Local Government Energy Audit:
Energy Audit Report

Riverside Elementary School

58 Riverside Drive

Princeton, New Jersey 08540

Princeton Public Schools

January 24, 2019

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 savings are included in this report to help make decisions about reducing energy use at the facility. This report, however, is not intended to serve as a detailed engineering design document. Further design and analysis may be necessary in order to implement some of the measures recommended in this report.

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

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

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

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1 EXECUTIVE SUMMARY

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

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

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

1.1 Facility Summary

Riverside Elementary School is a 60,094 square foot facility comprised of various space types within one building. The School building is one floor and includes classrooms, offices, cafeteria, gym, kitchen and a sub-basement mechanical space.

Lighting at Riverside Elementary School consists of aging T8 fixtures and inefficient T12 fixtures, some roof top HVAC equipment in need of replacement with new high efficiency equipment and controls as well. Heating is supplied by heat pumps. A thorough description of the facility and our observations are in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated seven measures which together represent an opportunity for Riverside Elementary School to reduce annual energy costs by roughly $20,358 and annual greenhouse gas emissions by 139,032 lbs. CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 2.9 years. The breakdown of existing and potential utility costs after project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce Riverside Elementary School's annual energy use by 11%.

Figure 1 – Previous 12 Month Utility Costs

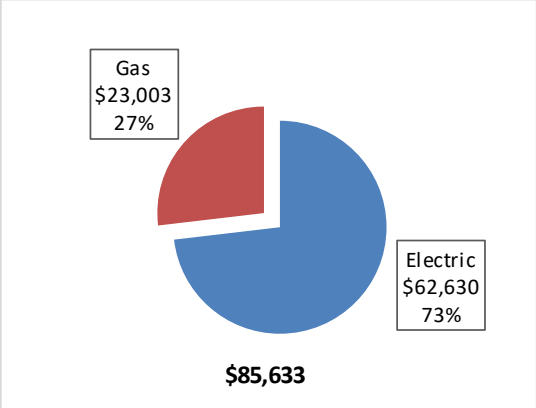
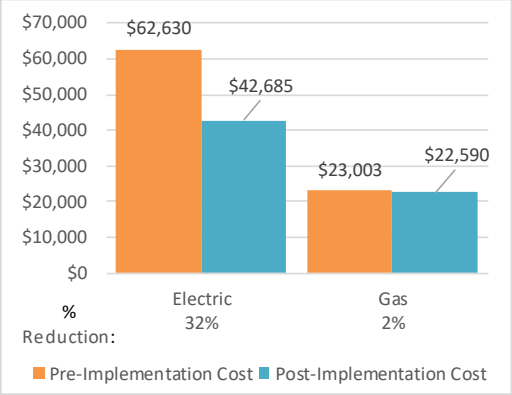


Figure 2 – Potential Post-Implementation Costs



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

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

Figure 3 – Summary of Energy Reduction Opportunities

	Energy Conservation Measure	Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**91,394**	**18.4**	**0.0**	**$13,891.23**	**$38,056.30**	**$9,945.00**	**$28,111.30**	**2.0**	**92,033**
	Install LED Fixtures	No	415	0.2	0.0	$63.03	$1,549.76	$300.00	$1,249.76	19.8	418
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	613	0.1	0.0	$93.24	$437.15	$65.00	$372.15	4.0	618
ECM 2	Retrofit Fixtures with LED Lamps	Yes	90,365	18.1	0.0	$13,734.96	$36,069.38	$9,580.00	$26,489.38	1.9	90,997
Lighting Control Measures			**21,738**	**4.3**	**0.0**	**$3,304.01**	**$23,302.00**	**$2,875.00**	**$20,427.00**	**6.2**	**21,890**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	18,873	3.8	0.0	$2,868.57	$22,102.00	$2,875.00	$19,227.00	6.7	19,005
ECM 4	Install High/Low Lighitng Controls	Yes	2,865	0.6	0.0	$435.44	$1,200.00	$0.00	$1,200.00	2.8	2,885
Motor Upgrades			**759**	**0.2**	**0.0**	**$115.36**	**$804.84**	**$0.00**	**$804.84**	**7.0**	**764**
ECM 5	Premium Efficiency Motors	Yes	759	0.2	0.0	$115.36	$804.84	$0.00	$804.84	7.0	764
Variable Frequency Drive (VFD) Measures			**17,749**	**3.6**	**0.0**	**$2,697.67**	**$10,388.90**	**$0.00**	**$10,388.90**	**3.9**	**17,873**
ECM 6	Install VFDs on Hot Water Pumps	Yes	17,749	3.6	0.0	$2,697.67	$10,388.90	$0.00	$10,388.90	3.9	17,873
Electric Unitary HVAC Measures			**10,595**	**6.6**	**0.0**	**$1,610.43**	**$63,052.48**	**$2,846.00**	**$60,206.48**	**37.4**	**10,669**
	Install High Efficiency Electric AC	No	8,591	5.1	0.0	$1,305.76	$49,438.72	$2,294.00	$47,144.72	36.1	8,651
	Install High Efficiency Heat Pumps	No	2,004	1.5	0.0	$304.67	$13,613.76	$552.00	$13,061.76	42.9	2,019
HVAC System Improvements			**10,403**	**2.3**	**0.0**	**$1,581.18**	**$5,250.00**	**$2,500.00**	**$2,750.00**	**1.7**	**10,476**
	Install Dual Enthalpy Outside Economizer Control	No	10,403	2.3	0.0	$1,581.18	$5,250.00	$2,500.00	$2,750.00	1.7	10,476
Domestic Water Heating Upgrade			**0**	**0.0**	**58.8**	**$412.67**	**$265.29**	**$0.00**	**$265.29**	**0.6**	**6,890**
ECM 7	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	58.8	$412.67	$265.29	$0.00	$265.29	0.6	6,890
TOTALS FOR HIGH PRIORITY MEASURES			**131,224**	**26.4**	**58.8**	**$20,357.92**	**$71,267.56**	**$12,520.00**	**$58,747.56**	**2.9**	**139,032**
TOTALS FOR ALL EVALUATED MEASURES			**152,637**	**35.4**	**58.8**	**$23,612.56**	**$141,119.80**	**$18,166.00**	**$122,953.80**	**5.2**	**160,594**

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

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

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

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

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

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

Electric Unitary HVAC measures generally involve replacing older inefficient air conditioning systems with modern energy efficient systems. New air conditioning systems can provide equivalent cooling to older

air condition systems at a reduced energy cost. These measures save energy by reducing the power used by the air conditioning systems, due to improved electrical efficiency.

HVAC System Improvements generally involve the installation of automated controls to reduce heating and cooling demand during periods of reduced demand. These measures could encompass changing temperature setpoints, using outside air for free cooling, or limiting excessive outside air during extreme outdoor air temperature conditions. These measures save energy by reducing the demand on HVAC systems and the amount of time systems operate.

Domestic Hot Water upgrade measures generally involve replacing older inefficient domestic water heating systems with modern energy efficient systems. New domestic hot water heating systems can provide equivalent, or greater, water heating capacity compared to older systems at a reduced energy cost. These measures save energy by reducing the fuel used for domestic hot water heating due to improved heating efficiency or reducing standby losses.

Energy Efficient Practices

TRC also identified seven 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 Riverside Elementary School include:

- Close Doors and Windows
- Perform Proper Lighting Maintenance
- Turn Off Unneeded Motors
- Perform Routine Motor Maintenance
- Clean and/or Replace HVAC Filters
- 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 Riverside Elementary School. Based on the configuration of the site and its loads there is a high potential for installing a photovoltaic (PV) array.

Figure 4 – Photovoltaic Potential

Potential	High	
System Potential	107	kW DC STC
Electric Generation	127,477	kWh/yr
Displaced Cost	$11,090	/yr
Installed Cost	$278,200	

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
- Direct Install
- SREC (Solar Renewable Energy Certificate) Registration Program (SRP)
- Energy Savings Improvement Program (ESIP)

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

This facility may also qualify for the Direct Install program which can provide turnkey installation of multiple measures, through an authorized network of participating contractors. This program can provide substantially higher incentives than SmartStart, up to 70% of the cost of selected measures, although measure eligibility will have to be assessed and be verified by the designated Direct Install contractor and, in most cases, they will perform the installation work.

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the Energy Savings Improvement Program (ESIP). Supported directly by the NJBPU, ESIP provides government agencies with project development, design, and implementation support services, as well as, attractive financing for implementing ECMs. An LGEA report (or other approved energy audit) is required for participation in ESIP. Please refer to Section 8.4 for additional information on the ESIP Program.

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 5 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Gary Weisman	Director of Plant Operations	GaryWeisman@princetonk12.org	(609) 203-4534
Peter Vazquez	Operations Manager	PeterVazquez@princetonk12.org	(609) 751-3916
Stephanie Kennedy	Business Administrator	stephaniekennedy@princetonk12.org	(609) 806-4204
TRC Energy Services			
Yagna Otia	Auditor	Yotia@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On July 26, 2018, TRC performed an energy audit at Riverside Elementary School located in Princeton, New Jersey. TRC's team met with Gary Weisman, Director of Plant Operations to review the facility operations and help focus our investigation on specific energy-using systems.

Riverside Elementary School is a 60,094 square foot facility comprised of various space types within one building. The school building is one floor and includes classrooms, offices, cafeteria, gym, kitchen and a sub-basement mechanical space.

The building was constructed in 1959. Over the last several years the facility has replaced all its existing T12 fluorescent fixtures with T8 fluorescent fixtures.

2.3 Building Occupancy

The school building is open Monday through Friday. The typical schedule is presented in the table below. The entire facility is used year-round by the community and camps are run throughout the summer. During a typical day, the facility is occupied by approximately 50 staff and 200 students.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Riverside Elementary School	Weekday	7 AM - 6 PM
Riverside Elementary School	Weekend	unoccupied

2.4 Building Envelope

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

Image 1 Building roof and exterior

2.5 On-Site Generation

Riverside Elementary School does not have any on-site electric generation capacity.

2.6 Energy-Using Systems

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

Lighting System

Lighting at the facility is provided mostly by 32-Watt linear fluorescent T8 lamps with electronic ballasts as well as some compact fluorescent lamps (CFL). Most of the fixtures are 2-lamp or 3-lamp, 4-foot long troffers with diffusers. The facility's maintenance technician, indicated that the building had a comprehensive T8 retrofit several years ago.

A small area of the building is primarily lit with 15-Watt or 18-Watt CFL lamps in recessed can ceiling fixtures.

Image 2 U-bend and T5 lamps

Lighting control in most spaces is provided by wall switches while in some spaces occupancy sensors are present. The occupancy sensors are either wall or ceiling mounted depending on the space layout. Stairwells, elevator lobbies and main lobby areas do not contain any occupancy sensors and are on 24 hours per day throughout the year.

Image 3 Gymnasium Lighting

The building's exterior lighting consists primarily of efficient wall-mounted LED fixtures and CFL case fixtures that are controlled by photocells, though the lights were seen on during a sunny day.

Hot Water Heating System

The hot water system consists of two smith cast iron 1,875 kBtu/hr output, hot water boilers (BR1 & 2). The boilers have a nominal combustion efficiency of 78%. Each boiler has a 1 hp combustion air fan. The boilers are configured in a constant flow primary distribution with two 15 hp hot water pumps (HHWP1 & 2). Hot water is supplied at 180°F when the outside air temperature is below 50°F and the setpoint is reset to 155°F when the outside air is above 65°F.

Image 4 Boiler system and hot water pumps

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

The 12 year old boilers are in fair condition and well maintained.

Direct Expansion Air Conditioning System (DX)

Four 1.5-ton (RTU-5,6,7,8) Trane direct-expansion (DX) package units with electric heating and two 4-ton Trane, one 10-ton Trane direct-expansion (DX) package units are used to condition the school building. The unit is located on the roof. The four 1.5-ton Trane units provides variable air volume with a single 0.3 hp supply fan and no return fan. The unit has an outside air economizer to utilize free cooling when the outside air temperature is lower than the return air temperature. In addition, there are 35 window ACs with capacity of 1.5-ton to provide cooling in classrooms. The school also has two Daikin heating and ventilating (HV-1,2) units with 1.5 hp supply fan and 1 hp return fan.

All units are controlled by programmable thermostats located in zones. The thermostat is set to maintain a heating setpoint of 72 °F and a cooling setpoint of 68 °F from 7:00 AM to 6:00 PM every day. At night the heating setpoint is 60 °F and the cooling setpoint is 78 °F.

Image 5 Roof top units

Domestic Hot Water Heating System

The domestic hot water heating system for the facility consists of a single 85-gallon A.O. Smith gas fired hot water heater with an input rating of 365 kBtu/hr each and a nominal efficiency of 80%. One 500-Watt recirculation pump distribute 120°F water to the entire site. The recirculation pump operates continuously.

Image 6 DHW Heater

Food Service & Laundry Equipment

The school has an electric kitchen that is used to prepare approximately 200 lunches per day for the students. Most of the cooking is done using the two convection ovens. There are two insulated food holding cabinets with half size storage and a full-size storage unit.

Image 7 Kitchen Equipment

Refrigeration

The kitchen has two stand-up freezers, one stand-up refrigerator and two chest type freezer that are used to store food prepared for school lunches.

Image 8 Stand-up Refrigerator

Building Plug Load

There are roughly 56 computer work stations throughout the facility. Roughly 60% of the computers are desktop units with LCD monitors and the other 40% are notebooks with a moving charging cart. There is no centralized PC power management software installed.

We noted two server closets in the facility. The facility has only one refrigerated beverage vending machine.

2.7 Water-Using Systems

There are five restrooms at this facility. A sampling of restrooms found that all of the faucets are rated for 2.2 gallons per minute (gpm) or higher, the toilets are rated at 2.5 gallons per flush (gpf) and the urinals are rated at 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 3.4 for additional information.

3.1 Total Cost of Energy

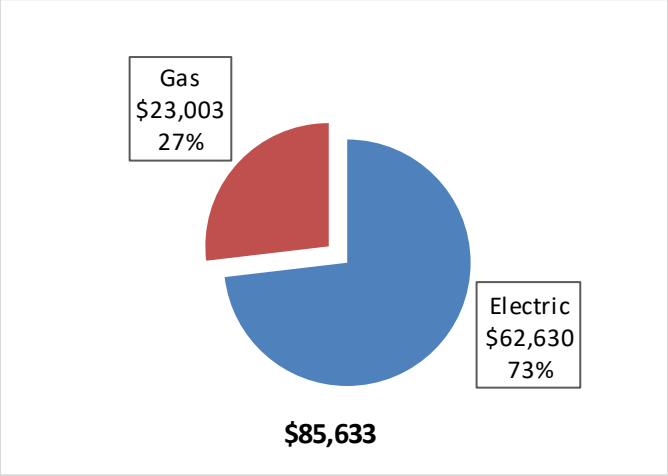
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 7 - Utility Summary

Utility Summary for Riverside Elementary School		
Fuel	**Usage**	**Cost**
Electricity	412,058 kWh	$62,630
Natural Gas	32,800 Therms	$23,003
Total		**$85,633**

The current annual energy cost for this facility is $85,633 as shown in the chart below.

Figure 8 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by PSE&G. The average electric cost over the past 12 months was $0.152/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 9 - Electric Usage & Demand

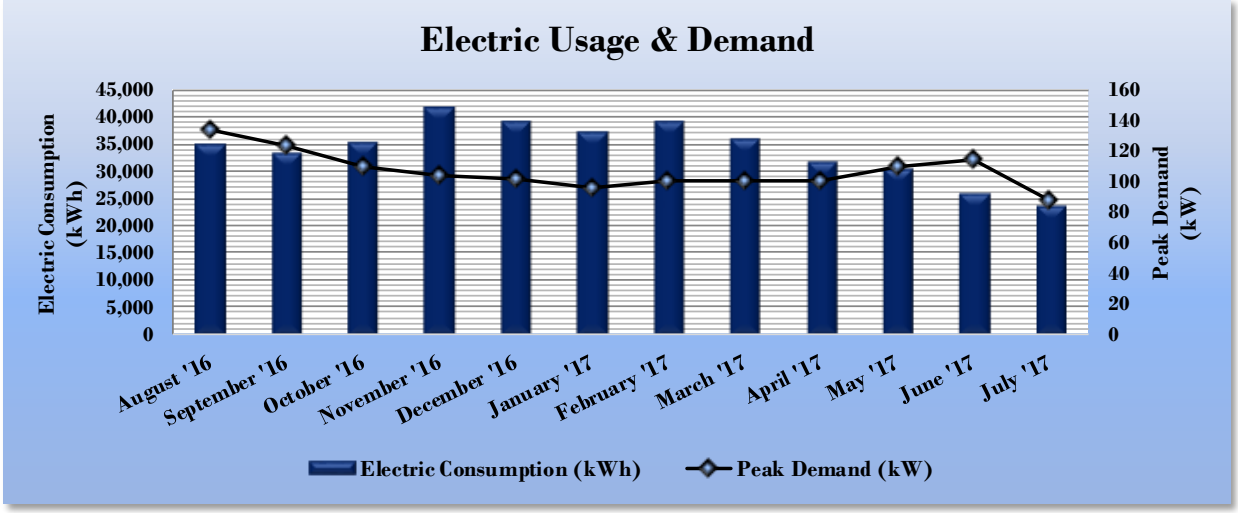


Figure 10 - Electric Usage & Demand

Electric Billing Data for Riverside Elementary School					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
9/12/16	30	35,000	134	$593	$5,311
10/10/16	28	33,400	124	$554	$5,068
11/8/16	29	35,400	110	$491	$5,372
12/9/16	31	41,800	104	$465	$6,343
1/11/17	33	39,400	102	$456	$5,979
2/9/17	29	37,400	96	$428	$5,675
3/13/17	32	39,200	100	$448	$5,948
4/11/17	29	36,000	100	$451	$5,463
5/12/17	31	31,800	100	$451.22	$4,825
6/13/17	32	30,600	110	$496	$4,583
7/14/17	31	26,000	114	$514	$4,160
8/11/17	28	23,800	88	$384	$3,559
Totals	**363**	**409,800**	**134**	**$5,733**	**$62,287**
Annual	**365**	**412,058**	**134**	**$5,764**	**$62,630**

3.3 Natural Gas Usage

Natural gas is provided by PSE&G. The average gas cost for the past 12 months is $0.701/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below.

Figure 11 - Months Natural Gas Usage

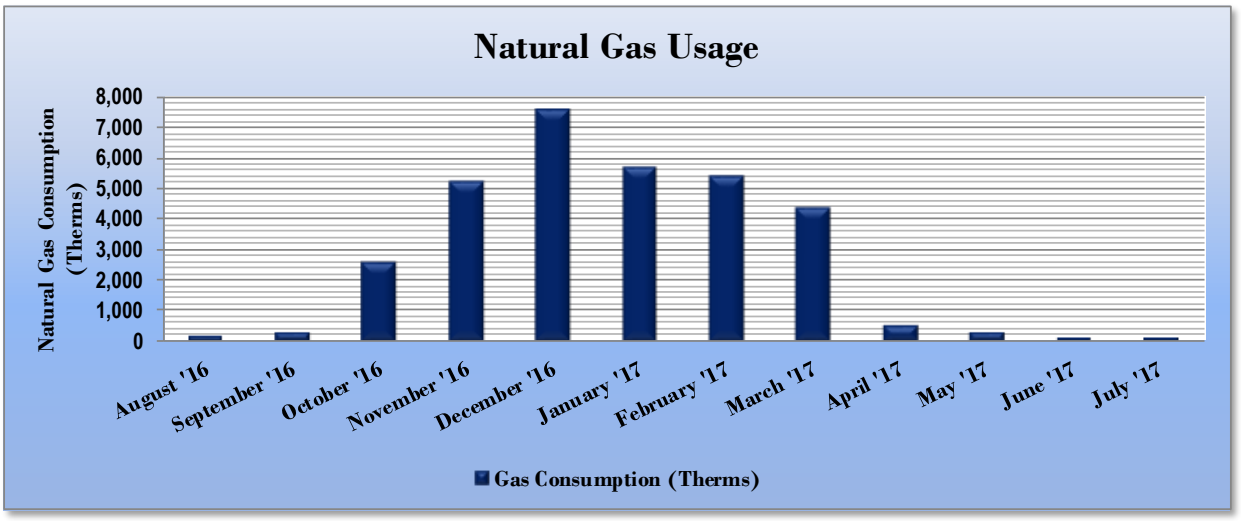


Figure 12 - Natural Gas Usage

Gas Billing Data for Riverside Elementary School			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
9/12/16	30	176	$122
10/10/16	28	284	$132
11/8/16	29	2,593	$1,449
12/9/16	31	5,270	$1,987
1/11/17	33	7,603	$7,164
2/9/17	29	5,724	$5,823
3/13/17	32	5,427	$5,170
4/11/17	29	4,415	$500
5/12/17	31	556	$158
6/13/17	32	280	$133
7/14/17	31	155	$121
8/11/17	28	138	$116
Totals	**363**	**32,620**	**$22,877**
Annual	**365**	**32,800**	**$23,003**

3.4 Benchmarking

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

The EUI is a measure of a facility's energy consumption per square foot, and it is the standard metric for comparing buildings' energy performance. Comparing the EUI of a building with the national median EUI for that building type illustrates whether that building uses more or less energy than similar buildings of its type on a square foot basis. EUI is presented in terms of "site energy" and "source energy." Site energy is the amount of fuel and electricity consumed by a building as reflected in utility bills. Source energy includes fuel consumed to generate electricity consumed at the site, factoring in electric production and distribution losses for the region.

Figure 13 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Riverside Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	130.8	141.4
Site Energy Use Intensity (kBtu/ft^2)	78.0	58.2

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

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

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Riverside Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	106.3	141.4
Site Energy Use Intensity (kBtu/ft^2)	69.5	58.2

Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75% of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. This facility has a current score of 35.

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

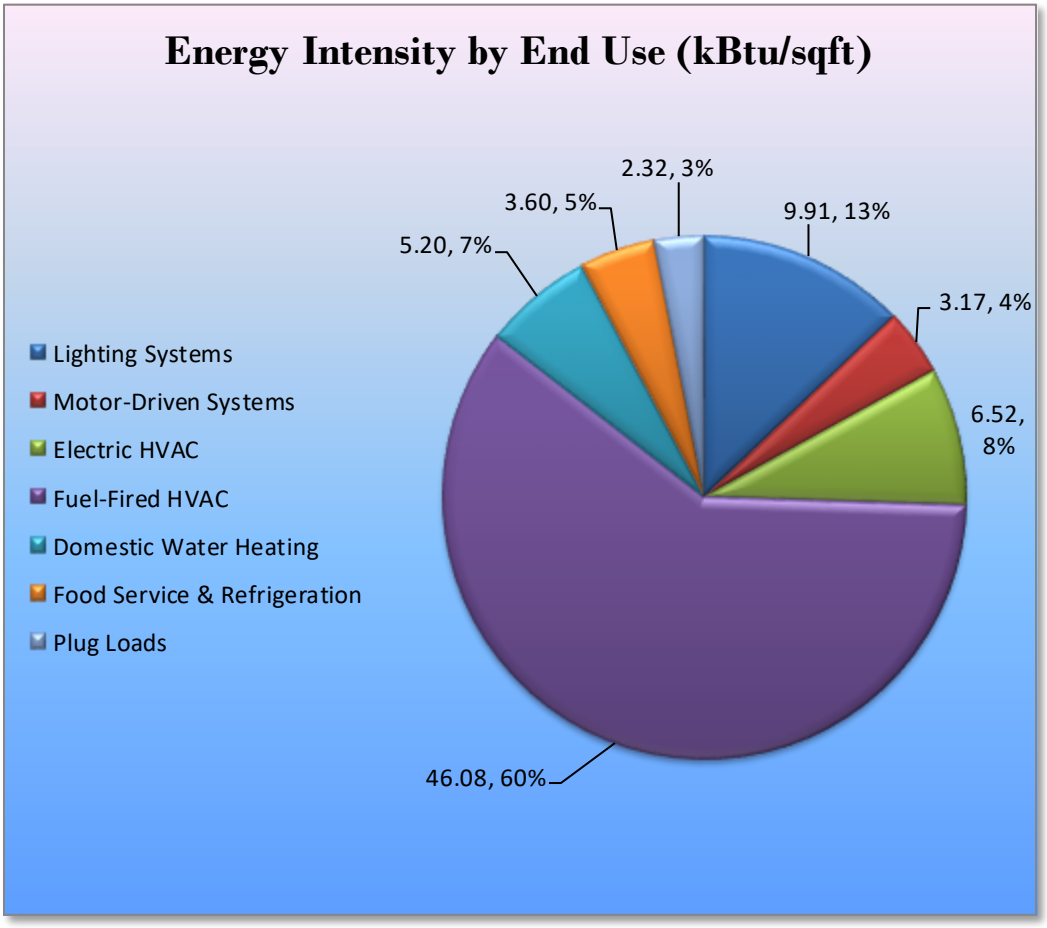
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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 here the greatest benefits might be found from energy efficiency measures.

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



4 ENERGY CONSERVATION MEASURES

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

The following sections describe the evaluated measures.

4.1 Recommended ECMs

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

Figure 16 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**90,979**	**18.2**	**0.0**	**$13,828.20**	**$36,506.53**	**$9,645.00**	**$26,861.53**	**1.9**	**91,615**
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	613	0.1	0.0	$93.24	$437.15	$65.00	$372.15	4.0	618
ECM 2	Retrofit Fixtures with LED Lamps	90,365	18.1	0.0	$13,734.96	$36,069.38	$9,580.00	$26,489.38	1.9	90,997
Lighting Control Measures		**21,738**	**4.3**	**0.0**	**$3,304.01**	**$23,302.00**	**$2,875.00**	**$20,427.00**	**6.2**	**21,890**
ECM 3	Install Occupancy Sensor Lighting Controls	18,873	3.8	0.0	$2,868.57	$22,102.00	$2,875.00	$19,227.00	6.7	19,005
ECM 4	Install High/Low Lighitng Controls	2,865	0.6	0.0	$435.44	$1,200.00	$0.00	$1,200.00	2.8	2,885
Motor Upgrades		**759**	**0.2**	**0.0**	**$115.36**	**$804.84**	**$0.00**	**$804.84**	**7.0**	**764**
ECM 5	Premium Efficiency Motors	759	0.2	0.0	$115.36	$804.84	$0.00	$804.84	7.0	764
Variable Frequency Drive (VFD) Measures		**17,749**	**3.6**	**0.0**	**$2,697.67**	**$10,388.90**	**$0.00**	**$10,388.90**	**3.9**	**17,873**
ECM 6	Install VFDs on Hot Water Pumps	17,749	3.6	0.0	$2,697.67	$10,388.90	$0.00	$10,388.90	3.9	17,873
Domestic Water Heating Upgrade		**0**	**0.0**	**58.8**	**$412.67**	**$265.29**	**$0.00**	**$265.29**	**0.6**	**6,890**
ECM 7	Install Low-Flow Domestic Hot Water Devices	0	0.0	58.8	$412.67	$265.29	$0.00	$265.29	0.6	6,890
TOTALS		**131,224**	**26.4**	**58.8**	**$20,357.92**	**$71,267.56**	**$12,520.00**	**$58,747.56**	**2.9**	**139,032**

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

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

4.1.1 Lighting Upgrades

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

Figure 17 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**90,979**	**18.2**	**0.0**	**$13,828.20**	**$36,506.53**	**$9,645.00**	**$26,861.53**	**1.9**	**91,615**
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	613	0.1	0.0	$93.24	$437.15	$65.00	$372.15	4.0	618
ECM 2	Retrofit Fixtures with LED Lamps	90,365	18.1	0.0	$13,734.96	$36,069.38	$9,580.00	$26,489.38	1.9	90,997

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: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

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	613	0.1	0.0	$93.24	$437.15	$65.00	$372.15	4.0	618
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend retrofitting existing fluorescent fixtures in hallway and exterior by removing fluorescent and ballasts and replacing them with LEDs and LED drivers (if necessary), which are designed to be used retrofitted fluorescent fixtures. The measure uses the existing fixture housing but replaces the rest of the components with more efficient lighting technology. 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 tube and more than 10 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	89,411	18.0	0.0	$13,589.96	$35,397.61	$9,580.00	$25,817.61	1.9	90,037
Exterior	954	0.1	0.0	$145.00	$671.78	$0.00	$671.78	4.6	961

Measure Description

We recommend retrofitting existing incandescent lamps in closest, exterior metal halide or other lighting technologies in classrooms 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 HID sources such as metal halide.

4.1.2 Lighting Control Measures

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

Figure 18 – Summary of Lighting Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**21,738**	**4.3**	**0.0**	**$3,304.01**	**$23,302.00**	**$2,875.00**	**$20,427.00**	**6.2**	**21,890**
ECM 3	Install Occupancy Sensor Lighting Controls	18,873	3.8	0.0	$2,868.57	$22,102.00	$2,875.00	$19,227.00	6.7	19,005
ECM 4	Install High/Low Lighitng Controls	2,865	0.6	0.0	$435.44	$1,200.00	$0.00	$1,200.00	2.8	2,885

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)
18,873	3.8	0.0	$2,868.57	$22,102.00	$2,875.00	$19,227.00	6.7	19,005

Measure Description

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

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

ECM 4: Install High/Low Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
2,865	0.6	0.0	$435.44	$1,200.00	$0.00	$1,200.00	2.8	2,885

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. In hallways with significant ambient lighting this control can sometimes be combined with photocell controls to turn the lights off when there is sufficient daylighting. 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

Our recommendation for motor upgrade measures are summarized in Figure 19 below.

Figure 19 – 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)
Motor Upgrades		**759**	**0.2**	**0.0**	**$115.36**	**$804.84**	**$0.00**	**$804.84**	**7.0**	**764**
ECM 5	Premium Efficiency Motors	759	0.2	0.0	$115.36	$804.84	$0.00	$804.84	7.0	764

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)
759	0.2	0.0	$115.36	$804.84	$0.00	$804.84	7.0	764

Measure Description

We recommend replacing standard efficiency motors of RTU-3's supply fan with NEMA Premium® efficiency motors. Our evaluation assumes that existing motors will be replaced with motors of equivalent size and type. Although occasionally additional savings can be achieved by downsizing motors to better meet the motor's current load requirements. The base case motor efficiencies are estimated from nameplate information and our best estimates of motor run hours. Efficiencies of proposed motor upgrades are obtained from the *New Jersey's Clean Energy Program Protocols to Measure Resource Savings (2016)*. Savings are based on the difference between baseline and proposed efficiencies and the assumed annual operating hours.

4.1.4 Variable Frequency Drive Measures

Our recommendation for variable frequency drive (VFD) measures is summarized in Figure 20 below.

Figure 20 – Summary of Variable Frequency Drive ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**17,749**	**3.6**	**0.0**	**$2,697.67**	**$10,388.90**	**$0.00**	**$10,388.90**	**3.9**	**17,873**
ECM 6	Install VFDs on Hot Water Pumps	17,749	3.6	0.0	$2,697.67	$10,388.90	$0.00	$10,388.90	3.9	17,873

ECM 6: Install VFDs on Hot Water Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
17,749	3.6	0.0	$2,697.67	$10,388.90	$0.00	$10,388.90	3.9	17,873

Measure Description

We recommend installing a variable frequency drives (VFD) to control two 15 hp hot water pumps in boiler room. This measure requires that a majority of the hot water coils be served by 2-way valves and that a differential pressure sensor is installed in the hot water loop. As the hot water valves close, the differential pressure increases. The VFD modulates pump speed to maintain a differential pressure setpoint. Energy savings results from reducing pump motor speed (and power) as hot water valves close. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

4.1.5 Domestic Hot Water Heating System Upgrades

Our recommendation for domestic water heating system improvements is summarized in Figure 21 below.

Figure 21 - Summary of Domestic Water Heating 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)
Domestic Water Heating Upgrade		**0**	**0.0**	**58.8**	**$412.67**	**$265.29**	**$0.00**	**$265.29**	**0.6**	**6,890**
ECM 7	Install Low-Flow Domestic Hot Water Devices	0	0.0	58.8	$412.67	$265.29	$0.00	$265.29	0.6	6,890

ECM 7: Install Low-Flow DHW Devices

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	58.8	$412.67	$265.29	$0.00	$265.29	0.6	6,890

Measure Description

We recommend installing low-flow domestic hot water devices to reduce overall hot water demand. Energy demand from domestic hot water heating systems can be reduced by reducing water usage in general. Faucet aerators can reduce hot water usage, relative to standard aerators, which saves energy. Low-flow devices reduce the overall water flow from the fixture, while still providing adequate pressure for washing. This reduces the amount of water used per day resulting in energy and water savings.

4.2 ECMs Evaluated but Not Recommended

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

Figure 22 – Summary of Measures Evaluated, But Not Recommended

Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades	**415**	**0.2**	**0.0**	**$63.03**	**$1,549.76**	**$300.00**	**$1,249.76**	**19.8**	**418**
Install LED Fixtures	415	0.2	0.0	$63.03	$1,549.76	$300.00	$1,249.76	19.8	418
Electric Unitary HVAC Measures	**10,595**	**6.6**	**0.0**	**$1,610.43**	**$63,052.48**	**$2,846.00**	**$60,206.48**	**37.4**	**10,669**
Install High Efficiency Electric AC	8,591	5.1	0.0	$1,305.76	$49,438.72	$2,294.00	$47,144.72	36.1	8,651
Install High Efficiency Heat Pumps	2,004	1.5	0.0	$304.67	$13,613.76	$552.00	$13,061.76	42.9	2,019
HVAC System Improvements	**10,403**	**2.3**	**0.0**	**$1,581.18**	**$5,250.00**	**$2,500.00**	**$2,750.00**	**1.7**	**10,476**
Install Dual Enthalpy Outside Economizer Control	10,403	2.3	0.0	$1,581.18	$5,250.00	$2,500.00	$2,750.00	1.7	10,476
TOTALS	**21,413**	**9.1**	**0.0**	**$3,254.64**	**$69,852.24**	**$5,646.00**	**$64,206.24**	**19.7**	**21,563**

* - 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).

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	415	0.2	0.0	$63.03	$1,549.76	$300.00	$1,249.76	19.8	418

Measure Description

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

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of HID sources such as metal halide.

Reasons for not Recommending

Retrofitting exterior lighting fixtures with more efficient LED fixtures will result in energy savings, however, the cost of installation will outweigh the energy saving advantages resulting in a very long payback. Still, the District may want to go through with the measure for the sake of uniformity if the rest of the fixtures are upgraded.

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)
8,591	5.1	0.0	$1,305.76	$49,438.72	$2,294.00	$47,144.72	36.1	8,651

Measure Description

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

Reasons for not Recommending

Replacing existing air conditioning systems with high efficiency air conditioning systems will result in energy savings, however, the cost of installation will outweigh the energy saving advantages resulting in a very long payback. This makes the measure financially not viable therefore not recommended based on energy savings alone.

Install High Efficiency Heat Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
2,004	1.5	0.0	$304.67	$13,613.76	$552.00	$13,061.76	42.9	2,019

Measure Description

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

Reasons for not Recommending

Replacing existing heat pumps with high efficiency heat pumps will result in energy savings, however, the cost of installation will outweigh the energy saving advantages resulting in a very long payback. This makes the measure financially not viable therefore not recommended based on energy savings alone.

Install Dual-Enthalpy Economizers

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)
10,403	2.3	0.0	$1,581.18	$5,250.00	$2,500.00	$2,750.00	1.7	10,476

Measure Description

Dual enthalpy economizers are used to control a ventilation system's outside air intake in order to reduce a facility's total cooling load. A dual-enthalpy economizer monitors the air temperature and humidity of both the outside and return air. The control supplies the lowest energy (temperature and humidity) air to the air handling system. When outside air conditions allow, outside air can be used for cooling instead of running the air handling system's compressor. This reduces the demand on the cooling system, lowering its usage hours and saving energy.

Savings result from using outside air instead of mechanical cooling when outside air conditions permit.

Reasons for not Recommending

Installing dual-enthalpy economizers on air conditioning systems will result in energy savings, however, the cost of installation will outweigh the energy saving advantages resulting in a very long payback associated with ECM to install high efficiency units. This makes the measure financially not viable therefore not recommended based on energy savings alone.

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.

Perform Proper Lighting Maintenance

In order to sustain optimal lighting levels, lighting fixtures should undergo routine maintenance. Light levels decrease over time due to lamp aging, lamp and ballast failure, and buildup of dirt and dust on lamps, fixtures and reflective surfaces. Together, these factors can reduce total illumination by 20% - 60% or more, while operating fixtures continue drawing full power. To limit this reduction, lamps, reflectors and diffusers should be thoroughly cleaned of dirt, dust, oil, and smoke film buildup approximately every 6 – 12 months.

Turn Off Unneeded Motors

Electric motors often run unnecessarily, and this is an overlooked opportunity to save energy. These motors should be identified and turned off when appropriate. For example, exhaust fans often run unnecessarily when ventilation requirements are already met. Reducing run hours for these motors can result in significant energy savings. Whenever possible, use automatic devices such as twist timers or occupancy sensors to ensure that motors are turned off when not needed.

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.

Clean and/or Replace HVAC Filters

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

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 "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).

Refer to Section 4.1.5 for any low-flow ECM recommendations.

6 On-Site Generation Measures

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

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

Preliminary screenings were performed to determine the potential that a generation project could provide a cost-effective solution for your facility. Before making a decision to implement, a feasibility study should be conducted that would take a detailed look at existing energy profiles, siting, interconnection, and the costs associated with the generation project including interconnection costs, departing load charges, and any additional special facilities charges.

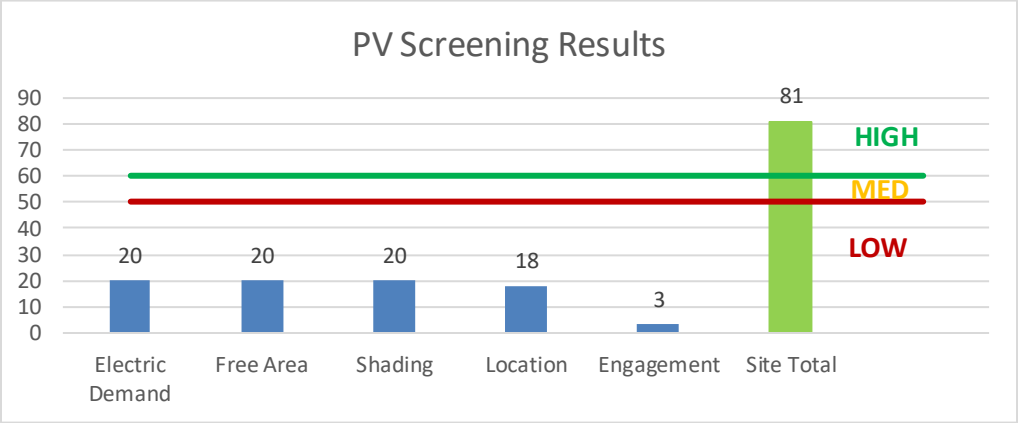
6.1 Photovoltaic

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

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

There is 15,600 square feet of free area, ease of installation (roof), and the lack of shading elements that contribute to the high potential for PV at this site. A PV array located on the roof of the main building may be feasible. If Riverside Elementary School is interested in pursuing the installation of PV, we recommended a full feasibility study be conducted.

Figure 23 - Photovoltaic Screening



Potential	High	
System Potential	107	kW DC STC
Electric Generation	127,477	kWh/yr
Displaced Cost	$11,090	/yr
Installed Cost	$278,200	

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.

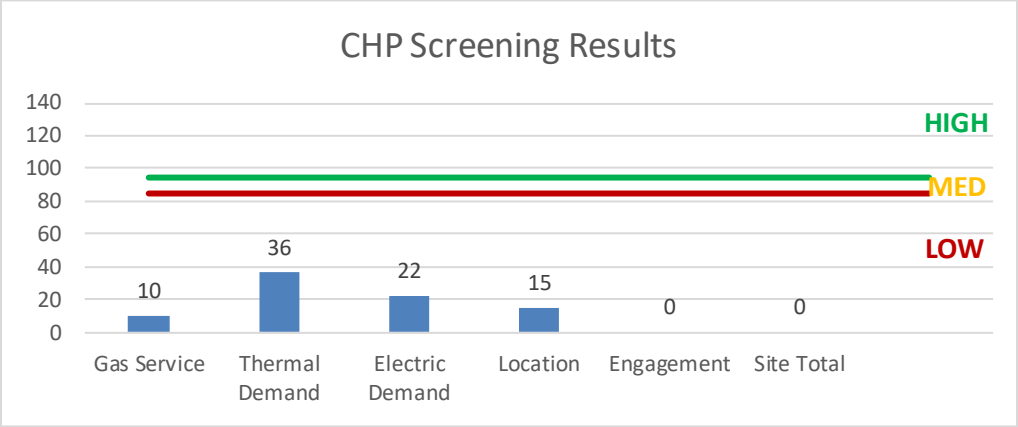
CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste 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.

The magnitude, type, and duration of the thermal demand, the coincident electric load, and the ease of interconnection contribute to the potential for CHP at the site. If Riverside Elementary School is interested in pursuing the installation of CHP, we recommended a more detailed feasibility study be conducted.

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

Figure 24 - Combined Heat and Power Screening



7 DEMAND RESPONSE

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

By enabling grid operators to call upon Curtailment Service Providers and commercial facilities to reduce electric usage during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment Service Providers provide regular payments to medium and large consumers of electric power for their participation in DR programs. Program participation is voluntary, and participants receive payments whether or not their facility is called upon to curtail their electric usage.

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

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

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

The first step toward participation in a DR program is to contact a Curtailment Service Provider. A list of these providers is available on PJM's website and it includes contact information for each company, as well as the states where they have active business (http://www.pjm.com/markets-and-operations/demand-response/csps.aspx). PJM also posts training materials that are developed for program members interested in specific rules and requirements regarding DR activity (http://www.pjm.com/training/training%20material.aspx), along with a variety of other DR program information.

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

In our opinion, due to reduced summer operation hours this facility is not a good candidate for DR.

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

Figure 25 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	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			
ECM 5	Premium Efficiency Motors			X			
ECM 6	Install VFDs on Hot Water Pumps			X			
ECM 7	Install Low-Flow Domestic Hot Water Devices			X			

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

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

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

8.1 SmartStart

Overview

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

Equipment with Prescriptive Incentives Currently Available:

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

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

Incentives

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

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

How to Participate

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

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

8.2 Direct Install

Overview

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

Incentives

The program pays up to 70% of the total installed cost of eligible measures, up to $125,000 per project. Each entity is limited to incentives up to $250,000 per fiscal year.

How to Participate

To participate in Direct Install, you will need to contact the participating contractor assigned to the region of the state where your facility is located. A complete list of Direct Install program partners is provided on the Direct Install website linked below. The contractor will be paid the measure incentives directly by the program which will pass on to you in the form of reduced material and implementation costs. This means up to 70% of eligible costs are covered by the program, subject to program caps and eligibility, while the remaining 30% of the cost is paid to the contractor by the customer.

Detailed program descriptions and applications can be found at: www.njcleanenergy.com/DI.

8.3 SREC Registration Program

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

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

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

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

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

8.4 Energy Savings Improvement Program

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

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

(1) Use an Energy Services Company or "ESCO."
(2) Use independent engineers and other specialists, or your own qualified staff, to provide and manage the requirements of the program through bonds or lease obligations.
(3) Use a hybrid approach of the two options described above where the ESCO is utilized for some services and independent engineers, or other specialists or qualified staff, are used to deliver other requirements of the program.

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

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

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

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

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

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

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

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

9.2 Retail Natural Gas Supply Options

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

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

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

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

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Room 63	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,860	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,860	0.02	83	0.0	$12.61	$72.46	$0.00	5.75
Exterior	2	Metal Halide: (1) 150W Lamp	Daylight Dimming	190	1,430	Fixture Replacement	No	2	LED - Fixtures: High-Bay	Daylight Dimming	45	1,430	0.19	477	0.0	$72.49	$1,549.76	$300.00	17.24
Room 56D	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,860	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,860	0.04	184	0.0	$27.99	$73.03	$20.00	1.89
Room 55	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,860	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,860	0.04	184	0.0	$27.99	$73.03	$20.00	1.89
Room 56A	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,860	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,860	0.07	368	0.0	$55.99	$146.06	$40.00	1.89
Room 48	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,860	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,002	0.10	483	0.0	$73.39	$416.06	$75.00	4.65
Room 55	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,860	Relamp	No	4	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,860	0.15	737	0.0	$111.98	$292.12	$80.00	1.89
Room 49	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,860	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,002	0.19	966	0.0	$146.77	$562.12	$115.00	3.05
Room 46	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,860	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,002	0.29	1,448	0.0	$220.16	$708.18	$155.00	2.51
Room 61	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,860	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,002	0.38	1,931	0.0	$293.55	$854.24	$195.00	2.25
Room 47	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,860	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,002	0.38	1,931	0.0	$293.55	$854.24	$195.00	2.25
Room 51	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,860	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,002	0.58	2,897	0.0	$440.32	$1,146.36	$275.00	1.98
Room 9A	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,860	0.03	163	0.0	$24.75	$54.77	$15.00	1.61
Room 59B	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,860	0.03	163	0.0	$24.75	$54.77	$15.00	1.61
Room 59A	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,860	0.03	163	0.0	$24.75	$54.77	$15.00	1.61
Room 58	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,860	0.03	163	0.0	$24.75	$54.77	$15.00	1.61
Room 57F	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,860	0.03	163	0.0	$24.75	$54.77	$15.00	1.61
Room 57E	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,860	0.03	163	0.0	$24.75	$54.77	$15.00	1.61
Room 57 Bathroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,860	0.03	163	0.0	$24.75	$54.77	$15.00	1.61
Room 4A	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,860	0.03	163	0.0	$24.75	$54.77	$15.00	1.61
Room 48	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,860	0.03	163	0.0	$24.75	$54.77	$15.00	1.61
Room 3A	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,860	0.03	163	0.0	$24.75	$54.77	$15.00	1.61
Room 34B	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,860	0.03	163	0.0	$24.75	$54.77	$15.00	1.61
Room 34A	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,860	0.03	163	0.0	$24.75	$54.77	$15.00	1.61
Room 31B	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,860	0.03	163	0.0	$24.75	$54.77	$15.00	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
Room 31A	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,860	0.03	163	0.0	$24.75	$54.77	$15.00	1.61
Room 2A	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,860	0.03	163	0.0	$24.75	$54.77	$15.00	1.61
Room 26A	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,860	0.03	163	0.0	$24.75	$54.77	$15.00	1.61
Room 1D	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,860	0.03	163	0.0	$24.75	$54.77	$15.00	1.61
Room 1C	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,860	0.03	163	0.0	$24.75	$54.77	$15.00	1.61
Room 1B	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,860	0.03	163	0.0	$24.75	$54.77	$15.00	1.61
Room 1A	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,860	0.03	163	0.0	$24.75	$54.77	$15.00	1.61
Room 11	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,860	0.03	163	0.0	$24.75	$54.77	$15.00	1.61
Room 7A	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.08	411	0.0	$62.54	$379.55	$65.00	5.03
Room 6	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,860	0.06	326	0.0	$49.49	$109.55	$30.00	1.61
Room 35C	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.08	411	0.0	$62.54	$379.55	$65.00	5.03
Room 35B	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.08	411	0.0	$62.54	$379.55	$65.00	5.03
Room 35A	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.08	411	0.0	$62.54	$379.55	$65.00	5.03
Girls Bathroom 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.08	411	0.0	$62.54	$379.55	$65.00	5.03
Boys Bathroom 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.08	411	0.0	$62.54	$379.55	$65.00	5.03
Room 8	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.12	617	0.0	$93.81	$434.32	$80.00	3.78
Room 57C	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.12	617	0.0	$93.81	$434.32	$80.00	3.78
Room 57B	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.12	617	0.0	$93.81	$434.32	$80.00	3.78
Room 57A	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.12	617	0.0	$93.81	$434.32	$80.00	3.78
Room 24	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.12	617	0.0	$93.81	$434.32	$80.00	3.78
Girls Bathroom	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.12	617	0.0	$93.81	$434.32	$80.00	3.78
Boys Bathroom	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.12	617	0.0	$93.81	$434.32	$80.00	3.78
Room 7	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.16	823	0.0	$125.08	$489.09	$95.00	3.15
Room 47	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.16	823	0.0	$125.08	$489.09	$95.00	3.15
Room 57D	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.21	1,029	0.0	$156.35	$543.86	$110.00	2.78

	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
Room 12	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.21	1,029	0.0	$156.35	$543.86	$110.00	2.78
Room 54	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.25	1,234	0.0	$187.61	$598.64	$125.00	2.52
Room 45	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.25	1,234	0.0	$187.61	$598.64	$125.00	2.52
Room 43	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.25	1,234	0.0	$187.61	$598.64	$125.00	2.52
Room 22	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.25	1,234	0.0	$187.61	$598.64	$125.00	2.52
Room 33	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.33	1,646	0.0	$250.15	$708.18	$155.00	2.21
Room 52	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.37	1,852	0.0	$281.42	$762.95	$170.00	2.11
Room 20	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.37	1,852	0.0	$281.42	$762.95	$170.00	2.11
Room 10	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.37	1,852	0.0	$281.42	$762.95	$170.00	2.11
Room 4	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.41	2,057	0.0	$312.69	$1,087.73	$220.00	2.78
Room 36	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.45	2,263	0.0	$343.96	$1,142.50	$235.00	2.64
Room 34	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.45	2,263	0.0	$343.96	$1,142.50	$235.00	2.64
Room 3	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.45	2,263	0.0	$343.96	$1,142.50	$235.00	2.64
Room 2	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.45	2,263	0.0	$343.96	$1,142.50	$235.00	2.64
Room 1	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.45	2,263	0.0	$343.96	$1,142.50	$235.00	2.64
Room 9	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.49	2,469	0.0	$375.23	$927.27	$215.00	1.90
Room 44	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.49	2,469	0.0	$375.23	$1,197.27	$250.00	2.52
Room 42	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.49	2,469	0.0	$375.23	$1,197.27	$250.00	2.52
Room 41	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.49	2,469	0.0	$375.23	$1,197.27	$250.00	2.52
Room 40	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.49	2,469	0.0	$375.23	$1,197.27	$250.00	2.52
Room 38	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.49	2,469	0.0	$375.23	$1,197.27	$250.00	2.52
Room 30	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.57	2,880	0.0	$437.77	$1,306.82	$280.00	2.35
Room 29	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.57	2,880	0.0	$437.77	$1,306.82	$280.00	2.35
Room 26	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.57	2,880	0.0	$437.77	$1,306.82	$280.00	2.35
Room 25	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.57	2,880	0.0	$437.77	$1,306.82	$280.00	2.35

	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
Room 18	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.57	2,880	0.0	$437.77	$1,306.82	$280.00	2.35
Room 17	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.57	2,880	0.0	$437.77	$1,306.82	$280.00	2.35
Room 13	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.57	2,880	0.0	$437.77	$1,036.82	$245.00	1.81
Room 21	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.66	3,292	0.0	$500.31	$1,416.36	$310.00	2.21
Room 19	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.66	3,292	0.0	$500.31	$1,416.36	$310.00	2.21
Room 14	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	0.66	3,292	0.0	$500.31	$1,146.36	$275.00	1.74
Room 35	25	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	25	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,002	1.03	5,143	0.0	$781.73	$1,909.31	$445.00	1.87
Hallway	38	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,860	Relamp	Yes	38	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,002	1.56	7,818	0.0	$1,188.23	$2,281.36	$570.00	1.44
Room 56C	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,860	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	0.02	109	0.0	$16.50	$36.52	$10.00	1.61
Room 56B	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,860	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	0.02	109	0.0	$16.50	$36.52	$10.00	1.61
Room 18A	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,860	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	0.02	109	0.0	$16.50	$36.52	$10.00	1.61
Room 17A	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,860	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	0.02	109	0.0	$16.50	$36.52	$10.00	1.61
Room 14A	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,860	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	0.02	109	0.0	$16.50	$36.52	$10.00	1.61
Room 13A	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,860	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	0.02	109	0.0	$16.50	$36.52	$10.00	1.61
Room 60	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,860	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	0.11	549	0.0	$83.38	$416.06	$75.00	4.09
Boiler Room	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,860	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	0.11	543	0.0	$82.48	$182.58	$50.00	1.61
Room 50	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,860	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	0.33	1,646	0.0	$250.15	$978.18	$190.00	3.15
Hallway	47	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,860	Relamp	Yes	47	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,002	1.28	6,446	0.0	$979.77	$1,916.21	$470.00	1.48
Room 67	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,860	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,860	0.01	58	0.0	$8.75	$18.26	$5.00	1.52
Room 60	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,860	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,860	0.01	58	0.0	$8.75	$18.26	$5.00	1.52
Room 56C	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,860	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,860	0.01	58	0.0	$8.75	$18.26	$5.00	1.52
Room 62	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,860	Relamp	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,002	0.04	216	0.0	$32.77	$170.77	$35.00	4.14
Room 32	12	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,860	Relamp	Yes	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,002	0.17	862	0.0	$131.08	$759.09	$130.00	4.80
Room 16	1	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Wall Switch	63	2,860	Relamp	No	1	LED - Linear Tubes: (4) 2' Lamps	Wall Switch	34	2,860	0.02	95	0.0	$14.50	$65.03	$20.00	3.11
Room 60	10	Linear Fluorescent - T5: 4' T5 (28W) - 4L	Occupancy Sensor	120	2,002	Relamp	No	10	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,002	0.41	1,427	0.0	$216.96	$730.30	$200.00	2.44

	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
Room 56	12	Linear Fluorescent - T5: 4' T5 (28W) - 4L	Wall Switch	120	2,860	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,002	0.62	3,134	0.0	$476.31	$1,416.36	$310.00	2.32
Room 37	1	Linear Fluorescent - T5: 4' T5 (28W) - 2L	Wall Switch	60	2,860	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	0.02	102	0.0	$15.50	$36.52	$10.00	1.71
Room 25A	1	Linear Fluorescent - T5: 4' T5 (28W) - 2L	Wall Switch	60	2,860	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	0.02	102	0.0	$15.50	$36.52	$10.00	1.71
Room 23	1	Linear Fluorescent - T5: 4' T5 (28W) - 2L	Wall Switch	60	2,860	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	0.02	102	0.0	$15.50	$36.52	$10.00	1.71
Hallway	5	Linear Fluorescent - T5: 4' T5 (28W) - 2L	Wall Switch	60	2,860	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,002	0.13	653	0.0	$99.23	$382.58	$50.00	3.35
Room 56B	1	Linear Fluorescent - T12: 2' T12 (20W) - 2L	Wall Switch	50	2,860	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,860	0.02	109	0.0	$16.50	$64.77	$10.00	3.32
Room 48B	1	Linear Fluorescent - T12: 2' T12 (20W) - 2L	Wall Switch	50	2,860	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,860	0.02	109	0.0	$16.50	$64.77	$10.00	3.32
Room 48A	1	Linear Fluorescent - T12: 2' T12 (20W) - 2L	Wall Switch	50	2,860	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,860	0.02	109	0.0	$16.50	$64.77	$10.00	3.32
Room 27	1	Linear Fluorescent - T12: 2' T12 (20W) - 2L	Wall Switch	50	2,860	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,860	0.02	109	0.0	$16.50	$64.77	$10.00	3.32
Hallway	2	Linear Fluorescent - T12: 2' T12 (20W) - 2L	Wall Switch	50	2,860	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	2,002	0.05	251	0.0	$38.09	$329.55	$20.00	8.13
Room 63	1	Linear Fluorescent - T12: 2' T12 (20W) - 1L	Wall Switch	25	2,860	Relamp & Reballast	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	2,860	0.01	54	0.0	$8.25	$48.52	$5.00	5.28
Room 21	4	LED Screw-In Lamps: 4 BAR TRI LED FIXTURE SPOTLIGHTS	Wall Switch	29	2,860	None	Yes	4	LED Screw-In Lamps: 4 BAR TRI LED FIXTURE SPOTLIGHTS	Occupancy Sensor	29	2,002	0.02	114	0.0	$17.40	$116.00	$20.00	5.52
Exterior	5	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	10	4,380	None	No	5	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	10	4,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 67	1	Incandescent: BULB	Wall Switch	60	2,860	Relamp	No	1	LED Screw-In Lamps: LED Bulb (9W) - 1L	Wall Switch	9	2,860	0.03	168	0.0	$25.50	$17.23	$5.00	0.48
Room 63	1	Incandescent: BULB	Wall Switch	60	2,860	Relamp	No	1	LED Screw-In Lamps: LED Bulb (9W) - 1L	Wall Switch	9	2,860	0.03	168	0.0	$25.50	$17.23	$5.00	0.48
Room 29A	1	Incandescent: BULB	Wall Switch	60	2,860	Relamp	No	1	LED Screw-In Lamps: LED Bulb (9W) - 1L	Wall Switch	9	2,860	0.03	168	0.0	$25.50	$17.23	$5.00	0.48
Room 28	1	Incandescent: BULB	Wall Switch	60	2,860	Relamp	No	1	LED Screw-In Lamps: LED Bulb (9W) - 1L	Wall Switch	9	2,860	0.03	168	0.0	$25.50	$17.23	$5.00	0.48
Room 15	1	Incandescent: BULB	Wall Switch	60	2,860	Relamp	No	1	LED Screw-In Lamps: LED Bulb (9W) - 1L	Wall Switch	9	2,860	0.03	168	0.0	$25.50	$17.23	$5.00	0.48
Janitor Closet	1	Incandescent: BULB	Wall Switch	60	210	Relamp	No	1	LED Screw-In Lamps: LED Bulb (9W) - 1L	Wall Switch	9	210	0.03	12	0.0	$1.87	$17.23	$5.00	6.53
Room 66	2	Incandescent: BULB	Wall Switch	60	2,860	Relamp	No	2	LED Screw-In Lamps: LED Bulb (9W) - 1L	Wall Switch	9	2,860	0.07	335	0.0	$50.99	$34.45	$10.00	0.48
Room 60	2	Incandescent: BULB	Wall Switch	60	2,860	Relamp	No	2	LED Screw-In Lamps: LED Bulb (9W) - 1L	Wall Switch	9	2,860	0.07	335	0.0	$50.99	$34.45	$10.00	0.48
Hallway	2	Incandescent: BULB	Wall Switch	60	2,860	Relamp	Yes	2	LED Screw-In Lamps: LED Bulb (9W) - 1L	High/Low Control	9	2,002	0.07	353	0.0	$53.69	$234.45	$10.00	4.18
Room 61	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
Boiler Room	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 56	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

	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
Room 60	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
Hallway	7	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	7	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 68	1	Compact Fluorescent: SPIRAL CFL BULB	Wall Switch	15	2,860	Relamp	No	1	LED Screw-In Lamps: Other	Wall Switch	11	2,860	0.00	15	0.0	$2.25	$17.23	$5.00	5.43
Hallway	10	Compact Fluorescent: 4 PIN CFL	Wall Switch	18	2,860	Relamp	Yes	10	LED Screw-In Lamps: Other	High/Low Control	13	2,002	0.06	302	0.0	$45.89	$565.20	$0.00	12.32
Exterior	36	Compact Fluorescent: 4 PIN CFL	Daylight Dimming	18	4,380	Relamp	No	36	LED Screw-In Lamps: Other	Daylight Dimming	13	4,380	0.13	979	0.0	$148.83	$620.10	$0.00	4.17
Exterior	3	Compact Fluorescent: 2 PIN CFL	Daylight Dimming	26	4,380	Relamp	No	3	LED Screw-In Lamps: Other	Daylight Dimming	18	4,380	0.02	118	0.0	$17.91	$51.68	$0.00	2.88

Motor Inventory & Recommendations

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Air Compressor	2	Air Compressor	0.8	78.0%	No	2,479	No	78.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Heating Hot Water Pump	2	Heating Hot Water Pump	15.0	93.0%	No	1,696	No	93.0%	Yes	2	3.63	17,749	0.0	$2,697.67	$10,388.90	$0.00	3.85
Boiler Room	Boiler Burner	2	Combustion Air Fan	1.0	85.5%	No	1,373	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	EF-1125, 1126	2	Exhaust Fan	0.3	78.0%	No	2,745	No	78.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	EF-6, 8	2	Exhaust Fan	0.3	78.0%	No	2,745	No	78.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU-1,2	2	Supply Fan	0.3	78.0%	No	2,745	No	78.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU-1,2	2	Supply Fan	0.6	78.0%	No	2,745	No	78.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU-2	1	Return Fan	0.8	81.1%	No	2,745	No	81.1%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ACCU-1	1	Other	0.1	78.0%	No	2,745	No	78.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU-3 Evaporator	1	Supply Fan	3.0	78.0%	No	2,745	Yes	89.5%	No		0.20	759	0.0	$115.36	$804.84	$0.00	6.98
Roof	RTU-3 Opt Exhaust	1	Return Fan	0.3	78.0%	No	2,745	No	78.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	HV-1, 2	2	Supply Fan	1.5	86.5%	No	1,373	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	HV-1, 2	2	Return Fan	1.0	85.5%	No	1,373	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU-5,6,7,8	4	Supply Fan	0.3	78.0%	No	2,745	No	78.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

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
Classrooms	Classrooms	35	Window AC	1.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU-5,6,7,8	4	Packaged Air-Source HP	1.50	26.20	Yes	4	Packaged Air-Source HP	1.50	26.20	14.00	3.80	Yes	1.92	4,890	0.0	$743.25	$15,613.76	$1,552.00	18.92
Roof	RTU-1,2	2	Packaged AC	4.00		Yes	2	Packaged AC	4.00		14.00		Yes	2.56	5,939	0.0	$902.63	$19,151.68	$1,236.00	19.85
Roof	RTU-3	1	Packaged AC	10.00		Yes	1	Packaged AC	10.00		11.50		Yes	1.86	4,932	0.0	$749.70	$18,571.06	$980.00	23.46
Roof	DSS 1B	1	Split-System AC	3.00		Yes	1	Split-System AC	3.00		14.00		No	0.74	1,246	0.0	$189.45	$4,488.66	$276.00	22.24
Roof	DSS 2B	1	Split-System AC	3.00		Yes	1	Split-System AC	3.00		14.00		No	0.74	1,246	0.0	$189.45	$4,488.66	$276.00	22.24
Roof	AC	1	Split-System AC	3.00		Yes	1	Split-System AC	3.00		14.00		No	0.43	727	0.0	$110.51	$4,488.66	$276.00	38.12

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	School	1	Non-Condensing Hot Water Boiler	1,875.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	School	1	Non-Condensing Hot Water Boiler	1,875.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

DHW Inventory & Recommendations

		Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	School	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Low-Flow Device Recommendations

	Recommedation Inputs				Energy Impact & Financial Analysis						
Location	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
RESTROOMS	3	Faucet Aerator (Lavatory)	3.50	1.00	0.00	0	9.1	$64.08	$21.51	$0.00	0.34
RESTROOMS	34	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	49.7	$348.59	$243.78	$0.00	0.70

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
Cafeteria 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
Cafeteria Kitchen	2	Freezer Chest	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cafeteria Kitchen	2	Stand-Up Freezer, Solid Door (31 - 50 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Cooking Equipment Inventory & Recommendations

	Existing Conditions			Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	High Efficiency Equipement?	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Cafeteria Kitchen	1	Insulated Food Holding Cabinet (Full Size)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cafeteria Kitchen	1	Insulated Food Holding Cabinet (1/2 Size)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cafeteria Kitchen	1	Gas Convection Oven (Half Size)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cafeteria Kitchen	1	Gas Combination Oven/Steam Cooker (<15 Pans)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Dishwasher Inventory & Recommendations

	Existing Conditions					Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Dishwasher Type	Water Heater Fuel Type	Booster Heater Fuel Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Payback w/ Incentives in Years
Kitchen	1	Single Tank Conveyor (High Temp)	Electric	N/A	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?
Classrooms	30	Projectors	120.0	No
Classrooms	56	Computers	120.0	No
Classrooms	47	Small Printer	46.0	Yes
Classrooms	22	Wall/Table Fan	45.0	No
Classrooms	27	Small Refrigerator	120.0	No
Kitchen	10	Microwave	800.0	No
Kitchen	3	Toaster Oven	700.0	No
Classrooms	8	Tv	244.0	No
Kitchen	3	Coffee Maker	300.0	No
Staffroom	1	Electric Heater	700.0	No
Copy Room	5	Large Printer	600.0	No
Classrooms	20	Ceiling Fan	45.0	No
Kitchen	2	Big Refrigerator	255.0	Yes
Main Office	2	Paper Shredder	80.0	Yes

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Riverside Elementary School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 60,094
Built: 1959

For Year Ending: July 31, 2017
Date Generated: September 20, 2018

1. The ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.

Property & Contact Information

Property Address	Property Owner	Primary Contact
Riverside Elementary School 58 RIverside Drive Princeton, New Jersey 08540	_____ , (___)___-_____	___ _____ , (___)___-_____ _____

Property ID: 6549885

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
77.6 kBtu/ft²

Source EUI
122.3 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	3,261,790 (70%)
Electric - Grid (kBtu)	1,400,609 (30%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	67.4
National Median Source EUI (kBtu/ft²)	106.2
% Diff from National Median Source EUI	15%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	315

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)