Local Government Energy Audit:
Energy Audit Report

Cedar Creek Elementary School

Lacey Township Board of Education

200 Western Boulevard

Lanoka Harbor, NJ 08734

March 16, 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 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 Mill Pond 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, as part of a comprehensive effort to assist Lacey Township Board of Education in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

1.1 Facility Summary

Cedar Creek Elementary School is a 64,420 square foot facility comprised of a single story public school building that provides educational services at the elementary grade level, serving kindergarten and grades 1 through 4. The building was constructed in 1990.

Lighting at Cedar Creek Elementary School consists primarily of a mixture of T8 and T12 fluorescent sources, which are inefficient as compared to currently available alternatives. Cooling and ventilation are provided by split system air conditioning units in the classrooms and a package unit in the multi-purpose room. The older units are less efficient and close or past retirement age at 15-28 years. Heating is provided by unit ventilators with heating hot water (HHW) located in the zones. The facility is equipped with rooftop mounted photovoltaic array that can generate up to 65 kW. A thorough description of the facility and our observations are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC Energy Services evaluated nine (9) measures, including seven (7) high priority measures which together represent an opportunity for Cedar Creek Elementary School to reduce annual energy costs by $10,657 and annual greenhouse gas emissions by 121,485 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 10.1 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 Cedar Creek Elementary School's annual energy use by 10%.

Figure 1 –Previous 12 Month Utility Costs

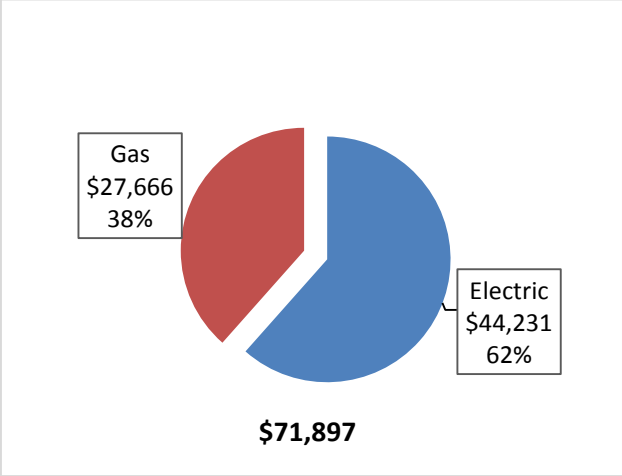
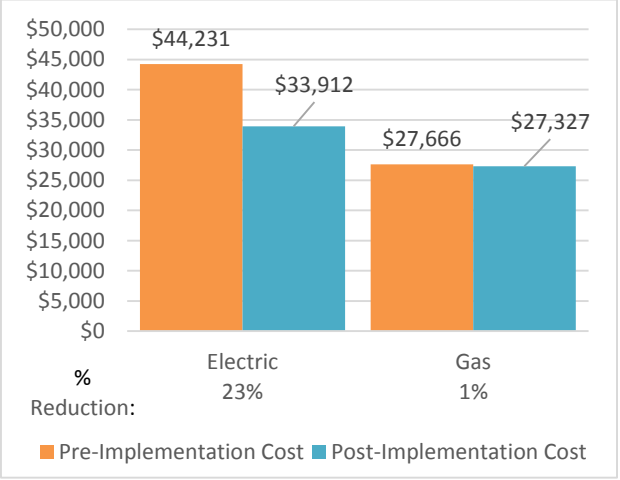


Figure 2 –Potential Post-Implementation Costs



A detailed description of Cedar Creek 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			**89,157**	**27.0**	**0.0**	**$7,884.13**	**$95,483.69**	**$7,415.00**	**$88,068.69**	**11.2**	**89,780**
ECM 1	Install LED Fixtures	Yes	13,308	7.0	0.0	$1,176.83	$52,542.85	$3,530.00	$49,012.85	41.6	13,401
ECM 2	Retrofit Fixtures with LED Lamps	Yes	75,849	20.0	0.0	$6,707.30	$42,940.84	$3,885.00	$39,055.84	5.8	76,379
Lighting Control Measures			**14,098**	**3.7**	**0.0**	**$1,246.66**	**$14,606.00**	**$1,585.00**	**$13,021.00**	**10.4**	**14,196**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	11,600	3.1	0.0	$1,025.77	$11,806.00	$1,585.00	$10,221.00	10.0	11,681
ECM 4	Install High/Low Lighitng Controls	Yes	2,498	0.7	0.0	$220.89	$2,800.00	$0.00	$2,800.00	12.7	2,515
Variable Frequency Drive (VFD) Measures			**11,819**	**3.4**	**0.0**	**$1,045.17**	**$6,536.80**	**$960.00**	**$5,576.80**	**5.3**	**11,902**
ECM 5	Install VFDs on Constant Volume (CV) HVAC	Yes	11,819	3.4	0.0	$1,045.17	$6,536.80	$960.00	$5,576.80	5.3	11,902
Electric Unitary HVAC Measures			**55,181**	**28.2**	**0.0**	**$4,879.64**	**$153,439.68**	**$8,183.00**	**$145,256.68**	**29.8**	**55,567**
	Install High Efficiency Electric AC	No	48,898	24.1	0.0	$4,324.06	$130,461.96	$7,403.00	$123,058.96	28.5	49,240
	Install High Efficiency Packaged Terminal AC/HP	No	6,283	4.0	0.0	$555.59	$22,977.72	$780.00	$22,197.72	40.0	6,327
Domestic Water Heating Upgrade			**0**	**0.0**	**34.0**	**$338.53**	**$236.61**	**$0.00**	**$236.61**	**0.7**	**3,983**
ECM 6	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	34.0	$338.53	$236.61	$0.00	$236.61	0.7	3,983
Plug Load Equipment Control - Vending Machine			**1,612**	**0.0**	**0.0**	**$142.53**	**$230.00**	**$0.00**	**$230.00**	**1.6**	**1,623**
ECM 7	Vending Machine Control	Yes	1,612	0.0	0.0	$142.53	$230.00	$0.00	$230.00	1.6	1,623
TOTALS (Recommended)			**116,686**	**34.2**	**34.0**	**$10,657.02**	**$117,093.10**	**$9,960.00**	**$107,133.10**	**10.1**	**121,485**
TOTALS (All Evaluated)			**171,867**	**62.3**	**34.0**	**$15,536.66**	**$270,532.78**	**$18,143.00**	**$252,389.78**	**16.2**	**177,051**

* - 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.

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.

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

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 15 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 Cedar Creek Elementary School include:

- Reduce Air Leakage
- Close Doors and Windows
- Use Window Treatments/Coverings
- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Perform Routine Motor Maintenance
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Check for and Seal Duct Leakage
- Perform Proper Furnace Maintenance
- Perform Proper Water Heater Maintenance
- Install Plug Load Controls
- Replace Computer Monitors
- 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 Cedar Creek Elementary School. Based on the configuration of the site and its loads there is a high potential for expanding the photovoltaic (PV) array.

Figure 4 – Photovoltaic Potential

Potential	High	
System Potential	130	kW DC STC
Electric Generation	154,879	kWh/yr
Displaced Cost	$13,470	/yr
Installed Cost	$473,200	

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

1.3 Implementation Planning

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

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

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

- SmartStart
- Direct Install

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

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

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the Energy Savings Improvement Program (ESIP). Supported directly by the NJBPU, ESIP provides government agencies with project development, design, and implementation support services, as well as,

attractive financing for implementing ECMs. An LGEA report (or other approved energy audit) is required for participation in ESIP. Please refer to Section 8.4 for additional information on the ESIP Program.

The Demand Response Energy Aggregator is a (non-NJCEP) program designed to reduce electric loads at commercial facilities, when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak power demand. Demand Response (DR) service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability. By enabling grid operators to call upon commercial facilities to reduce their electric usage during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment Service Providers provide regular payments to medium and large consumers of electric power for their participation in DR programs. Program participation is voluntary and facilities receive payments whether or not they are called upon to curtail their load during times of peak demand. Refer to Section 7 for additional information on this program.

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

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 5–Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Patrick S. DeGeorge	Business Administrator	pdegeorge@laceyschools.org	(609) 971-2000 x 1001
TRC Energy Services			
Smruti Srinivasan	Auditor	SSrinivasan@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On March 23, 2017, TRC performed an energy audit at Cedar Creek Elementary School located in Lanoka Harbor, New Jersey. TRC's team met with David Klink to review the facility operations and help focus our investigation on specific energy-using systems.

Cedar Creek Elementary School is a 64,420 square foot facility comprised of a single story public school building that provides educational services at the elementary grade level, serving kindergarten and grades 1 through 4. The building was constructed in 1990.

2.3 Building Occupancy

The school building is open Monday through Friday from approximately 7:30 AM through 3:30 PM during the school year September through June. During a typical day, the facility is occupied by a total of approximately 650 staff and students.

Figure 6- Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Cedar Creek Elementary School	Weekday	7:30 AM - 4:00 PM
Cedar Creek Elementary School	Weekend	Not occupied

2.4 Building Envelope

The Cedar Creek Elementary School building is constructed of concrete block and structural steel with a brick façade. The building has pitched roofs covered with composite shingle tiles that are in good condition. The building has double pane windows which are in good condition and show little sign of excessive infiltration. The exterior doors are constructed of metal and are in good condition.

2.5 On-Site Generation

As part of a 2009 district-wide effort, Cedar Creek Elementary School installed a 65 kW solar energy project consisting of rooftop mounted photovoltaic panels. The array was sized to displace over 15% of the sites electric use.

2.6 Energy-Using Systems

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

Lighting System

Interior lighting at the facility is provided by a combination of fixtures containing highly inefficient 40-Watt linear T12 fluorescent lamps with magnetic ballasts and fixtures contain somewhat more efficient 32-Watt linear T8 fluorescent lamps with electronic ballasts. Fixtures predominantly contain two lamps that are 4' long. The linear fluorescent fixtures are located in all areas of the building. Building exit signs use LED sources. Interior lighting control is exclusively provided by manually operated switches.

Exterior lighting consists of pole and building mounted metal halide wall pack fixtures controlled to operate only during non-daylight hours.

Hot Water Heating (HHW) System

The heating hot water system consists of two (2) boiler systems located in boiler room #1 and boiler room #2. Boiler Room #1 contains two (2) HB Smith boilers which serve the older portion of the building. Boiler Room #2 has five (5) Weil McClain boilers serving the newer portion (addition). The boilers have a nominal combustion efficiency of 80%.

Hot water distribution is via two (2) independent HHW loops. The HHW loop served by the HB Smith boilers has two (2) 3 hp pumps that operate in a lead lag sequence. The HHW loop served by the Weil McClain boilers use circulation pumps integral with the boilers.

All the heating is controlled by BMS. The boilers' HHW temperature setpoint (HHW-SP) is reset based on outside air temperature (OAT). When OAT is greater than 55°F, the boiler and HHW pumps shut down. Below 55°F the HHW-SP resets based on the OAT.

Direct Expansion Air Conditioning System (DX)

Space cooling is limited to 40% of the building; cooling is generally limited to office areas, computer rooms, library, and classrooms. Most cooled areas are served by split system air conditioning systems with capacities ranging between 1 and 3 tons, although several units are heat pumps and also provide heating capacity. Most of the cooling units are controlled by BMS. There are a few units that are not connected to the BMS but are connected to independent programmable thermostats.

Domestic Hot Water Heating System

The domestic hot water heating system for the facility consists of an AO Smith, gas-fired, 40-gallon storage tank water heater and a Rheem, gas-fired, 40-gallon storage tank water heater. The gas water heaters serve the kitchen and restrooms.

Food Service

The school has an all-electric warming kitchen. Food warming equipment consists of two (2) full sized convection ovens and one insulated food holding cabinet (Metro HM2000).

Refrigeration

The facility has two (2) cold storage areas, a walk-in cooler box and a walk-in freezer. The facility also has a reach in milk cooler and a stand up commercial refrigerator with solid door.

Building Plug Load

There are roughly 94 computer work stations throughout the facility, the majority with LCD monitors. Classroom areas are equipped with smart boards and projectors. Additional plug load includes several copiers, printers, and other office equipment. A small breakroom includes a coffee machine, refrigerator, microwave, and toaster. The faculty room has a refrigerated beverage vending machine.

2.7 Water-Using Systems

There are several faculty and student restrooms. A sampling of restrooms found that the faucets are rated for 2.5 gallons per minute (gpm) or higher. Additionally there are kitchen sink fixtures located in some classrooms and lounges. Replacement of sink aerators with low flow devices is recommended.

3 SITE ENERGY USE AND COSTS

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

3.1 Total Cost of Energy

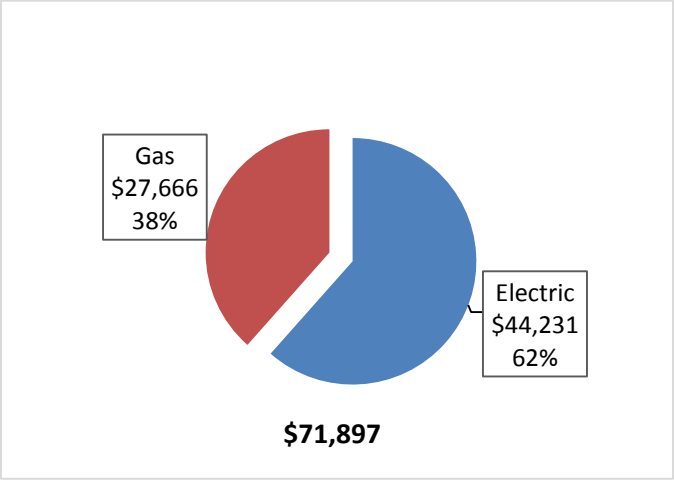
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 7 - Utility Summary

Utility Summary for Cedar Creek Elementary School		
Fuel	**Usage**	**Cost**
Electricity	500,182 kWh	$44,231
Natural Gas	27,800 Therms	$27,666
Total		**$71,897**

The current annual energy cost for this facility is $71,897 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 $0.088/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. Solar production accounts for over 15% of the facility total electricity use. Costs are not tabulated for the energy produced by the solar panels, which, brings down the site's overall cost of electricity. This rate is used throughout the analyses in this report to assess energy costs and savings. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 9 - Electric Usage & Demand

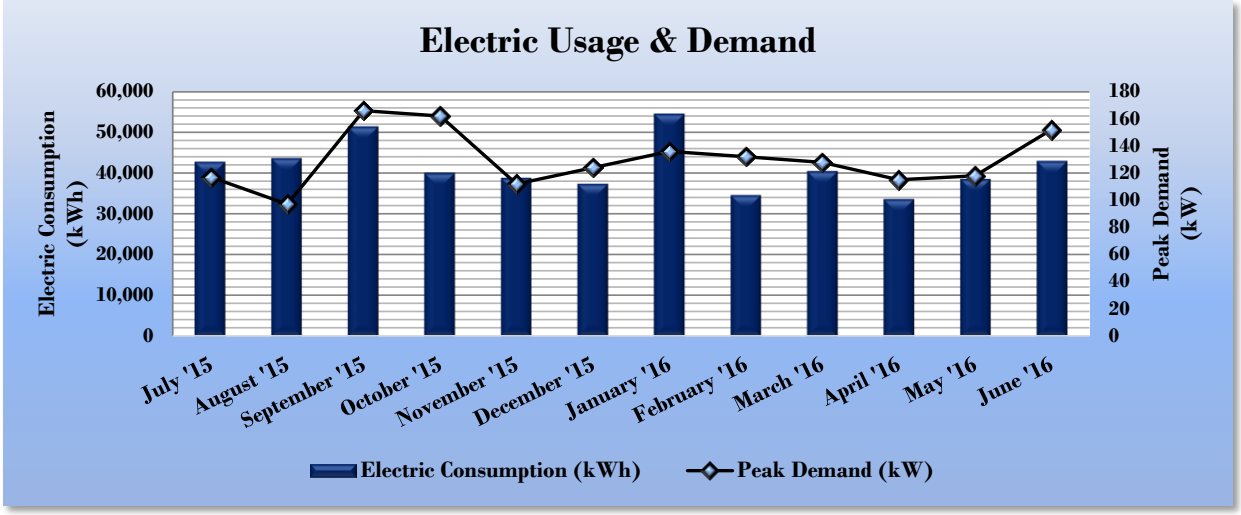


Figure 10 -Electric Usage & Demand

Electric Billing Data for Cedar Creek Elementary School					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
7/24/15	30	42,644	117	$641	$3,876
8/24/15	31	43,525	97	$520	$3,787
9/23/15	30	51,243	166	$936	$5,204
10/22/15	29	39,963	162	$852	$4,129
11/23/15	32	38,719	112	$573	$3,946
12/23/15	30	37,265	124	$637	$3,908
1/25/16	33	54,400	136	$707	$3,655
2/23/16	29	34,520	132	$686	$2,173
3/23/16	29	40,379	128	$659	$2,647
4/21/16	29	33,512	115	$587	$2,231
5/20/16	29	38,437	118	$608	$3,962
6/21/16	32	42,834	152	$855	$4,471
Totals	**363**	**497,441**	**166**	**$8,261**	**$43,989**
Annual	**365**	**500,182**	**166**	**$8,307**	**$44,231**

3.3 Natural Gas Usage

Natural gas is provided by New Jersey Natural Gas. The average gas cost for the past 12 months is $0.995/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below.

Figure 11 -Natural Gas Usage

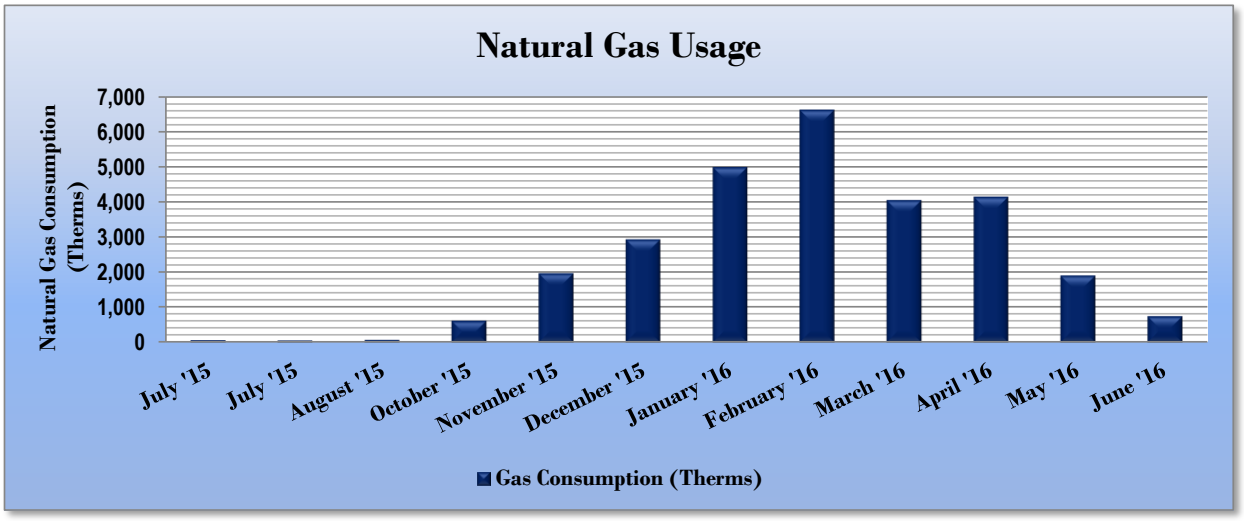


Figure 12 - Natural Gas Usage

Gas Billing Data for Cedar Creek Elementary School			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
7/17/15	30	68	517
8/13/15	27	57	508
9/15/15	33	73	521
10/16/15	31	618	952
11/16/15	31	1,967	2,016
12/18/15	32	2,924	2,797
1/18/16	31	4,978	4,437
2/18/16	31	6,604	5,736
3/17/16	28	4,039	3,687
4/19/16	33	4,134	3,763
5/19/16	30	1,900	1,979
6/20/16	32	743	1,056
Totals	**369**	**28,105**	**$27,969**
Annual	**365**	**27,800**	**$27,666**

3.4 Benchmarking

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

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

Figure 13 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Cedar Creek Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	128.5	141.4
Site Energy Use Intensity (kBtu/ft^2)	69.6	58.2

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

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

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Cedar Creek Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	108.5	141.4
Site Energy Use Intensity (kBtu/ft^2)	62.9	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 51.

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

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

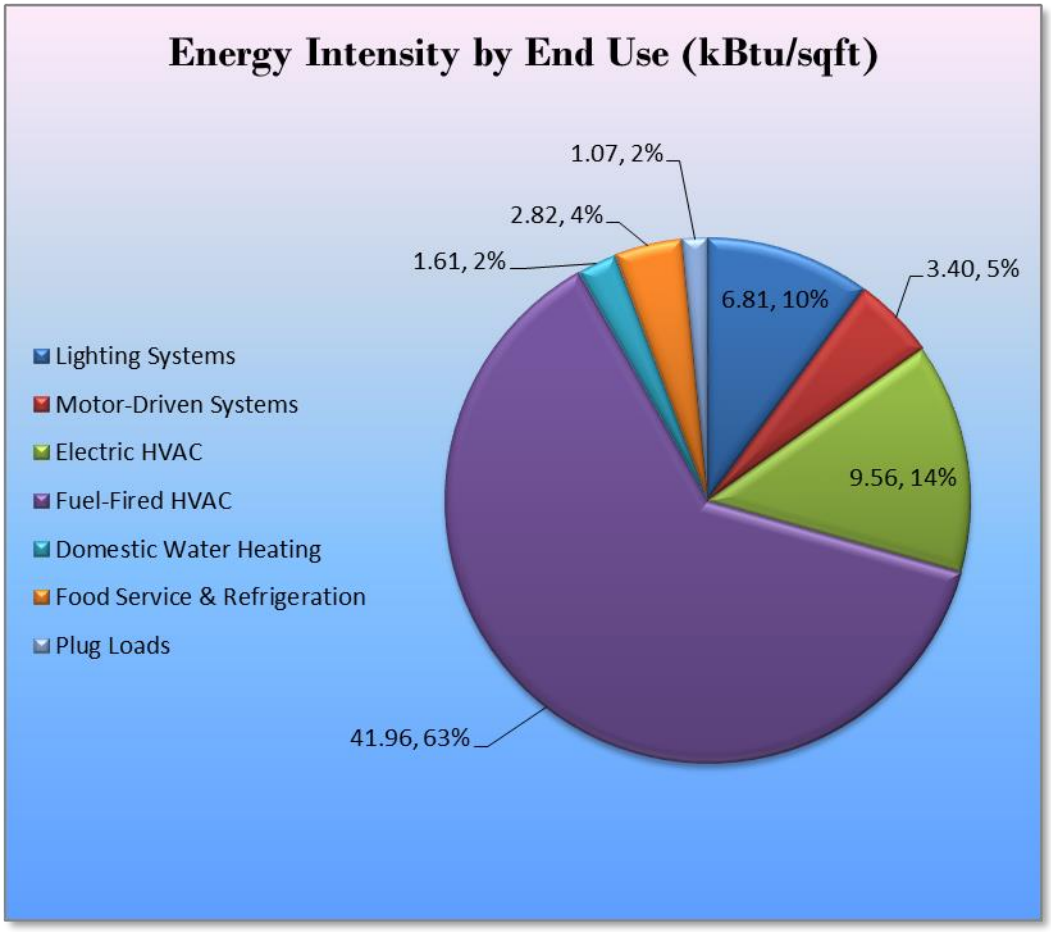
A Portfolio Manager account has been created online for your facility and you will be provided with the login information for the account. We encourage you to update your utility information in Portfolio

Manager regularly, so that you can keep track of your building's performance. Free online training is available to help you use ENERGY STAR® Portfolio Manager to track your building's performance at: https://www.energystar.gov/buildings/training.

3.5 Energy End-Use Breakdown

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

Figure 15 - Energy Balance (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 Cedar Creek 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.

4.1 Recommended ECMs

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

Figure 16 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**89,157**	**27.0**	**0.0**	**$7,884.13**	**$95,483.69**	**$7,415.00**	**$88,068.69**	**11.2**	**89,780**
ECM 1	Install LED Fixtures	13,308	7.0	0.0	$1,176.83	$52,542.85	$3,530.00	$49,012.85	41.6	13,401
ECM 2	Retrofit Fixtures with LED Lamps	75,849	20.0	0.0	$6,707.30	$42,940.84	$3,885.00	$39,055.84	5.8	76,379
Lighting Control Measures		**14,098**	**3.7**	**0.0**	**$1,246.66**	**$14,606.00**	**$1,585.00**	**$13,021.00**	**10.4**	**14,196**
ECM 3	Install Occupancy Sensor Lighting Controls	11,600	3.1	0.0	$1,025.77	$11,806.00	$1,585.00	$10,221.00	10.0	11,681
ECM 4	Install High/Low Lighitng Controls	2,498	0.7	0.0	$220.89	$2,800.00	$0.00	$2,800.00	12.7	2,515
Variable Frequency Drive (VFD) Measures		**11,819**	**3.4**	**0.0**	**$1,045.17**	**$6,536.80**	**$960.00**	**$5,576.80**	**5.3**	**11,902**
ECM 5	Install VFDs on Constant Volume (CV) HVAC	11,819	3.4	0.0	$1,045.17	$6,536.80	$960.00	$5,576.80	5.3	11,902
Domestic Water Heating Upgrade		**0**	**0.0**	**34.0**	**$338.53**	**$236.61**	**$0.00**	**$236.61**	**0.7**	**3,983**
ECM 6	Install Low-Flow Domestic Hot Water Devices	0	0.0	34.0	$338.53	$236.61	$0.00	$236.61	0.7	3,983
Plug Load Equipment Control - Vending Machine		**1,612**	**0.0**	**0.0**	**$142.53**	**$230.00**	**$0.00**	**$230.00**	**1.6**	**1,623**
ECM 7	Vending Machine Control	1,612	0.0	0.0	$142.53	$230.00	$0.00	$230.00	1.6	1,623
TOTALS		**116,686**	**34.2**	**34.0**	**$10,657.02**	**$117,093.10**	**$9,960.00**	**$107,133.10**	**10.1**	**121,485**

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

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

4.1.1 Lighting Upgrades

Recommended upgrades to existing lighting fixtures are summarized in Figure 17 below.

Figure 17 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**89,157**	**27.0**	**0.0**	**$7,884.13**	**$95,483.69**	**$7,415.00**	**$88,068.69**	**11.2**	**89,780**
ECM 1	Install LED Fixtures	13,308	7.0	0.0	$1,176.83	$52,542.85	$3,530.00	$49,012.85	41.6	13,401
ECM 2	Retrofit Fixtures with LED Lamps	75,849	20.0	0.0	$6,707.30	$42,940.84	$3,885.00	$39,055.84	5.8	76,379

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	13,308	7.0	0.0	$1,176.83	$52,542.85	$3,530.00	$49,012.85	41.6	13,401

Measure Description

We recommend replacing existing fixtures containing the exterior 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 fluorescent tube and more than 10 times longer than many incandescent lamps.

ECM 2: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	75,849	20.0	0.0	$6,707.30	$42,940.84	$3,885.00	$39,055.84	5.8	76,379
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend retrofitting existing fluorescent fixtures 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 many incandescent lamps. This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space.

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

4.1.2 Lighting Control Measures

Figure 18 – Summary of Lighting Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**14,098**	**3.7**	**0.0**	**$1,246.66**	**$14,606.00**	**$1,585.00**	**$13,021.00**	**10.4**	**14,196**
ECM 3	Install Occupancy Sensor Lighting Controls	11,600	3.1	0.0	$1,025.77	$11,806.00	$1,585.00	$10,221.00	10.0	11,681
ECM 4	Install High/Low Lighitng Controls	2,498	0.7	0.0	$220.89	$2,800.00	$0.00	$2,800.00	12.7	2,515

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)
11,600	3.1	0.0	$1,025.77	$11,806.00	$1,585.00	$10,221.00	10.0	11,681

Measure Description

We recommend installing occupancy sensors to control lighting fixtures that are currently controlled by manual switches in classrooms, offices areas, and similar spaces. 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)
2,498	0.7	0.0	$220.89	$2,800.00	$0.00	$2,800.00	12.7	2,515

Measure Description

We recommend installing occupancy sensors to provide dual level lighting control for lighting fixtures in spaces that are infrequently occupied but may require some level of continuous lighting for safety or security reasons. Typical areas for such lighting control are stairwells, interior corridors, parking lots, and parking garages.

Lighting fixtures with these controls operate at default low levels when the area is not occupied to provide minimal lighting to meet security or safety requirements. Sensors detect occupancy using ultrasonic and/or infrared sensors. The lighting systems are switched to full lighting levels whenever an occupant is

detected. Fixtures are automatically switched back to low level after an area has been vacant for a preset period of time. Energy savings results from only providing full lighting levels when it is required.

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

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

4.1.3 Variable Frequency Drive Measures

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

Figure 19 – Summary of Variable Frequency Drive ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**11,819**	**3.4**	**0.0**	**$1,045.17**	**$6,536.80**	**$960.00**	**$5,576.80**	**5.3**	**11,902**
ECM 5	Install VFDs on Constant Volume (CV) HVAC	11,819	3.4	0.0	$1,045.17	$6,536.80	$960.00	$5,576.80	5.3	11,902

ECM 5: Install VFDs on Constant Volume (CV) HVAC

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
11,819	3.4	0.0	$1,045.17	$6,536.80	$960.00	$5,576.80	5.3	11,902

Measure Description

We recommend installing variable frequency drives (VFDs) on the Gymnasium air handler units to control supply fan motor speeds to convert a constant-volume, single-zone air handling system into a variable-air-volume (VAV) system. A separate VFD is usually required to control the return fan motor. Zone thermostats will cause the VFDs to modulate fan speed to maintain the appropriate temperature in the zone, while maintaining a constant supply air temperature. Energy savings results from reducing fan speed (and power) when there is a reduced load required for the zone. The magnitude of energy savings is based on the estimated amount of time that fan motors operate at partial load.

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

4.1.4 Domestic Hot Water Heating System Upgrades

Our recommendations for domestic water heating system improvements are summarized in Figure 20 below.

Figure 20 - Summary of Domestic Water Heating ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**34.0**	**$338.53**	**$236.61**	**$0.00**	**$236.61**	**0.7**	**3,983**
ECM 6	Install Low-Flow Domestic Hot Water Devices	0	0.0	34.0	$338.53	$236.61	$0.00	$236.61	0.7	3,983

ECM 6: Install Low-Flow DHW Devices

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	34.0	$338.53	$236.61	$0.00	$236.61	0.7	3,983

Measure Description

We recommend installing low-flow domestic hot water devices to reduce overall hot water demand. Energy demand from domestic hot water heating systems can be reduced by reducing water usage in general. Faucet aerators can reduce hot water usage, relative to standard aerators, which saves energy. Pre-rinse spray valves (PRSVs)—often used in commercial and institutional kitchens—are designed to remove food waste from dishes prior to dishwashing. Replacing standard pre-rinse spray valves with low flow PRSVs will reduce hot water usage and save energy.

Low-flow devices reduce the overall water flow from the fixture, while still adequate pressure for washing. This reduces the amount of water used per day resulting in energy and water savings.

4.1.5 Plug Load Equipment Control - Vending Machines

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	$142.53	$230.00	$0.00	$230.00	1.6	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 21 – 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	**55,181**	**28.2**	**0.0**	**$4,879.64**	**$153,439.68**	**$8,183.00**	**$145,256.68**	**29.8**	**55,567**
Install High Efficiency Electric AC	48,898	24.1	0.0	$4,324.06	$130,461.96	$7,403.00	$123,058.96	28.5	49,240
Install High Efficiency Packaged Terminal AC/HP	6,283	4.0	0.0	$555.59	$22,977.72	$780.00	$22,197.72	40.0	6,327
TOTALS	**55,181**	**28.2**	**0.0**	**$4,879.64**	**$153,439.68**	**$8,183.00**	**$145,256.68**	**29.8**	**55,567**

* - 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)
48,898	24.1	0.0	$4,324.06	$130,461.96	$7,403.00	$123,058.96	28.5	49,240

Measure Description

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

Reasons for not Recommending

Although there is energy savings with replacing these old packaged air conditioning units, the installation costs outweigh the energy cost savings. The economics of replacing the units to save energy cannot be justified on energy savings alone and therefore are not currently recommended.

Install High Efficiency PTAC/PTHP

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)
6,283	4.0	0.0	$555.59	$22,977.72	$780.00	$22,197.72	40.0	6,327

Measure Description

We recommend replacing packaged terminal air conditioners and heat pumps (PTAC and PTHP) with high efficiency PTAC and PTHP. 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 for heat pumps. 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

Although there is energy savings with replacing these packaged terminal air conditioners and heat pumps, the installation costs outweigh the energy cost savings. The economics of replacing the units to save energy cannot be justified on energy savings alone and therefore are not currently recommended.

5 ENERGY EFFICIENT PRACTICES

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

Reduce Air Leakage

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

Close Doors and Windows

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

Use Window Treatments/Coverings

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

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 Evaporator/Condenser Coils on AC Systems

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

Clean and/or Replace HVAC Filters

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

Check for and Seal Duct Leakage

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

Perform Proper Furnace Maintenance

Preventative furnace maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. Following the manufacturer's instructions, a yearly tune-up should include tasks such as checking for gas / carbon monoxide leaks; changing the air and fuel filters; checking components for cracks, corrosion, dirt, or debris build-up; ensuring the ignition system is working properly; testing and adjusting operation and safety controls; inspecting the electrical connections; and ensuring proper lubrication for motors and bearings.

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.

Replace Computer Monitors

Replacing old computer monitors or displays with efficient monitors will reduce energy use. ENERGY STAR® rated monitors have specific requirements for on mode power consumption as well as idle and sleep mode power. According to the ENERGY STAR® website monitors that have earned the ENERGY STAR® label are 25% more efficient than standard monitors.

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 gallons per flush (gpf) and toilets that use as little as 1.28 gpf (this is lower than the current 1.6 gpf federal standard).

Refer to Section 4.1.4 for any low-flow ECM recommendations.

6 On-Site Generation Measures

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

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

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

6.1 Photovoltaic

Cedar Creek Elementary School has a 65 kW photovoltaic (PV) system installed on the roof. The systems provides only 15% of the electricity required by the facility. 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 expanding the existing PV array.

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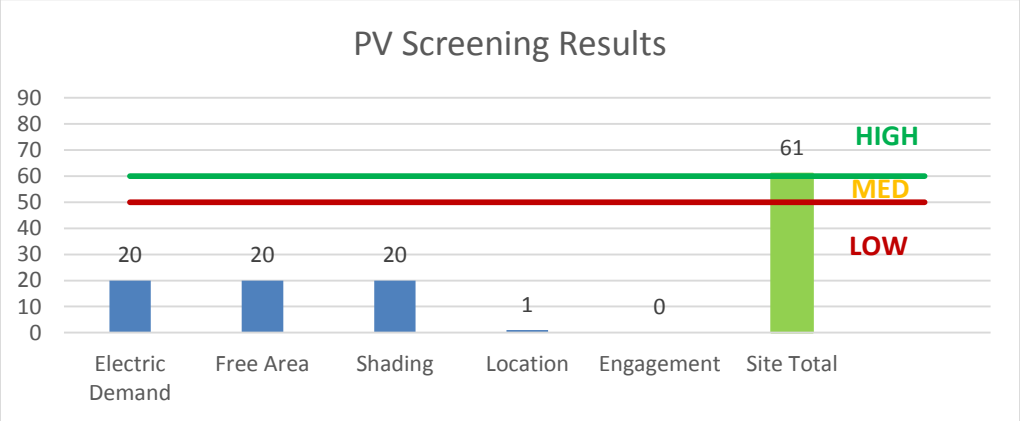
Figure 22 - Photovoltaic Screening



Potential	High	
System Potential	130	kW DC STC
Electric Generation	154,879	kWh/yr
Displaced Cost	$13,470	/yr
Installed Cost	$473,200	

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

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

6.2 Combined Heat and Power

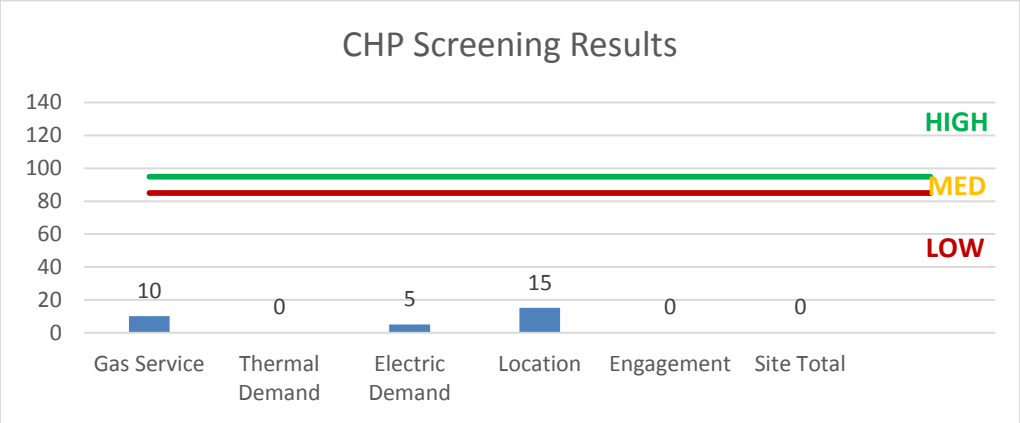
Combined heat and power (CHP) is the on-site generation of electricity along with the recovery of heat energy, which is put to beneficial use. Common technologies for CHP include reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines. Electric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

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

A preliminary screening based on heating and electrical demand, siting, and interconnection shows that the facility has a Low potential for installing a cost-effective CHP system. Low and infrequent thermal load are the most significant factors contributing to the potential for CHP at the site. In our opinion, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation.

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

Figure 23 - 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 Cedar Creek Elementary School has a low electrical load. In our opinion, the facility does not appear to meet the minimum requirements for participation in a DR 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 24 for a list of the eligible programs identified for each recommended ECM.

Figure 24 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	Direct Install
ECM 1	Install LED Fixtures	X	X
ECM 2	Retrofit Fixtures with LED Lamps	X	X
ECM 3	Install Occupancy Sensor Lighting Controls	X	X
ECM 4	Install High/Low Lighitng Controls	X	X
ECM 5	Install VFDs on Constant Volume (CV) HVAC	X	X
ECM 6	Install Low-Flow Domestic Hot Water Devices		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. Direct Install caters to small to mid-size facilities that can bundle multiple ECMs together. This can greatly simplify participation and may lead to higher incentive amounts, but requires the use of pre-approved contractors. The Pay for Performance (P4P) program is a "whole-building" energy improvement program designed for larger facilities. It requires implementation of multiple measures meeting minimum savings thresholds, as well as use of pre-approved consultants. The Large Energy Users Program (LEUP) is available to New Jersey's largest energy users giving them flexibility to install as little or as many measures, in a single facility or several facilities, with incentives capped based on the entity's annual energy consumption. LEUP applicants can use in-house staff or a preferred contractor.

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

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

8.1 SmartStart

Overview

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

Equipment with Prescriptive Incentives Currently Available:

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

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

Incentives

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

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

How to Participate

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

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

8.2 Direct Install

Overview

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

Incentives

The program pays up to 70% of the total installed cost of eligible measures, up to $125,000 per project. Direct Install participants will also be held to a fiscal year cap of $250,000 per entity.

How to Participate

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

Since Direct Install offers a free assessment of eligible measures, Direct Install is also available to small businesses and other commercial facilities too that may not be eligible for the more detailed facility audits provided by LGEA.

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

8.3 SREC Registration Program

The SREC 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 description and application can be found at: www.njcleanenergy.com/ESIP.

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

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

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

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

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

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

9.2 Retail Natural Gas Supply Options

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

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

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

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

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room1	7	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	2,160	Relamp	No	7	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,160	0.14	548	0.0	$48.43	$251.30	$0.00	5.19
Boiler Room1	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kithen	11	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.49	1,850	0.0	$163.58	$913.50	$35.00	5.37
Kithen	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kithen	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,160	0.04	147	0.0	$12.96	$58.50	$0.00	4.51
All Purpose Room	48	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	48	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,512	1.22	4,638	0.0	$410.15	$3,573.60	$70.00	8.54
All Purpose Room	24	U-Bend Fluorescent - T8: U T8 (32W) - 1L	Wall Switch	39	2,160	Relamp	Yes	24	LED - Linear Tubes: (1) U-Lamp	Occupancy Sensor	17	1,512	0.43	1,636	0.0	$144.71	$1,223.58	$35.00	8.21
All Purpose Room	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Receiving Room	5	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.22	841	0.0	$74.35	$562.50	$35.00	7.09
Boiler Room2	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,160	0.08	293	0.0	$25.92	$117.00	$0.00	4.51
Rm 25 SG1	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.18	673	0.0	$59.48	$350.00	$20.00	5.55
Rm 26 SG1	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.18	673	0.0	$59.48	$350.00	$20.00	5.55
Storage	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,160	0.08	293	0.0	$25.92	$117.00	$0.00	4.51
Rm 27 SG1	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.18	673	0.0	$59.48	$350.00	$20.00	5.55
Hallway	3	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,512	0.13	505	0.0	$44.61	$375.50	$0.00	8.42
Hallway	2	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	2,160	Relamp	Yes	2	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	1,512	0.05	178	0.0	$15.75	$71.80	$0.00	4.56
Classroom 28	12	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	2,160	Relamp	Yes	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,512	0.28	1,069	0.0	$94.50	$546.80	$20.00	5.57
Classroom 28	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,512	0.18	673	0.0	$59.48	$434.00	$0.00	7.30
Faculty Restroom	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,160	0.04	147	0.0	$12.96	$58.50	$0.00	4.51
Girls Restroom	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,160	0.08	293	0.0	$25.92	$117.00	$0.00	4.51
Boys Restroom	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,160	0.08	293	0.0	$25.92	$117.00	$0.00	4.51
CR-29	12	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.53	2,018	0.0	$178.45	$972.00	$35.00	5.25
Hallway	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,512	0.18	673	0.0	$59.48	$434.00	$0.00	7.30
Hallway Up	4	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	2,160	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	1,512	0.09	356	0.0	$31.50	$343.60	$0.00	10.91

	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
Storage	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,160	0.08	293	0.0	$25.92	$117.00	$0.00	4.51
Exterior Wall	9	Metal Halide: (1) 250W Lamp	Daylight Dimming	295	1,080	Fixture Replacement	No	9	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	86	1,080	1.23	2,336	0.0	$206.59	$3,516.09	$900.00	12.66
Exterior Parking Poles	22	Metal Halide: (1) 400W Lamp	Daylight Dimming	458	1,080	Fixture Replacement	No	22	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Daylight Dimming	146	1,080	4.50	8,525	0.0	$753.87	$42,965.85	$2,200.00	54.08
Room 37	12	Linear Fluorescent - T12: 4' T12 (40W) - 3L	Wall Switch	127	2,160	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,512	0.76	2,878	0.0	$254.50	$1,172.40	$35.00	4.47
Room 38	18	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.80	3,027	0.0	$267.68	$1,323.00	$35.00	4.81
Room 38	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.09	336	0.0	$29.74	$387.00	$35.00	11.84
Hallway	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,512	0.40	1,514	0.0	$133.84	$726.50	$0.00	5.43
Hallway	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR-34	12	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.53	2,018	0.0	$178.45	$972.00	$35.00	5.25
CR-35	12	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.53	2,018	0.0	$178.45	$972.00	$35.00	5.25
CR-33	12	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.53	2,018	0.0	$178.45	$972.00	$35.00	5.25
Hallway	12	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,512	0.53	2,018	0.0	$178.45	$902.00	$0.00	5.05
Hallway	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR-36	5	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.22	841	0.0	$74.35	$562.50	$35.00	7.09
Storage	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,160	0.08	293	0.0	$25.92	$117.00	$0.00	4.51
CR-32	12	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.53	2,018	0.0	$178.45	$972.00	$35.00	5.25
CR-31	12	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.53	2,018	0.0	$178.45	$972.00	$35.00	5.25
Hallway	39	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	39	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,512	1.73	6,559	0.0	$579.97	$2,881.50	$0.00	4.97
CR-30	12	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.53	2,018	0.0	$178.45	$972.00	$35.00	5.25
CR-23	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.40	1,514	0.0	$133.84	$796.50	$35.00	5.69
CR-23	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.04	157	0.0	$13.90	$144.60	$30.00	8.24
CR-24	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.40	1,514	0.0	$133.84	$796.50	$35.00	5.69
CR-24	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.04	157	0.0	$13.90	$144.60	$30.00	8.24
CR-21	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.40	1,514	0.0	$133.84	$796.50	$35.00	5.69
CR-21	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.04	157	0.0	$13.90	$144.60	$30.00	8.24

	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
CR-22	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.40	1,514	0.0	$133.84	$796.50	$35.00	5.69
CR-22	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.04	157	0.0	$13.90	$144.60	$30.00	8.24
Room J- Art	12	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,160	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.53	2,018	0.0	$178.45	$972.00	$35.00	5.25
Room J- Art	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.06	210	0.0	$18.54	$192.80	$40.00	8.24
Hallway	10	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	10	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	1,512	0.14	524	0.0	$46.35	$682.00	$100.00	12.56
CR-19	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.25	932	0.0	$82.44	$796.50	$125.00	8.15
CR-19	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.04	157	0.0	$13.90	$144.60	$30.00	8.24
CR-20	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.25	932	0.0	$82.44	$796.50	$125.00	8.15
CR-20	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.04	157	0.0	$13.90	$144.60	$30.00	8.24
Rm-18	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	$36.64	$504.00	$75.00	11.71
Rm-18	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	$9.27	$96.40	$20.00	8.24
Girls Restroom	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,160	Relamp	No	5	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,160	0.06	217	0.0	$19.22	$179.50	$25.00	8.04
Boys Restroom	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,160	Relamp	No	5	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,160	0.06	217	0.0	$19.22	$179.50	$25.00	8.04
CR-17	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.25	932	0.0	$82.44	$796.50	$125.00	8.15
CR-17	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.04	157	0.0	$13.90	$144.60	$30.00	8.24
Hallway	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,512	0.41	1,554	0.0	$137.40	$1,077.50	$150.00	6.75
Hallway	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Interior-Exterior	2	Metal Halide: (1) 250W Lamp	Daylight Dimming	295	1,080	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	86	1,080	0.27	519	0.0	$45.91	$781.35	$200.00	12.66
Courtyard	2	Metal Halide: (1) 250W Lamp	Daylight Dimming	295	1,080	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	146	1,080	0.20	370	0.0	$32.73	$781.35	$200.00	17.76
Hallway	10	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	10	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	1,512	0.14	524	0.0	$46.35	$682.00	$100.00	12.56
CR-12	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.25	932	0.0	$82.44	$796.50	$125.00	8.15
CR-12	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.04	157	0.0	$13.90	$144.60	$30.00	8.24
CR-13	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.25	932	0.0	$82.44	$796.50	$125.00	8.15
CR-13	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.04	157	0.0	$13.90	$144.60	$30.00	8.24
CR-14	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.25	932	0.0	$82.44	$796.50	$125.00	8.15

	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
CR-14	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.04	157	0.0	$13.90	$144.60	$30.00	8.24
CR-15	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.25	932	0.0	$82.44	$796.50	$125.00	8.15
CR-15	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.04	157	0.0	$13.90	$144.60	$30.00	8.24
CR-16	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.25	932	0.0	$82.44	$796.50	$125.00	8.15
CR-16	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.04	157	0.0	$13.90	$144.60	$30.00	8.24
Library	17	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,160	Relamp	Yes	17	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,512	0.82	3,100	0.0	$274.09	$2,157.27	$410.00	6.37
Library	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	$36.64	$234.00	$40.00	5.29
Library	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	$18.32	$117.00	$20.00	5.29
Library	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR-9	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	$36.64	$504.00	$75.00	11.71
CR-10	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	$36.64	$504.00	$75.00	11.71
CR-8A	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	$54.96	$467.00	$80.00	7.04
CR-8B	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	$54.96	$467.00	$80.00	7.04
Hallway	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,512	0.25	932	0.0	$82.44	$726.50	$90.00	7.72
CR-K3	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.49	1,864	0.0	$164.88	$1,323.00	$215.00	6.72
Lavoratory	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,160	0.01	40	0.0	$3.51	$48.20	$10.00	10.87
Storage	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	$21.75	$175.50	$30.00	6.69
Storage	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,160	0.01	40	0.0	$3.51	$48.20	$10.00	10.87
CR-K2	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	$109.92	$972.00	$155.00	7.43
Lavoratory	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,160	0.01	40	0.0	$3.51	$48.20	$10.00	10.87
CR-K1	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	$109.92	$972.00	$155.00	7.43
Lavoratory	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,160	0.01	40	0.0	$3.51	$48.20	$10.00	10.87
Hallway	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	1,512	0.01	52	0.0	$4.63	$48.20	$10.00	8.24
Hallway	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	1,512	0.01	52	0.0	$4.63	$48.20	$10.00	8.24
Hallway	8	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	8	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	1,512	0.11	419	0.0	$37.08	$585.60	$80.00	13.64

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Hallway	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR-5	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	$27.48	$291.50	$50.00	8.79
CR-4	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.25	932	0.0	$82.44	$796.50	$125.00	8.15
CR-4	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.04	157	0.0	$13.90	$144.60	$30.00	8.24
CR-4 (Lav)	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	22	2,160	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	2,160	0.01	34	0.0	$2.97	$31.90	$5.00	9.07
CR-3	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.25	932	0.0	$82.44	$796.50	$125.00	8.15
CR-3	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.04	157	0.0	$13.90	$144.60	$30.00	8.24
CR-3 (Lav)	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	22	2,160	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	2,160	0.01	34	0.0	$2.97	$31.90	$5.00	9.07
Nurse's Office	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	$27.48	$291.50	$50.00	8.79
Nurse's Office	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	$45.80	$292.50	$50.00	5.29
Nurse's Office	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,160	0.02	79	0.0	$7.03	$96.40	$20.00	10.87
Nurse's Office	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	22	2,160	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	2,160	0.01	34	0.0	$2.97	$31.90	$5.00	9.07
Main Office 4	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	$36.64	$350.00	$60.00	7.92
Main Office 4	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	$14.50	$117.00	$20.00	6.69
Main Office 4	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	Yes	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,512	0.06	210	0.0	$18.54	$192.80	$40.00	8.24
Main Office 4	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,160	0.01	40	0.0	$3.51	$48.20	$10.00	10.87
Entrance Hallways	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	$21.75	$175.50	$30.00	6.69
Entrance Hallways	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	$7.25	$58.50	$10.00	6.69
Entrance Hallways	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,160	0.09	328	0.0	$29.00	$234.00	$40.00	6.69
Entrance Hallways	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.25	932	0.0	$82.44	$642.50	$110.00	6.46
Entrance Hallways	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	$21.75	$175.50	$30.00	6.69
Entrance Hallways	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	$14.50	$117.00	$20.00	6.69
Entrance Hallways	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,160	0.02	79	0.0	$7.03	$96.40	$20.00	10.87
Entrance Hallways	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	No	4	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,160	0.04	159	0.0	$14.06	$192.80	$40.00	10.87
Entrance Hallways	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,160	0.02	79	0.0	$7.03	$96.40	$20.00	10.87

	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
Entrance Hallways	7	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,160	Relamp	No	7	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,160	0.07	278	0.0	$24.60	$337.40	$70.00	10.87
Music Room	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,160	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,512	0.25	932	0.0	$82.44	$642.50	$110.00	6.46
Music Room	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	$14.50	$117.00	$20.00	6.69
Faculty Room	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	0.11	410	0.0	$36.24	$292.50	$50.00	6.69
Exterior Wall Pack	6	Metal Halide: (1) 250W Lamp	Daylight Dimming	295	1,080	Fixture Replacement	No	6	LED - Fixtures: Porch (Wall Mounted)	Daylight Dimming	86	1,080	0.82	1,557	0.0	$137.73	$4,498.20	$30.00	32.44

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
Classrooms	Classrooms	28	Supply Fan	0.3	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room 1	Building (Orig)	2	Heating Hot Water Pump	3.0	84.0%	No	1,263	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room 2	Building (Addition)	5	Heating Hot Water Pump	0.5	84.0%	No	1,263	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Art Room	1	Split-System AC	0.2	87.5%	No	2,745	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Library	1	Supply Fan	1.0	87.5%	No	2,745	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Library	1	Return Fan	0.5	89.5%	No	2,745	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Room 9,10	2	Split-System AC	0.3	89.5%	No	2,745	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Room	4	Split-System AC	0.3	91.0%	No	2,745	No	91.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Room	4	Split-System AC	0.3	91.0%	No	2,745	No	91.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Room	2	Split-System AC	0.2	92.4%	No	2,745	No	92.4%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Room 37	1	Split-System AC	0.4	92.4%	No	2,745	No	92.4%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Room 38	1	Split-System AC	0.5	93.0%	No	2,745	No	93.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Room 36	1	Packaged Terminal HP	0.1	93.0%	No	2,745	No	93.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Main Office	4	Packaged Terminal HP	0.1	93.6%	No	2,745	No	93.6%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Faculty Dining	1	Split-System AC	0.3	94.1%	No	2,745	No	94.1%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Multipurpose Room	1	Supply Fan	10.0	94.5%	No	3,391	No	94.5%	Yes	1	2.83	10,172	0.0	$899.53	$3,807.95	$800.00	3.34
Roof	Multipurpose Room	1	Return Fan	2.0	94.5%	No	2,745	No	94.5%	Yes	1	0.57	1,647	0.0	$145.63	$2,728.85	$160.00	17.64
Roof	Main Office	1	Split-System AC	0.2	95.0%	No	2,745	No	95.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	School	1	Split-System AC	0.2	95.0%	No	2,745	No	95.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Room 25-1	1	Packaged Terminal AC	0.1	95.0%	No	2,745	No	95.0%	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
Ground	Room 26-1	1	Packaged Terminal AC	0.1	95.4%	No	2,745	No	95.4%	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
Ground	Art Room	1	Split-System AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Library	1	Packaged AC	5.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Room 9,10	2	Split-System AC	3.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Room 8	1	Split-System AC	3.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Room	4	Split-System AC	3.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Room	4	Split-System AC	3.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Room	2	Split-System AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Room 37	1	Split-System AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Room 38	1	Split-System AC	5.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Room 36	1	Packaged Terminal HP	1.00	10.80	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Main Office	4	Packaged Terminal HP	1.00	10.80	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Faculty Dining	1	Split-System AC	3.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Multipurpose Room	1	Packaged AC	25.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Main Office	1	Split-System AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Music Room	1	Split-System AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	School	1	Split-System AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Room 25-1	1	Packaged Terminal AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	Room 26-1	1	Packaged Terminal AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	Multipurpose Room	1	Furnace	320.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room 2	Building (addition)	5	Non-Condensing Hot Water Boiler	84.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room 1	Building (Orig)	2	Non-Condensing Hot Water Boiler	490.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

DHW Inventory & Recommendations

		Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Rm 1	Classrooms	1	Storage Tank Water Heater (≤ 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Rm 2	Classrooms	1	Storage Tank Water Heater (≤ 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Low-Flow Device Recommendations

	Recommedation Inputs				Energy Impact & Financial Analysis						
Location	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Restroom Sinks	18	Faucet Aerator (Lavatory)	2.50	1.00	0.00	0	25.3	$251.80	$129.06	$0.00	0.51
Nurses Office	2	Faucet Aerator (Lavatory)	2.50	1.00	0.00	0	2.8	$27.98	$14.34	$0.00	0.51
Classrooms	10	Faucet Aerator (Kitchen)	2.50	2.20	0.00	0	2.8	$27.98	$71.70	$0.00	2.56
Main Office	2	Faucet Aerator (Lavatory)	2.50	1.00	0.00	0	2.8	$27.98	$14.34	$0.00	0.51
Main Office	1	Faucet Aerator (Kitchen)	2.50	2.20	0.00	0	0.3	$2.80	$7.17	$0.00	2.56

Reach-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions		Proposed Conditions					Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Energy Efficient Doors?	Install Door Heater Control?	Install Aluminum Night Covers?	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
Ice Cream Fridge	1	Medium Temp Freezer (0F to 30F)	No	No	No	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions		Proposed Conditions			Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Evaporator Fan Control?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Medium Temp Freezer (0F to 30F)	No	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Cooler (35F to 55F)	No	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	2	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Commercial Ice Maker Inventory & Recommendations

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Ice Maker 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
Kitch	1	Self-Contained Unit (<175 lbs/day), Batch	No	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	2	Electric Convection Oven (Full Size)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Insulated Food Holding Cabinet (Full Size)	No	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?
School	94	Computers	75.0	Yes
School	8	Laptops	40.0	Yes
School	2	Small Printers	20.0	Yes
School	6	Medium Printers	268.0	Yes
School	3	Large Printers	515.0	Yes
School	28	Projectors	200.0	Yes
School	3	Microwave	1,000.0	Yes
School	1	Refridgerator (medium)	300.0	Yes
School	2	Refridgerator (Large)	600.0	Yes
School	5	coffee Machines	400.0	Yes
School	2	TV (42")	200.0	Yes
School	29	Smartboard	7.0	Yes

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
breakroom	1	Refrigerated	Yes	0.00	1,612	0.0	$142.53	$230.00	$0.00	1.61

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Cedar Creek Elementary School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 65,000
Built: 1990

For Year Ending: May 31, 2016
Date Generated: June 13, 2017

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
Cedar Creek Elementary School 220 Western Boulvard Lanoka Harbor, New Jersey 08734	_____ . (___)___-_____	____ _____ . (___)___-_____ _____

Property ID: 2388307

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
69.6 kBtu/ft²

Source EUI
121 kBtu/ft²

Annual Energy by Fuel		National Median Comparison	
Electric - Grid (kBtu)	1,497,100 (33%)	National Median Site EUI (kBtu/ft²)	70.7
Electric - Solar (kBtu)	244,419 (5%)	National Median Source EUI (kBtu/ft²)	122.9
Natural Gas (kBtu)	2,782,805 (62%)	% Diff from National Median Source EUI	-2%
		Annual Emissions	
		Greenhouse Gas Emissions (Metric Tons CO2e/year)	320

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)