2.0	82.5%	No	3,200	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Packaged units	4	Other	2.0	82.5%	No	3,200	Yes	86.5%	No		0.19	803	0.0	$138.67	$2,128.68	$0.00	15.35
Roof	Packaged units	4	Other	2.0	82.5%	No	3,200	Yes	86.5%	No		0.19	803	0.0	$138.67	$2,128.68	$0.00	15.35

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
Rooftop	1964 wing offices	6	Split-System AC	0.75		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	Child Study Team office	1	Packaged AC	1.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	Nurses office	1	Split-System AC	1.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	Offices	1	Packaged AC	3.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	Offices	2	Packaged AC	2.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	Gym	2	Packaged AC	7.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	Gym	1	Packaged AC	17.50		Yes	1	Packaged AC	17.50		15.00		No	4.69	7,917	0.0	$1,367.44	$24,392.38	$1,382.50	16.83
Lower roof	Offices	1	Packaged AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Lower roof	Offices	2	Packaged AC	7.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Lower roof	Offices	2	Packaged AC	2.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Lower roof	Offices	2	Split-System AC	0.75		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Lower roof	Offices	1	Packaged AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Lower roof	Offices	2	Packaged AC	12.50		Yes	2	Packaged AC	12.50		13.00		No	4.64	7,830	0.0	$1,352.42	$34,846.25	$1,975.00	24.31
Lower roof	Offices	2	Packaged AC	17.50		Yes	2	Packaged AC	17.50		13.00		No	6.49	10,962	0.0	$1,893.38	$48,784.75	$2,765.00	24.31

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	Space heating	1	Non-Condensing Hot Water Boiler	383.00	Yes	1	Condensing Hot Water Boiler	383.00	91.00%	Et	0.00	0	71.8	$644.71	$9,193.31	$1,000.00	12.71
Roof	Space heating	2	Furnace	37.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Space heating	2	Furnace	166.00	Yes	2	Furnace	166.00	95.00%	AFUE	0.00	0	75.1	$674.30	$7,522.23	$800.00	9.97
Roof	Space heating	2	Furnace	72.90	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Space heating	2	Furnace	284.00	Yes	2	Furnace	284.00	95.00%	AFUE	0.00	0	126.6	$1,137.51	$12,869.37	$800.00	10.61

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	Domestic hot water	1	Storage Tank Water Heater (≤ 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler room	Domestic hot water	1	Storage Tank Water Heater (> 50 Gal)	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	1	Stand-Up Freezer, Glass Door (>50 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Stand-Up Refrigerator, Solid Door (>50 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	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?
Laundry room	1	Washer	900.0	Yes
Laundry room	1	Dryer	1,600.0	Yes
Whole building	50	Computer	110.0	Yes
Whole building	4	Printer/copier	515.0	Yes
Whole building	10	CRT (24')	120.0	Yes
Whole building	8	LCD (50')	150.0	Yes
Whole building	3	Microwave	1,000.0	Yes
Kitchen	1	Electric range	3,000.0	Yes

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
Breakroom	1	Refrigerated	Yes	0.00	1,612	0.0	$278.40	$230.00	$0.00	0.83
Breakroom	1	Non-Refrigerated	No	0.00	0	0.0	$0.00	$230.00	$0.00	0.00

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

76

ENERGY STAR® Score[1]

Joseph Shaner Elementary School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 78,921
Built: 1957

For Year Ending: October 31, 2016
Date Generated: August 17, 2017

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
Joseph Shaner Elementary School 5801 Third Street Mays Landing, New Jersey 08330	Hamilton Township School District 1876 Dr. Dennis Foreman Drive Mays Landing, NJ 08330 609-476-6303	Anne-Marie Fala 1876 Dr. Dennis Foreman Drive Mays Landing, NJ 08330 609-476-6303 falaa@hamiltonschools.org

Property ID: 5999282

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
71.6 kBtu/ft²

Source EUI
138.1 kBtu/ft²

Annual Energy by Fuel		National Median Comparison	
Electric - Solar (kBtu)	320,297 (6%)	National Median Site EUI (kBtu/ft²)	93.4
Electric - Grid (kBtu)	2,386,804 (42%)	National Median Source EUI (kBtu/ft²)	180.4
Natural Gas (kBtu)	2,940,785 (52%)	% Diff from National Median Source EUI	-23%
		Annual Emissions	
		Greenhouse Gas Emissions (Metric Tons CO2e/year)	421

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)