Local Government Energy Audit:
Energy Audit Report

Howard C Johnson Elementary School

101 Larsen Road

Jackson Township BOE, NJ 08527

Jackson Township BOE

June 21, 2018

Final Report by:

TRC Energy Services

Disclaimer

The intent of this energy analysis report is to identify energy savings opportunities and recommend upgrades to the facility's energy using equipment and systems. Approximate 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 Howard C Johnson 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

Howard C. Johnson Elementary School is a 55,452 square foot facility comprised of spaces including classrooms, offices, cafeteria, media center, storage closets, hallways and mechanical space. This is a single-story facility. The building also has four trailers that are being used as classrooms. The typical hours of operation are between 9:00 AM and 3:00 PM during the weekdays. During weekends the school remains closed.

The original building was constructed in 1970 and the 5th grade wing was added in 1999. The school is conditioned using vertical ground source heat pumps located in the attics and closets. Lighting at Howard C. Johnson Elementary School consists of linear T8 tubes and a few incandescent lamp fixtures.

A thorough description of the facility and our observations are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated nine measures and recommends seven measures which together represent an opportunity for Howard C Johnson Elementary School to reduce annual energy costs by roughly $18,774 and annual greenhouse gas emissions by 158,379 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 7.1 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 Howard C Johnson Elementary School's annual energy use by 23%.

Figure 1 – Previous 12 Month Utility Costs

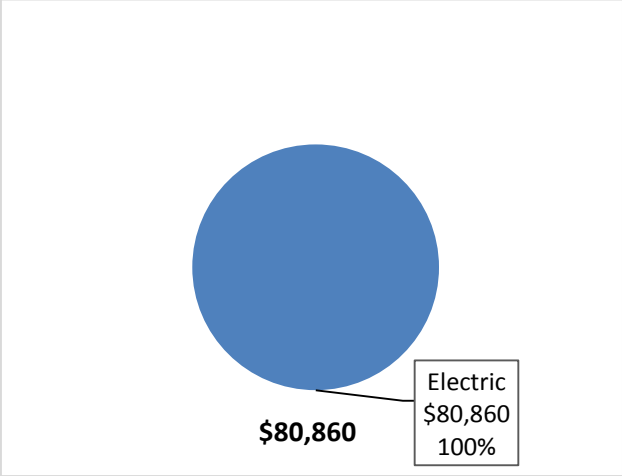
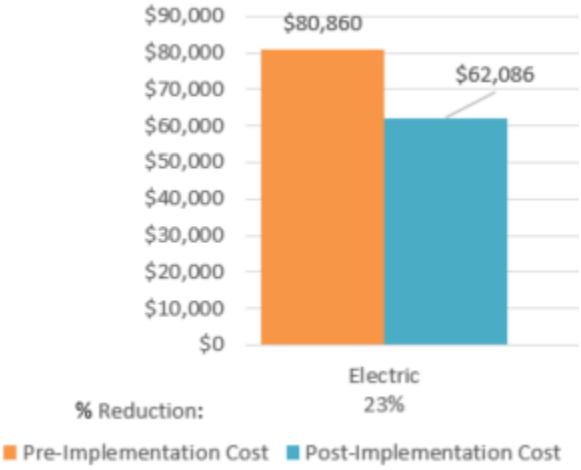


Figure 2 – Potential Post-Implementation Costs



A detailed description of Howard C Johnson 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			**111,081**	**24.6**	**0.0**	**$13,259.60**	**$119,694.18**	**$12,200.00**	**$107,494.18**	**8.1**	**111,858**
ECM 1	Install LED Fixtures	Yes	51,478	6.7	0.0	$6,144.89	$64,839.84	$3,800.00	$61,039.84	9.9	51,838
ECM 2	Retrofit Fixtures with LED Lamps	Yes	59,603	17.9	0.0	$7,114.72	$54,854.34	$8,400.00	$46,454.34	6.5	60,020
Lighting Control Measures			**8,006**	**2.1**	**0.0**	**$955.70**	**$12,432.00**	**$880.00**	**$11,552.00**	**12.1**	**8,062**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	6,003	1.6	0.0	$716.57	$9,032.00	$880.00	$8,152.00	11.4	6,045
ECM 4	Install High/Low Lighitng Controls	Yes	2,003	0.5	0.0	$239.12	$3,400.00	$0.00	$3,400.00	14.2	2,017
Motor Upgrades			**853**	**0.2**	**0.0**	**$101.81**	**$3,782.84**	**$0.00**	**$3,782.84**	**37.2**	**859**
ECM 5	Premium Efficiency Motors	Yes	853	0.2	0.0	$101.81	$3,782.84	$0.00	$3,782.84	37.2	859
Variable Frequency Drive (VFD) Measures			**35,728**	**3.7**	**0.0**	**$4,264.78**	**$10,388.90**	**$0.00**	**$10,388.90**	**2.4**	**35,978**
ECM 6	Install VFDs on Hot Water Pumps	Yes	35,728	3.7	0.0	$4,264.78	$10,388.90	$0.00	$10,388.90	2.4	35,978
Electric Unitary HVAC Measures			**18,892**	**12.6**	**0.0**	**$2,255.12**	**$589,727.52**	**$57,354.00**	**$532,373.52**	**236.1**	**19,024**
	Install High Efficiency Electric AC	No	4,354	2.8	0.0	$519.75	$27,227.52	$1,104.00	$26,123.52	50.3	4,385
	Install High Efficiency Heat Pumps	No	14,538	9.8	0.0	$1,735.37	$562,500.00	$56,250.00	$506,250.00	291.7	14,640
Plug Load Equipment Control - Vending Machine			**1,612**	**0.0**	**0.0**	**$192.40**	**$230.00**	**$0.00**	**$230.00**	**1.2**	**1,623**
ECM 7	Vending Machine Control	Yes	1,612	0.0	0.0	$192.40	$230.00	$0.00	$230.00	1.2	1,623
TOTALS			**176,172**	**43.2**	**0.0**	**$21,029.41**	**$736,255.44**	**$70,434.00**	**$665,821.44**	**31.7**	**177,403**
TOTAL OF ALL RECOMMENDED ECMS			**157,280**	**31**	**0**	**$ 18,774.29**	**$ 146,527.92**	**$ 13,080.00**	**$ 133,447.92**	**7.1**	**158,379**

* - 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 measure save energy by reducing the power used by the lighting components due to improved electrical efficiency.

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

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

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

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

Food Service Equipment & Refrigeration measures generally involve improvements in the efficiency of cooking, food service, dishwashing, and food storage equipment. These measures may include more efficient convection ovens, steamers, ice machines, or refrigeration. These measures save energy by reducing the energy usage with more energy efficient equipment.

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

Energy Efficient Practices

TRC also identified eight 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 Howard C Johnson Elementary School include:

- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Perform Routine Motor Maintenance
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Clean and/or Replace HVAC Filters
- Perform Proper Water Heater Maintenance
- Install Plug Load Controls
- Water Conservation

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

On-Site Generation Measures

TRC evaluated the potential for installing on-site generation for Howard C Johnson 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	179	kW DC STC
Electric Generation	213,255	kWh/yr
Displaced Cost	$18,550	/yr
Installed Cost	$465,400	

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

1.3 Implementation Planning

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

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

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

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

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

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

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

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 or: www.njcleanenergy.com/ci.

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 5 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Michelle Richardson	Business Administrator	mrichardson@jacksonsd.org	(732) 833-4600
John Blair	Energy Education Specialist	jblair@jacksonsd.org	732-833-4600 Extn:4380
TRC Energy Services			
Smruti Srinivasan	Auditor	ssrinivasan@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On February 6, 2018, TRC Energy Services performed an energy audit at Howard C Johnson Elementary School located in Jackson Township, New Jersey. TRC's team met with John Blair to review the facility operations and help focus our investigation on specific energy-using systems.

Howard C. Johnson Elementary School is a 55,452 square foot facility comprised of spaces including classrooms, offices, cafeteria, media center, storage closets, hallways and mechanical space. This is a single-story facility. The building also has 4 trailers that are being used as classrooms. The typical hours of operation are between 9:00 AM and 3:00 PM during the weekdays. During weekends the school remains closed.

The original building was constructed in 1970 and the 5th grade wing was added in 1999. The school is conditioned using vertical ground source heat pumps located in the attics and closets. Lighting at Howard C. Johnson Elementary School consists of linear T8 tubes and a few incandescent lamp fixtures.

2.3 Building Occupancy

The typical schedule is presented in the table below. During a typical day, the facility is occupied by approximately 55 full time staff (admin, maintenance and teachers) and 467 students.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Howard C Johnson Elementary School	Weekday	9AM - 3PM
Howard C Johnson Elementary School	Weekend	No operation

2.4 Building Envelope

The building is constructed of concrete block and structural steel with a brick facade. The building has flat rubber roof sections covered with stone. The building has single pane windows. The exterior doors are constructed of aluminum and in good condition. The trailers are made of vinyl and wood.

Image 1: Building Envelope

2.5 On-Site Generation

Howard C. Johnson Elementary School does not have any on-site electric generation systems currently installed.

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 incandescent fixtures. Most of the fixtures are 2-lamp or 4-lamp, 2-foot and 4-foot long troffers and 2-foot U-bend fixtures. Linear T5 fluorescent fixtures provide illumination in selected classrooms.

Lighting control is provided by manual wall switches or occupancy sensors. The occupancy sensors are either wall or ceiling mounted depending on the space layout. The building's exterior lighting consists of 400-Watt pole fixtures and 70-Watt wall pack fixtures with high pressure sodium lamps, and canopy fixtures with 42-Watt CFL lamps. Exterior lighting for the trailers is provided by 60-Watt incandescent lamps. The exterior lights are controlled by photocells and timers. The exit lights are LED fixtures.

Image 2: Lighting System

Air Conditioning System (DX) and Heating System

Heating and cooling is provided using water source heat pumps. Ground source water is circulated throughout the school using constant speed 15 HP supply pumps. Typically, classrooms units have 2.5-ton Florida Heat Pump (FHP) units. The principal's office, teachers' room and Nurse's room are served by one 7.5-ton FHP unit. The cafeteria is served by two 8-ton FHP units. Other spaces have heat pump units ranging from 2.5 ton to 4-ton. Most of these units are between 18-20 years old. The space temperatures are controlled via Johnson Controls Metasys. Zone thermostats allow space temperature setpoints to be altered by plus or minus 1.5 degrees Fahrenheit. Stairways and vestibules are heated using electric heaters. The trailers have packaged electric heating (5 kW) and cooling (3 ton) units from Bard Manufacturing, and are approximately 20 years old. Each of the trailers has a dedicated thermostat for controlling space temperatures.

HVAC system schedules and space temperatures for the main building are controlled via building automation system provided by Johnson Control Metasys. The occupied heating set point is 70°F and occupied cooling set point is 72°F. The unoccupied heating set point is 65°F and the unoccupied cooling set point is 80°F.

Image 3: Air Conditioning and Heating Systems

Domestic Hot Water Heating System

The domestic hot water heating system for the facility consists of four electric water heaters located in spaces near the points of use. The tank capacities range 40 gallons to 52 gallons. Two of these units are 12 years old and the other two are original to the building and past useful life. It is suggested that these systems be replaced with newer units that are sized to their respective loads. The trailers have two tankless heaters in the restroom areas.

Image 4: Domestic Water Heating Systems

Food Service & Refrigeration

The school has an all-electric kitchen that consists of one convection oven, food holding cabinets, milk coolers, ice cream chest and commercial refrigerators. The kitchen functions from 8:30 AM to 2:30 PM from September through June and serves lunch to the students in the facility. The kitchen equipment was observed to be in good condition and are not evaluated for replacement.

Building Plug Load

There are approximately 34 computer work stations throughout the facility. Other office plug loads in the facility include laptops, printer, projectors and smart boards. Spaces such as the teachers' lounge and a few private offices have kitchenette equipment such as microwave over, various sizes of refrigerators, toasters, toaster ovens and coffee machines. Most of these plug loads are ENERGY STAR® equipment. There is no centralized PC power management software installed.

The teachers' lounge also has on non-refrigerated and one refrigerated vending machine in the facility. No controls were observed to be installed on them.

2.7 Water-Using Systems

The restroom faucets are rated for 2.2 gallons per minute (gpm) or lower, the toilets are rated at 1.6 gallons per flush (gpf) and the urinals are rated at 1 gpf.

3 SITE ENERGY USE AND COSTS

Utility data for electricity was analyzed to identify opportunities for savings. In addition, data for Electricity 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 3.3 for additional information.

3.1 Total Cost of Energy

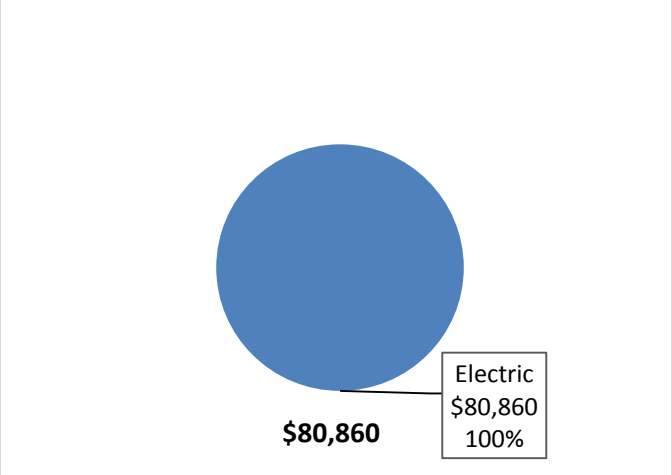
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 7 - Utility Summary

Utility Summary for Howard C Johnson Elementary School		
Fuel	**Usage**	**Cost**
Electricity	677,400 kWh	$80,860
Total		**$80,860**

The current annual energy cost for this facility is $80,860 as shown in the chart below.

Figure 8 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by JCP&L. The average electric cost over the past 12 months was $0.119/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 third party electric supply at the facility is provided by New Constellation Energy. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 9 - Electric Usage & Demand

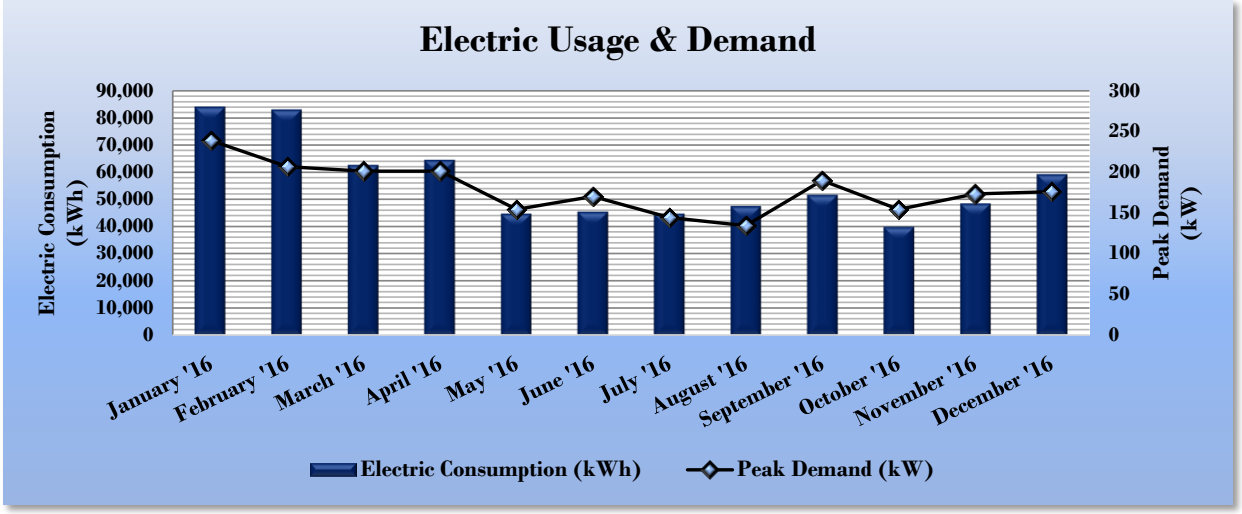


Figure 10 - Electric Usage & Demand

Electric Billing Data for Howard C Johnson Elementary School					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
1/31/16	30	84,200	239		$9,626
2/28/16	28	83,200	207		$9,355
3/31/16	32	62,800	201		$7,315
4/30/16	30	64,600	201		$7,520
5/31/16	31	44,800	154		$5,282
6/30/16	30	45,600	170		$5,599
7/31/16	31	44,800	144		$5,461
8/31/16	31	47,600	134		$5,656
9/30/16	30	51,800	190		$6,486
10/31/16	31	40,000	154		$5,069
11/30/16	30	48,600	173		$6,142
12/31/16	31	59,400	176		$7,350
Totals	**365**	**677,400**	**238.8**	**$0**	**$80,860**
Annual	**365**	**677,400**	**238.8**	**$0**	**$80,860**

3.3 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 11 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Howard C Johnson Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	130.9	141.4
Site Energy Use Intensity (kBtu/ft^2)	41.7	58.2

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

Figure 12 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Howard C Johnson Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	98.7	141.4
Site Energy Use Intensity (kBtu/ft^2)	31.4	58.2

Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. This facility has a current score of 63.

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

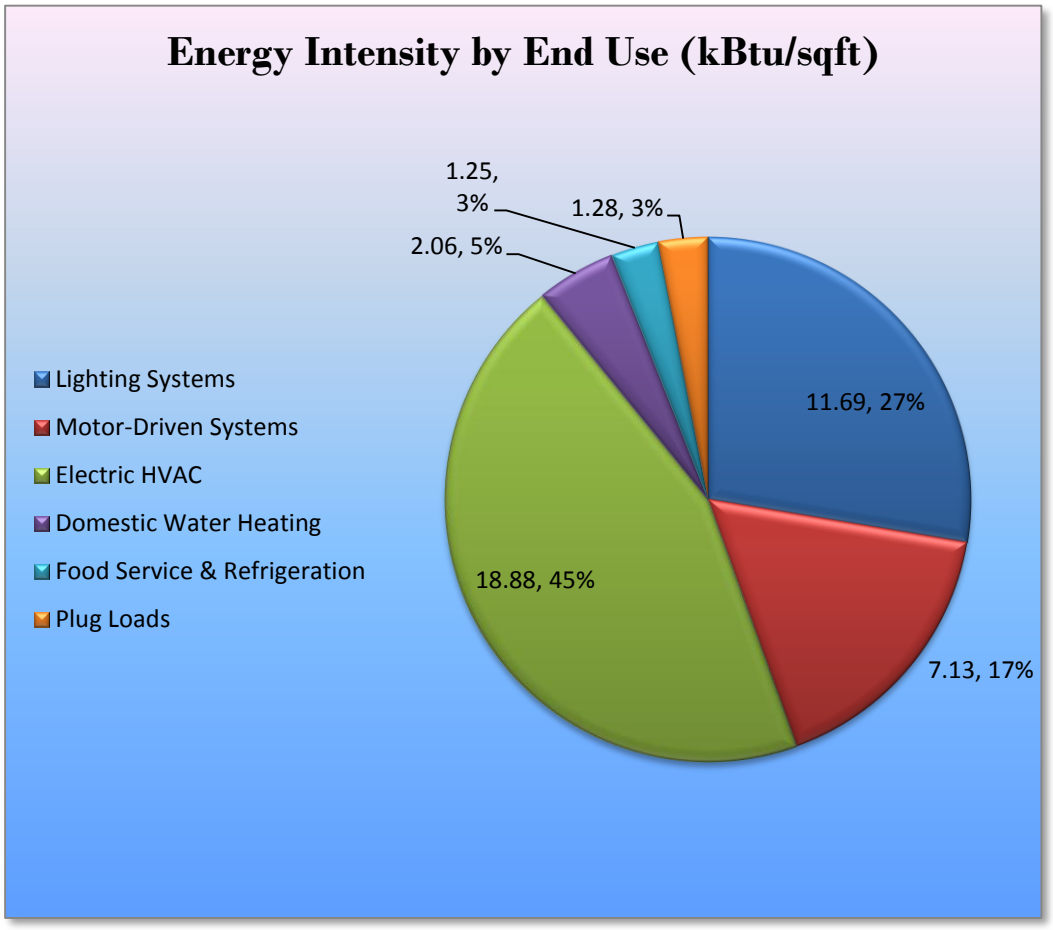
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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.

3.4 Energy End-Use Breakdown

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

Figure 13 - Energy Balance (% and kBtu/SF)



4 ENERGY CONSERVATION MEASURES

Level of Analysis

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information to the Howard C Johnson 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 14 – 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		**111,081**	**24.6**	**0.0**	**$13,259.60**	**$119,694.18**	**$12,200.00**	**$107,494.18**	**8.1**	**111,858**
ECM 1	Install LED Fixtures	51,478	6.7	0.0	$6,144.89	$64,839.84	$3,800.00	$61,039.84	9.9	51,838
ECM 2	Retrofit Fixtures with LED Lamps	59,603	17.9	0.0	$7,114.72	$54,854.34	$8,400.00	$46,454.34	6.5	60,020
Lighting Control Measures		**8,006**	**2.1**	**0.0**	**$955.70**	**$12,432.00**	**$880.00**	**$11,552.00**	**12.1**	**8,062**
ECM 3	Install Occupancy Sensor Lighting Controls	6,003	1.6	0.0	$716.57	$9,032.00	$880.00	$8,152.00	11.4	6,045
ECM 4	Install High/Low Lighitng Controls	2,003	0.5	0.0	$239.12	$3,400.00	$0.00	$3,400.00	14.2	2,017
Motor Upgrades		**853**	**0.2**	**0.0**	**$101.81**	**$3,782.84**	**$0.00**	**$3,782.84**	**37.2**	**859**
ECM 5	Premium Efficiency Motors	853	0.2	0.0	$101.81	$3,782.84	$0.00	$3,782.84	37.2	859
Variable Frequency Drive (VFD) Measures		**35,728**	**3.7**	**0.0**	**$4,264.78**	**$10,388.90**	**$0.00**	**$10,388.90**	**2.4**	**35,978**
ECM 6	Install VFDs on Hot Water Pumps	35,728	3.7	0.0	$4,264.78	$10,388.90	$0.00	$10,388.90	2.4	35,978
Plug Load Equipment Control - Vending Machine		**1,612**	**0.0**	**0.0**	**$192.40**	**$230.00**	**$0.00**	**$230.00**	**1.2**	**1,623**
ECM 7	Vending Machine Control	1,612	0.0	0.0	$192.40	$230.00	$0.00	$230.00	1.2	1,623
TOTAL OF ALL RECOMMENDED ECMS		**157,280**	**31**	**0**	**$ 18,774.29**	**$ 146,527.92**	**$ 13,080.00**	**$ 133,447.92**	**7.1**	**158,379**

* - 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 15 below.

Figure 15 – 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		**111,081**	**24.6**	**0.0**	**$13,259.60**	**$119,694.18**	**$12,200.00**	**$107,494.18**	**8.1**	**111,858**
ECM 1	Install LED Fixtures	51,478	6.7	0.0	$6,144.89	$64,839.84	$3,800.00	$61,039.84	9.9	51,838
ECM 2	Retrofit Fixtures with LED Lamps	59,603	17.9	0.0	$7,114.72	$54,854.34	$8,400.00	$46,454.34	6.5	60,020

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

ECM 1: Install LED Fixtures

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0
Exterior	51,478	6.7	0.0	$6,144.89	$64,839.84	$3,800.00	$61,039.84	9.9	51,838

Measure Description

We recommend replacing exterior pole and wallpack fixtures that contain HID lamps with new high performance LED light fixtures. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

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

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	56,546	17.5	0.0	$6,749.88	$53,187.99	$8,360.00	$44,827.99	6.6	56,942
Exterior	3,056	0.4	0.0	$364.83	$1,666.34	$40.00	$1,626.34	4.5	3,078

Measure Description

We recommend retrofitting existing incandescent and T8 lamp lighting technologies with LED lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed while leaving the fluorescent fixture ballast in place. LED bulbs can be used in existing fixtures as a direct replacement for most other lighting technologies. This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of a fluorescent tubes and more than 10 times longer than many incandescent lamps.

4.1.2 Lighting Control Measures

Our recommendations for lighting control measures are summarized in Figure 16 below.

Figure 16 – 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		**8,006**	**2.1**	**0.0**	**$955.70**	**$12,432.00**	**$880.00**	**$11,552.00**	**12.1**	**8,062**
ECM 3	Install Occupancy Sensor Lighting Controls	6,003	1.6	0.0	$716.57	$9,032.00	$880.00	$8,152.00	11.4	6,045
ECM 4	Install High/Low Lighitng Controls	2,003	0.5	0.0	$239.12	$3,400.00	$0.00	$3,400.00	14.2	2,017

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)
6,003	1.6	0.0	$716.57	$9,032.00	$880.00	$8,152.00	11.4	6,045

Measure Description

We recommend installing occupancy sensors to control lighting fixtures that are currently controlled by manual switches in selected restrooms, storage rooms, classrooms and offices areas. 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)
2,003	0.5	0.0	$239.12	$3,400.00	$0.00	$3,400.00	14.2	2,017

Measure Description

We recommend installing occupancy sensors to provide dual level lighting control for lighting fixtures in the hallways that are infrequently occupied but may require some level of continuous lighting for safety or security reasons.

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

For this type of measure the occupancy sensors will generally be ceiling or fixture mounted. Sufficient sensor coverage needs to be provided to ensure that lights turn on in each area as an occupant approaches. Additional savings from reduced lighting maintenance may also result from this measure, due to reduced lamp operation.

4.1.3 Motor Upgrades

Our recommendations for motor upgrades measures are summarized in Figure 17 below.

Figure 17 – Summary of Motor 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)
Motor Upgrades		**853**	**0.2**	**0.0**	**$101.81**	**$3,782.84**	**$0.00**	**$3,782.84**	**37.2**	**859**
ECM 5	Premium Efficiency Motors	853	0.2	0.0	$101.81	$3,782.84	$0.00	$3,782.84	37.2	859

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)
853	0.2	0.0	$101.81	$3,782.84	$0.00	$3,782.84	37.2	859

Measure Description

We recommend replacing the two 15 HP, standard efficiency, water-source heat pump circulation motors with *NEMA Premium™* efficiency motors. Our evaluation assumes that existing motors will be replaced with motors of equivalent size and type. Although occasionally additional savings can be achieved by downsizing motors to better meet the motor's current load requirements. The base case motor efficiencies are estimated from nameplate information and our best estimates of motor run hours. Efficiencies of proposed motor upgrades are obtained from the New Jersey's Clean Energy Program Protocols to Measure Resource Savings (2016). Savings are based on the difference between baseline and proposed efficiencies and the assumed annual operating hours.

While the payback for replacing the motors is long, new inverter rated motors will be required for the variable frequency drives also recommended for the hot water system. Additionally, the existing motors are close to the end of useful life and should be replaced as a safeguard to ensure uninterrupted operation of the circulation system.

4.1.4 Variable Frequency Drive Measures

Our recommendations for variable frequency drive (VFD) measures are summarized in Figure 18 below.

Figure 18 – 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		**35,728**	**3.7**	**0.0**	**$4,264.78**	**$10,388.90**	**$0.00**	**$10,388.90**	**2.4**	**35,978**
ECM 6	Install VFDs on Hot Water Pumps	35,728	3.7	0.0	$4,264.78	$10,388.90	$0.00	$10,388.90	2.4	35,978

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)
35,728	3.7	0.0	$4,264.78	$10,388.90	$0.00	$10,388.90	2.4	35,978

Measure Description

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

4.1.5 Plug Load Equipment Control - Vending Machines

Our recommendations for plug load equipment controls are summarized in Figure 19 below.

Figure 19 – Summary of Plug Load Equipment 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)
Plug Load Equipment Control - Vending Machine		**1,612**	**0.0**	**0.0**	**$192.40**	**$230.00**	**$0.00**	**$230.00**	**1.2**	**1,623**
ECM 7	Vending Machine Control	1,612	0.0	0.0	$192.40	$230.00	$0.00	$230.00	1.2	1,623

ECM 7: Vending Machine Control

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,612	0.0	0.0	$192.40	$230.00	$0.00	$230.00	1.2	1,623

Measure Description

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

4.2 ECMs Evaluated But Not Recommended

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

Figure 20 – 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)
Electric Unitary HVAC Measures	**18,892**	**12.6**	**0.0**	**$2,255.12**	**$589,727.52**	**$57,354.00**	**$532,373.52**	**236.1**	**19,024**
Install High Efficiency Electric AC	4,354	2.8	0.0	$519.75	$27,227.52	$1,104.00	$26,123.52	50.3	4,385
Install High Efficiency Heat Pumps	14,538	9.8	0.0	$1,735.37	$562,500.00	$56,250.00	$506,250.00	291.7	14,640
TOTALS	**18,892**	**12.6**	**0.0**	**$2,255.12**	**$589,727.52**	**$57,354.00**	**$532,373.52**	**236.1**	**19,024**

* - 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 High Efficiency Air Conditioning Units

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
4,354	2.8	0.0	$519.75	$27,227.52	$1,104.00	$26,123.52	50.3	4,385

Measure Description

We typically 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.

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)
14,538	9.8	0.0	$1,735.37	$562,500.00	$56,250.00	$506,250.00	291.7	14,640

Measure Description

We typically 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

The equipment addressed by the two evaluated measures above is approaching the end of useful life, and was therefore evaluated for replacement. The payback periods for investments in the replacement equipment is longer than the expected useful life of the proposed replacement equipment.

The measures are therefore not cost effective on the basis of energy savings alone. As the District plans for replacement of this equipment, we suggest consideration be given to replacement with a higher efficiency equivalents of the respective units.

5 ENERGY EFFICIENT PRACTICES

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

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.

Develop a Lighting Maintenance Schedule

In addition to routine fixture cleaning, development of a maintenance schedule can both ensure maintenance is performed regularly and can reduce the overall cost of fixture re-lamping and re-ballasting. By re-lamping and re-ballasting fixtures in groups, lighting levels are better maintained and the number of site visits by a lighting technician or contractor can be minimized, decreasing the overall cost of maintenance.

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.

Practice Proper Use of Thermostat Schedules and Temperature Resets

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

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.

Perform Proper Water Heater Maintenance

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

Plug Load Controls

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

Water Conservation

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

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

6 On-Site Generation Measures

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

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

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

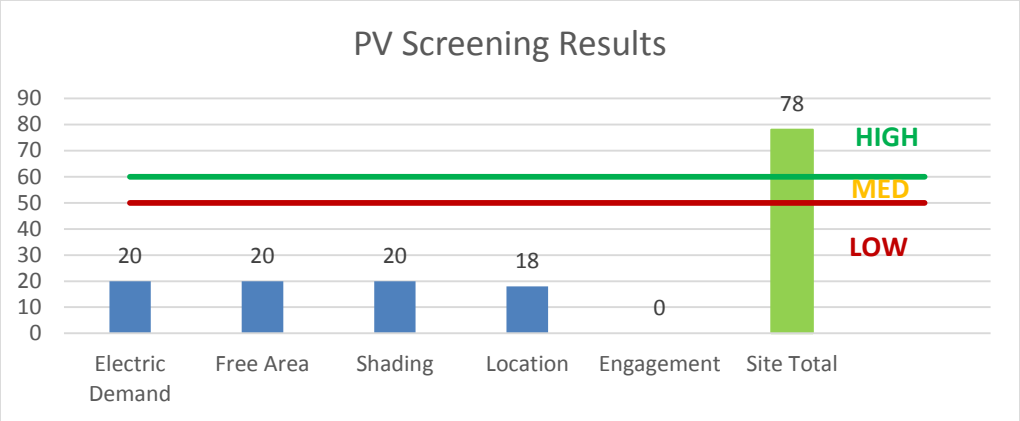
6.1 Photovoltaic

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

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

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

Figure 21 - Photovoltaic Screening



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

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

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

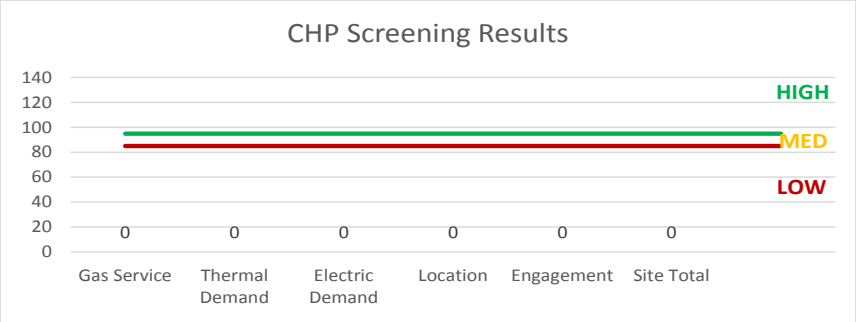
6.2 Combined Heat and Power

Combined heat and power (CHP) is the on-site generation of electricity along with the recovery of heat energy, which is put to beneficial use. Common technologies for CHP include reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines. Electric generation from a CHP system is typically interconnected to local power distribution systems. Heat is recovered from exhaust and ancillary cooling systems and interconnected to the existing hot water (or steam) distribution systems.

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

A preliminary screening based on heating and electrical demand, siting, and interconnection shows that the facility has a Low potential for installing a cost-effective CHP system.Lack of gas service is the most significant factor contributing to the potential for CHP at the site. In our opinion, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation. For a list of qualified firms in New Jersey specializing in commercial CHP cost assessment and installation, go to: http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/.

Figure 22 - 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, this school is not a good candidate for the demand response program.

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

Figure 23 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	Pay For Performance Existing Buildings
ECM 1	Install LED Fixtures	x	x
ECM 2	Retrofit Fixtures with LED Lamps	x	x
ECM 3	Install Occupancy Sensor Lighting Controls	x	x
ECM 4	Install High/Low Lighitng Controls		x
ECM 5	Premium Efficiency Motors	x	x
ECM 6	Install VFDs on Hot Water Pumps		x
ECM 7	Vending Machine Control		x

SmartStart is generally well-suited for implementation of individual measures or small group of measures. It provides flexibility to install measures at your own pace using in-house staff or a preferred contractor. 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.

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

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

8.1 SmartStart

Overview

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

Equipment with Prescriptive Incentives Currently Available:

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

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

Incentives

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

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

How to Participate

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

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

8.2 Pay for Performance - Existing Buildings

Overview

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

Incentives

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

How to Participate

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

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

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

8.3 SREC Registration Program

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

After the registration is accepted, construction is complete, and final paperwork has been submitted and is deemed complete, the project is issued a New Jersey certification number which enables it to generate New Jersey SRECs. SREC's 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 SREC's 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 descriptions 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
Receiving	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,160	0.09	356	0.0	$42.54	$292.50	$50.00	5.70
Outside pumproom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,160	0.02	82	0.0	$9.78	$58.50	$10.00	4.96
Pump room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,160	0.06	246	0.0	$29.35	$175.50	$30.00	4.96
Teachers' lounge	9	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	9	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.12	472	0.0	$56.31	$703.80	$125.00	10.28
Outside teachers' lounge	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,160	0.03	119	0.0	$14.23	$144.60	$30.00	8.05
Teachers' lounge restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.01	52	0.0	$6.26	$164.20	$10.00	24.65
Outside teachers' lounge hallway	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	3	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	1,512	0.08	290	0.0	$34.60	$389.60	$0.00	11.26
Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,160	0.02	82	0.0	$9.78	$58.50	$10.00	4.96
3 closets	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,160	0.13	492	0.0	$58.71	$351.00	$60.00	4.96
Room 300 closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,160	0.04	164	0.0	$19.57	$117.00	$20.00	4.96
CR 402	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,512	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.32	861	0.0	$102.74	$752.00	$150.00	5.86
CR 402	5	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Occupancy Sensor	30	1,512	Relamp	No	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.05	135	0.0	$16.09	$179.50	$25.00	9.60
CR 402 - restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.01	52	0.0	$6.26	$164.20	$10.00	24.65
CR 401	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,512	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.32	861	0.0	$102.74	$752.00	$150.00	5.86
CR 401	5	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Occupancy Sensor	30	1,512	Relamp	No	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.05	135	0.0	$16.09	$179.50	$25.00	9.60
CR 401 - restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.01	52	0.0	$6.26	$164.20	$10.00	24.65
CR 403	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,512	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.32	861	0.0	$102.74	$752.00	$150.00	5.86
CR 403	5	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Occupancy Sensor	30	1,512	Relamp	No	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.05	135	0.0	$16.09	$179.50	$25.00	9.60
CR 403 - restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.01	52	0.0	$6.26	$164.20	$10.00	24.65
CR 404	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,512	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.32	861	0.0	$102.74	$752.00	$150.00	5.86
CR 404	5	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Occupancy Sensor	30	1,512	Relamp	No	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.05	135	0.0	$16.09	$179.50	$25.00	9.60
CR 404 - restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.01	52	0.0	$6.26	$164.20	$10.00	24.65
Hallway 401-421	7	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	7	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	1,512	0.18	676	0.0	$80.74	$642.40	$0.00	7.96
Hallway skylights	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,512	0.03	104	0.0	$12.36	$58.50	$10.00	3.92
Nurse's office	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	6	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,512	0.15	580	0.0	$69.21	$649.20	$35.00	8.87

	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
Nurse's office restroom	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.03	105	0.0	$12.51	$212.40	$20.00	15.38
Nurse's office hallway	7	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	7	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	1,512	0.18	676	0.0	$80.74	$642.40	$0.00	7.96
Nurse's office hallway	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,512	0.03	104	0.0	$12.36	$58.50	$10.00	3.92
Main office	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	1,512	Relamp	No	6	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,512	0.11	303	0.0	$36.12	$379.20	$0.00	10.50
Principal's office	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	1,512	Relamp	No	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,512	0.08	202	0.0	$24.08	$252.80	$0.00	10.50
Principal's office restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.01	52	0.0	$6.26	$164.20	$10.00	24.65
Janitor's closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.03	104	0.0	$12.36	$174.50	$10.00	13.30
Cafeteria	30	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,160	Relamp	Yes	30	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,512	1.44	5,470	0.0	$652.92	$3,934.00	$740.00	4.89
Cafeteria	16	Compact Fluorescent: 1 Lamp	Wall Switch	42	2,160	Relamp	Yes	16	LED Screw-In Lamps: 1 Lamp	Occupancy Sensor	29	1,512	0.22	851	0.0	$101.62	$860.05	$35.00	8.12
Kitchen	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,160	0.39	1,475	0.0	$176.13	$1,053.00	$180.00	4.96
Kitchen storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.03	104	0.0	$12.36	$174.50	$10.00	13.30
Kitchen office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.03	104	0.0	$12.36	$174.50	$10.00	13.30
Kitchen restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.03	104	0.0	$12.36	$174.50	$10.00	13.30
Copy room	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,512	0.08	290	0.0	$34.60	$459.60	$35.00	12.27
Entrance	7	Incandescent: 1 Lamp	Wall Switch	60	2,160	Relamp	No	7	LED Screw-In Lamps: 1 Lamp	Wall Switch	9	2,160	0.23	887	0.0	$105.85	$376.27	$35.00	3.22
Entrance	6	Compact Fluorescent: 1 Lamp	Wall Switch	42	2,160	Relamp	No	6	LED Screw-In Lamps: 1 Lamp	Wall Switch	29	2,160	0.05	188	0.0	$22.42	$322.52	$0.00	14.39
Entrance	3	Incandescent: 1 Lamp	Wall Switch	100	2,160	Relamp	No	3	LED Screw-In Lamps: 1 Lamp	Wall Switch	15	2,160	0.17	633	0.0	$75.61	$293.56	$15.00	3.68
Hallway - reading	7	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	7	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	1,512	0.18	676	0.0	$80.74	$642.40	$0.00	7.96
Hallway - reading	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,512	0.03	104	0.0	$12.36	$58.50	$10.00	3.92
Reading room 340	12	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	1,512	Relamp	No	12	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,512	0.23	605	0.0	$72.23	$758.40	$0.00	10.50
Office 341	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	1,512	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,512	0.04	101	0.0	$12.04	$126.40	$0.00	10.50
Faculty Women's restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.05	207	0.0	$24.73	$233.00	$20.00	8.61
Faculty Men's restroom	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.08	311	0.0	$37.09	$445.50	$65.00	10.26
Custodial closet	1	Incandescent: 1 Lamp	Wall Switch	40	2,160	Relamp	No	1	LED Screw-In Lamps: 1 Lamp	Wall Switch	6	2,160	0.02	84	0.0	$10.08	$53.75	$5.00	4.84
OT/PT	26	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,512	Relamp	No	26	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.84	2,238	0.0	$267.13	$1,955.20	$390.00	5.86

	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
Speech office	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	1,512	Relamp	No	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,512	0.08	202	0.0	$24.08	$252.80	$0.00	10.50
Room 306 - office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.11	414	0.0	$49.46	$350.00	$60.00	5.86
Room 302 - Hallway	7	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	7	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	1,512	0.18	676	0.0	$80.74	$642.40	$0.00	7.96
CR 304	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,512	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.26	689	0.0	$82.19	$601.60	$120.00	5.86
CR 304	5	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Occupancy Sensor	30	1,512	Relamp	No	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.05	135	0.0	$16.09	$179.50	$25.00	9.60
CR 304 - restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.01	52	0.0	$6.26	$164.20	$10.00	24.65
CR 301	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,512	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.39	1,033	0.0	$123.29	$902.40	$180.00	5.86
CR 301	5	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Occupancy Sensor	30	1,512	Relamp	No	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.05	135	0.0	$16.09	$179.50	$25.00	9.60
CR 301 - restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.01	52	0.0	$6.26	$164.20	$10.00	24.65
CR 302	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,512	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.39	1,033	0.0	$123.29	$902.40	$180.00	5.86
CR 302	5	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Occupancy Sensor	30	1,512	Relamp	No	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.05	135	0.0	$16.09	$179.50	$25.00	9.60
CR 302 - restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.01	52	0.0	$6.26	$164.20	$10.00	24.65
CR 303	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,512	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.39	1,033	0.0	$123.29	$902.40	$180.00	5.86
CR 303	5	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Occupancy Sensor	30	1,512	Relamp	No	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.05	135	0.0	$16.09	$179.50	$25.00	9.60
CR 303 - restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.01	52	0.0	$6.26	$164.20	$10.00	24.65
Hallway receiving	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	1,512	0.10	387	0.0	$46.14	$452.80	$0.00	9.81
Hallway receiving	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,512	0.08	311	0.0	$37.09	$175.50	$30.00	3.92
Hallway 200	12	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	12	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	1,512	0.31	1,160	0.0	$138.41	$1,558.40	$0.00	11.26
Hallway 200	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,512	0.05	207	0.0	$24.73	$117.00	$20.00	3.92
Custodial closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,160	0.02	82	0.0	$9.78	$58.50	$10.00	4.96
Girls' restroom	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.14	518	0.0	$61.82	$562.50	$85.00	7.72
Boys' restroom	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.14	518	0.0	$61.82	$562.50	$85.00	7.72
Teacher's restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.01	52	0.0	$6.26	$164.20	$10.00	24.65
Room 211	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,512	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.32	861	0.0	$102.74	$752.00	$150.00	5.86
Room 211	5	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Occupancy Sensor	30	1,512	Relamp	No	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.05	135	0.0	$16.09	$179.50	$25.00	9.60

	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 212	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,512	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.32	861	0.0	$102.74	$752.00	$150.00	5.86
Room 212	5	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Occupancy Sensor	30	1,512	Relamp	No	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.05	135	0.0	$16.09	$179.50	$25.00	9.60
Room 201	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,512	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.32	861	0.0	$102.74	$752.00	$150.00	5.86
Room 201	5	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Occupancy Sensor	30	1,512	Relamp	No	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.05	135	0.0	$16.09	$179.50	$25.00	9.60
Room 213	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,512	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.32	861	0.0	$102.74	$752.00	$150.00	5.86
Room 213	5	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Occupancy Sensor	30	1,512	Relamp	No	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.05	135	0.0	$16.09	$179.50	$25.00	9.60
Room 202	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,512	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.32	861	0.0	$102.74	$752.00	$150.00	5.86
Room 202	5	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Occupancy Sensor	30	1,512	Relamp	No	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.05	135	0.0	$16.09	$179.50	$25.00	9.60
Room 214	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,512	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.32	861	0.0	$102.74	$752.00	$150.00	5.86
Room 214	5	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Occupancy Sensor	30	1,512	Relamp	No	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.05	135	0.0	$16.09	$179.50	$25.00	9.60
Room 203	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,512	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.32	861	0.0	$102.74	$752.00	$150.00	5.86
Room 203	5	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Occupancy Sensor	30	1,512	Relamp	No	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.05	135	0.0	$16.09	$179.50	$25.00	9.60
5th grade hall	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,512	0.11	414	0.0	$49.46	$434.00	$40.00	7.97
5th grade hall	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,512	0.03	104	0.0	$12.36	$58.50	$10.00	3.92
5th grade hall entrance	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,512	0.05	207	0.0	$24.73	$117.00	$20.00	3.92
Room 216	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,512	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.39	1,033	0.0	$123.29	$902.40	$180.00	5.86
Room 215	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,512	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.39	1,033	0.0	$123.29	$902.40	$180.00	5.86
Room 204	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,512	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.39	1,033	0.0	$123.29	$902.40	$180.00	5.86
Room 205	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,512	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.39	1,033	0.0	$123.29	$902.40	$180.00	5.86
Girls' restroom	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.16	621	0.0	$74.19	$621.00	$95.00	7.09
Boys' restroom	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.16	621	0.0	$74.19	$621.00	$95.00	7.09
Restroom hallway	1	Compact Fluorescent: 2 Lamps	Wall Switch	26	2,160	Relamp	Yes	1	LED Screw-In Lamps: 2 Lamps	High/Low Control	18	1,512	0.01	33	0.0	$3.93	$307.51	$10.00	75.67
Restroom hallway	1	Compact Fluorescent: 2 Lamps	Wall Switch	26	2,160	Relamp	Yes	1	LED Screw-In Lamps: 2 Lamps	High/Low Control	18	1,512	0.01	33	0.0	$3.93	$307.51	$10.00	75.67
Electrical closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,160	0.02	82	0.0	$9.78	$58.50	$10.00	4.96
Media center hallway	7	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	7	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	1,512	0.18	676	0.0	$80.74	$642.40	$0.00	7.96

	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
Media center hallway	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,512	0.03	104	0.0	$12.36	$58.50	$10.00	3.92
Annex room	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.33	1,243	0.0	$148.37	$972.00	$155.00	5.51
Media center hallway	8	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	8	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	1,512	0.20	773	0.0	$92.27	$705.60	$0.00	7.65
Media center hallway	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,512	0.05	207	0.0	$24.73	$117.00	$20.00	3.92
Media center	31	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,512	Relamp	No	31	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	1.01	2,668	0.0	$318.50	$2,331.20	$465.00	5.86
Media center	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	1,512	Relamp	No	6	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,512	0.11	303	0.0	$36.12	$379.20	$0.00	10.50
Media center storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.03	104	0.0	$12.36	$174.50	$10.00	13.30
Media center office	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	1,512	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,512	0.02	50	0.0	$6.02	$63.20	$0.00	10.50
329 - Sensory room	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,160	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,160	0.04	139	0.0	$16.60	$95.13	$20.00	4.52
Girls' restroom	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.14	518	0.0	$61.82	$562.50	$85.00	7.72
Boys' restroom	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.14	518	0.0	$61.82	$562.50	$85.00	7.72
Teachers' restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.01	52	0.0	$6.26	$164.20	$10.00	24.65
Room 101	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,160	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.41	1,554	0.0	$185.47	$1,022.00	$185.00	4.51
Room 101	5	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Wall Switch	30	2,160	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.07	247	0.0	$29.43	$179.50	$60.00	4.06
Room 111	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,160	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.41	1,554	0.0	$185.47	$1,022.00	$185.00	4.51
Room 111	5	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Wall Switch	30	2,160	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.07	247	0.0	$29.43	$179.50	$60.00	4.06
Room 102	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,160	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.41	1,554	0.0	$185.47	$1,022.00	$185.00	4.51
Room 102	5	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Wall Switch	30	2,160	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.07	247	0.0	$29.43	$179.50	$60.00	4.06
Room 112	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,160	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.41	1,554	0.0	$185.47	$1,022.00	$185.00	4.51
Room 112	5	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Wall Switch	30	2,160	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.07	247	0.0	$29.43	$179.50	$60.00	4.06
Room 103	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,160	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.41	1,554	0.0	$185.47	$1,022.00	$185.00	4.51
Room 103	5	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Wall Switch	30	2,160	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.07	247	0.0	$29.43	$179.50	$60.00	4.06
Room 113	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,160	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.41	1,554	0.0	$185.47	$1,022.00	$185.00	4.51
Room 113	5	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Wall Switch	30	2,160	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.07	247	0.0	$29.43	$179.50	$60.00	4.06
Room 104	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,160	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.41	1,554	0.0	$185.47	$1,022.00	$185.00	4.51

	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 104	5	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Wall Switch	30	2,160	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.07	247	0.0	$29.43	$179.50	$60.00	4.06
Room 105	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,160	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.41	1,554	0.0	$185.47	$1,022.00	$185.00	4.51
Room 105	5	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Wall Switch	30	2,160	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.07	247	0.0	$29.43	$179.50	$60.00	4.06
Room 114	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,160	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.41	1,554	0.0	$185.47	$1,022.00	$185.00	4.51
Room 114	5	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Wall Switch	30	2,160	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.07	247	0.0	$29.43	$179.50	$60.00	4.06
100 Hallway	13	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	13	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	1,512	0.33	1,256	0.0	$149.95	$1,221.60	$0.00	8.15
100 Hallway	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,512	0.05	207	0.0	$24.73	$117.00	$20.00	3.92
Stage	18	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,160	Relamp	No	18	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,160	0.66	2,504	0.0	$298.88	$1,712.40	$360.00	4.52
Room 344	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.08	311	0.0	$37.09	$291.50	$50.00	6.51
Room 344 closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,160	0.02	82	0.0	$9.78	$58.50	$10.00	4.96
Room 327	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.03	104	0.0	$12.36	$174.50	$10.00	13.30
Pole with 1 fixture	28	High-Pressure Sodium: (1) 400W Lamp	Wall Switch	465	4,380	Fixture Replacement	No	28	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Wall Switch	140	4,380	5.97	45,907	0.0	$5,479.89	$54,683.80	$2,800.00	9.47
Pole with 2 fixture	4	High-Pressure Sodium: (1) 400W Lamp	Wall Switch	800	4,380	Fixture Replacement	No	4	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Wall Switch	240	4,380	1.47	11,283	0.0	$1,346.82	$7,811.97	$400.00	5.50
Canopy	23	Compact Fluorescent: 1 Lamp	Wall Switch	42	4,380	Relamp	No	23	LED Screw-In Lamps: 1 Lamp	Wall Switch	29	4,380	0.19	1,460	0.0	$174.25	$1,236.32	$0.00	7.10
Wall packs	6	High-Pressure Sodium: (1) 70W Lamp	Wall Switch	95	4,380	Fixture Replacement	No	6	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	29	4,380	0.26	2,010	0.0	$239.90	$2,344.06	$600.00	7.27
Trailers	8	Incandescent: 1 Lamp	Wall Switch	60	4,380	Relamp	No	8	LED Screw-In Lamps: 1 Lamp	Wall Switch	9	4,380	0.27	2,055	0.0	$245.31	$430.02	$40.00	1.59
All school and trailers	16	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	16	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Motor Inventory & Recommendations

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	ERU 5 - Hallways	2	Supply Fan	1.5	86.5%	Yes	2,745	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ERU 5 - Hallways	2	Exhaust Fan	1.5	86.5%	Yes	2,745	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ERU 6 - Hallways	1	Supply Fan	2.0	86.5%	Yes	2,745	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ERU 6 - Hallways	1	Exhaust Fan	2.0	86.5%	Yes	2,745	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ERU 5	1	Supply Fan	1.5	86.5%	Yes	2,745	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ERU 5	1	Exhaust Fan	1.5	86.5%	Yes	2,745	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ERU 3	1	Supply Fan	0.3	60.0%	Yes	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ERU 3	1	Exhaust Fan	0.3	60.0%	Yes	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Hallway cooling unit	1	Supply Fan	1.0	85.5%	Yes	2,745	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof ERU 3	Principal's office, Teachers room, Nurse's office	1	Supply Fan	0.3	60.0%	Yes	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof ERU 3	Principal's office, Teachers room, Nurse's office	1	Return Fan	0.3	60.0%	Yes	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ERU 4 - hallway	1	Supply Fan	2.0	86.5%	Yes	2,745	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ERU 4 - hallway	1	Return Fan	2.0	86.5%	Yes	2,745	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	5th grade wing	1	Supply Fan	1.5	86.5%	Yes	2,745	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	5th grade wing	1	Return Fan	1.5	86.5%	Yes	2,745	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ERU 7 - Hallway	1	Supply Fan	0.5	60.0%	Yes	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ERU 7 - Hallway	1	Supply Fan	0.5	60.0%	Yes	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Pump room	2	Water-Source Heat Pump Circulation Pump	15.0	91.0%	No	3,391	Yes	92.4%	Yes	2	3.84	36,581	0.0	$4,366.59	$14,171.74	$0.00	3.25
OT/PT room 300	ERU 3	1	Supply Fan	0.3	60.0%	Yes	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
OT/PT room 300	ERU 3	1	Return Fan	0.3	60.0%	Yes	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	All school	10	Exhaust Fan	0.3	60.0%	No	2,745	No	60.0%	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
Roof	Hallway	1	Groundwater Source HP	5.00	50.00	Yes	1	Groundwater Source HP	5.00	50.00	16.00	3.60	No	1.43	2,090	0.0	$249.45	$22,500.00	$2,250.00	81.18
Roof	Principal's office, Teachers' room, Nurse's room	1	Groundwater Source HP	7.50	75.00	Yes	1	Groundwater Source HP	7.50	75.00	16.00	3.30	No	2.14	3,135	0.0	$374.17	$33,750.00	$3,375.00	81.18
Classrooms	Classroom	24	Groundwater Source HP	2.50	19.00	Yes	24	Groundwater Source HP	2.50	19.00	16.00	4.00	No	0.53	850	0.0	$101.45	$270,000.00	$27,000.00	2395.17
Addition classroom	5th grade classrooms	4	Groundwater Source HP	2.50	19.00	Yes	4	Groundwater Source HP	2.50	19.00	16.00	4.00	No	0.09	129	0.0	$15.34	$45,000.00	$4,500.00	2639.58
Hallway attic	Hallway	2	Groundwater Source HP	3.00	24.50	Yes	2	Groundwater Source HP	3.00	24.50	16.00	3.50	No	0.32	473	0.0	$56.47	$27,000.00	$2,700.00	430.34
HP 5	Cafeteria	2	Groundwater Source HP	8.00	80.00	Yes	2	Groundwater Source HP	8.00	80.00	16.00	3.20	No	3.17	4,637	0.0	$553.56	$72,000.00	$7,200.00	117.06
Attic -HP7	Music/Reading	1	Groundwater Source HP	4.00	36.50	Yes	1	Groundwater Source HP	4.00	36.50	16.00	3.50	No	0.38	563	0.0	$67.16	$18,000.00	$1,800.00	241.22
Attic -HP7	IMC	2	Groundwater Source HP	4.00	36.50	Yes	2	Groundwater Source HP	4.00	36.50	16.00	3.50	No	0.77	1,194	0.0	$142.54	$36,000.00	$3,600.00	227.31
OT/PT closet	Room 300	1	Groundwater Source HP	6.00	53.00	Yes	1	Groundwater Source HP	6.00	53.00	16.00	3.40	No	0.98	1,436	0.0	$171.40	$27,000.00	$2,700.00	141.77
Attic	5th grade hallway	1	Groundwater Source HP	2.50	19.00	Yes	1	Groundwater Source HP	2.50	19.00	16.00	5.00	No	0.02	32	0.0	$3.84	$11,250.00	$1,125.00	2639.58
Trailers	Trailers	4	Electric Resistance Heat		38.40	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Trailers	Trailers	4	Packaged AC	3.00		Yes	4	Packaged AC	3.00		14.00		No	2.81	4,354	0.0	$519.75	$27,227.52	$1,104.00	50.26
School hallway	School hallway	10	Electric Resistance Heat		17.06	No							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
Outside pump room	Kitchen	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Custodial closet	Restrooms	2	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Custodial closet	Restrooms	1	Storage Tank Water Heater (≤ 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Trailer	Trailer	2	Tankless Water Heater	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	2	Refrigerator Chest	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	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
Kitchen	1	Freezer Chest	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
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
Kitchen	1	Electric Convection Oven (Half Size)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Insulated Food Holding Cabinet (1/2 Size)	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?
Howard C Johnson ES	34	Computer	150.0	Yes
Howard C Johnson ES	29	Laptop	45.0	Yes
Howard C Johnson ES	6	Printer - Small	20.0	Yes
Howard C Johnson ES	4	Printer - Medium	60.0	Yes
Howard C Johnson ES	4	Printer - Big	218.0	Yes
Howard C Johnson ES	1	Paper shredder	150.0	Yes
Howard C Johnson ES	1	Projector	200.0	Yes
Howard C Johnson ES	6	Microwave	900.0	No
Howard C Johnson ES	2	Refrigerator - Small	20.0	No
Howard C Johnson ES	1	Refrigerator - medium	40.0	Yes
Howard C Johnson ES	3	Refrigerator - large	218.0	Yes
Howard C Johnson ES	3	Coffee machine	900.0	Yes
Howard C Johnson ES	1	Toaster	850.0	Yes
Howard C Johnson ES	1	Toaster oven	1,200.0	No
Howard C Johnson ES	1	Television	120.0	Yes
Howard C Johnson ES	1	LCD	120.0	Yes
Howard C Johnson ES	1	Space heater	1.0	Yes
Howard C Johnson ES	14	Standing fan	60.0	Yes
Howard C Johnson ES	26	Smart board	5.0	Yes

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Teachers' lounge	1	Refrigerated	Yes	0.00	1,612	0.0	$192.40	$230.00	$0.00	1.20

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Howard C. Johnson Elementary School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 55,452
Built: 1970

For Year Ending: December 31, 2016
Date Generated: April 18, 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
Howard C. Johnson Elementary School 1021 Larsen Road Jackson, New Jersey 08527	Jackson Township BOE 151 Don Connor Boulevard Jackson, NJ 08527 (732) 833-4600	Michelle Richardson 151 Don Connor Boulevard Jackson, NJ 08527 (732) 833-4600 sstewart@trcsolutions.com

Property ID: 2552300

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
41.7 kBtu/ft²

Source EUI
130.9 kBtu/ft²

Annual Energy by Fuel

Electric - Grid (kBtu)	2,311,289	(100%)

National Median Comparison

National Median Site EUI (kBtu/ft²)	46.9
National Median Source EUI (kBtu/ft²)	147.4
% Diff from National Median Source EUI	-11%

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO2e/year)	256

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)