Local Government Energy Audit:
Energy Audit Report

Dutch Neck

Elementary School

392 Village Road East

West Windsor, New Jersey 08550

West Windsor-Plainsboro Regional School District

March 22, 2019

Final Report by:

TRC Energy Services

Disclaimer

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information about financial incentives that may be available. Most energy conservation measures have received preliminary analysis of feasibility that identifies expected ranges of savings and costs. This level of analysis is usually considered sufficient to establish a basis for further discussion and to help prioritize energy measures.

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

TRC bases estimated installation costs on our experience at similar facilities, pricing from local contractors and vendors, and/or cost estimates from RS Means. We encourage the owner of the facility is encouraged to independently confirm these cost estimates and to obtain multiple estimates when considering measure installations. Actual installation costs can vary widely based on individual 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.

The New Jersey 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. Please review all available program incentives and eligibility requirements prior to selecting and installing any energy conservation measures.

The customer and their respective contractor(s) are responsible to implement energy conservation measures in complete conformance with all applicable local, state and federal requirements.

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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 Dutch Neck Elementary School.

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

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

1.1 Facility Summary

Dutch Neck Elementary School is a 77,168 square foot facility comprised of various space types within a single building. The building is mostly one floor with a small section which has a second floor. The facility spaces include classrooms, gym, offices, media center, kitchen, cafeteria, and electrical and mechanical spaces.

Interior lighting at Dutch Neck Elementary School consists of primarily of T8 linear fluorescent lighting as well as a variety of other technologies such as incandescent, compact fluorescent, halogen, and mercury vapor lamps. Exterior lighting is mostly CFLs and high-pressure sodium fixtures. Cooling is provided by a water-cooled chiller and a variety of package and split-system air conditioners. The school is heated by condensing boilers which supply hot water to air handlers and fan coils in classrooms. A thorough description of the facility and our observations are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated 12 measures and recommends 10 measures which together represent an opportunity for Dutch Neck Elementary School to reduce annual energy costs by roughly $37,128 and annual greenhouse gas emissions by 237,524 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 3.3 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 Dutch Neck Elementary School's annual energy use by 25%.

Figure 1 – Previous 12 Month Utility Costs

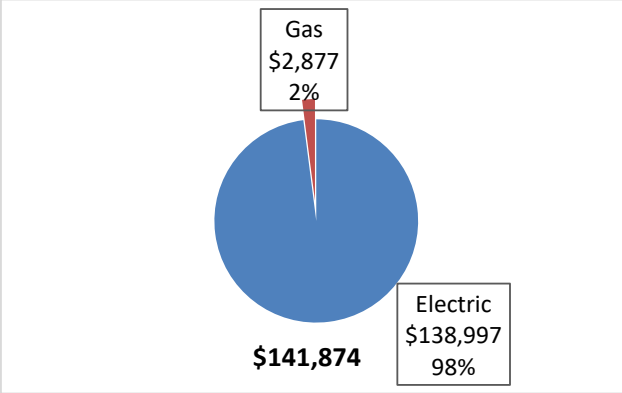
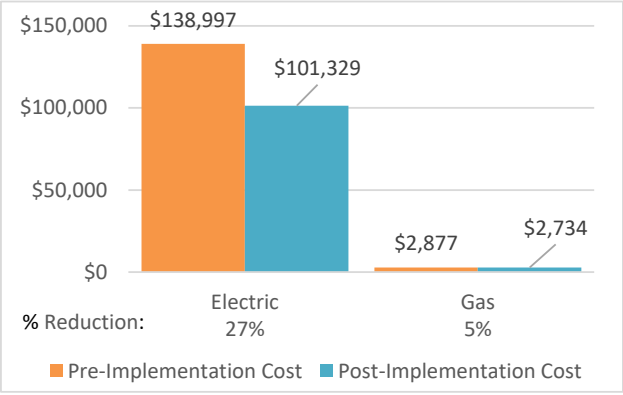


Figure 2 – Potential Post-Implementation Costs



A detailed description of Dutch Neck 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		**170,298**	**33.8**	**0.0**	**$26,893.85**	**$95,808.70**	**$18,360.00**	**$77,448.70**	**2.9**	**171,488**
ECM 1	Install LED Fixtures	Yes	52,065	7.8	0.0	$8,222.31	$41,120.62	$4,025.00	$37,095.62	4.5	52,429
ECM 2	Retrofit Fixtures with LED Lamps	Yes	117,917	26.0	0.0	$18,621.74	$54,398.41	$14,335.00	$40,063.41	2.2	118,741
ECM 3	Install LED Exit Signs	Yes	315	0.0	0.0	$49.80	$289.66	$0.00	$289.66	5.8	318
	Lighting Control Measures		**32,282**	**7.0**	**0.0**	**$5,098.04**	**$27,240.00**	**$3,220.00**	**$24,020.00**	**4.7**	**32,508**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	32,282	7.0	0.0	$5,098.04	$27,240.00	$3,220.00	$24,020.00	4.7	32,508
	Motor Upgrades		**1,079**	**0.2**	**0.0**	**$170.32**	**$4,995.06**	**$0.00**	**$4,995.06**	**29.3**	**1,086**
ECM 5	Premium Efficiency Motors	Yes	1,079	0.2	0.0	$170.32	$4,995.06	$0.00	$4,995.06	29.3	1,086
	Variable Frequency Drive (VFD) Measures		**28,927**	**3.5**	**0.0**	**$4,568.25**	**$17,372.10**	**$1,000.00**	**$16,372.10**	**3.6**	**29,129**
ECM 6	Install VFDs on Constant Volume (CV) HVAC	Yes	5,812	1.7	0.0	$917.85	$6,882.65	$1,000.00	$5,882.65	6.4	5,853
ECM 7	Install VFDs on Hot Water Pumps	Yes	18,139	1.9	0.0	$2,864.51	$7,213.60	$0.00	$7,213.60	2.5	18,266
ECM 8	Install VFDs on Cooling Tower Fans	Yes	4,976	0.0	0.0	$785.89	$3,275.85	$0.00	$3,275.85	4.2	5,011
	Electric Unitary HVAC Measures		**16,976**	**17.5**	**0.0**	**$2,680.96**	**$199,196.45**	**$7,444.42**	**$191,752.03**	**71.5**	**17,095**
	Install High Efficiency Electric AC	No	13,646	14.1	0.0	$2,154.94	$153,719.71	$5,900.67	$147,819.05	68.6	13,741
	Install High Efficiency Packaged Terminal AC/HP	No	3,331	3.4	0.0	$526.02	$45,476.74	$1,543.75	$43,932.99	83.5	3,354
	Domestic Water Heating Upgrade		**0**	**0.0**	**14.4**	**$142.74**	**$100.38**	**$0.00**	**$100.38**	**0.7**	**1,690**
ECM 9	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	14.4	$142.74	$100.38	$0.00	$100.38	0.7	1,690
	Plug Load Equipment Control - Vending Machine		**1,612**	**0.0**	**0.0**	**$254.55**	**$230.00**	**$0.00**	**$230.00**	**0.9**	**1,623**
ECM 10	Vending Machine Control	Yes	1,612	0.0	0.0	$254.55	$230.00	$0.00	$230.00	0.9	1,623
	TOTALS FOR HIGH PRIORITY MEASURES		**234,197**	**44.6**	**14.4**	**$37,127.75**	**$145,746.24**	**$22,580.00**	**$123,166.24**	**3.3**	**237,524**
	TOTALS FOR ALL EVALUATED MEASURES		**251,173**	**62.1**	**14.4**	**$39,808.70**	**$344,942.69**	**$30,024.42**	**$314,918.27**	**7.9**	**254,619**

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.
** - Simple Payback Period is based on net measure costs (i.e. after incentives).

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

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

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

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

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

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

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

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

Energy Efficient Practices

TRC also identified six 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 Dutch Neck Elementary School include:

- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Clean Evaporator/Condenser Coils on AC Systems
- Perform Proper Boiler Maintenance
- Perform Proper Water Heater Maintenance
- 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 Dutch Neck Elementary School. Based on the configuration of the site and its loads there is a high potential for installing a photovoltaic (PV) array.

Figure 4 – Photovoltaic Potential

Potential	High	
System Potential	250	kW DC STC
Electric Generation	297,843	kWh/yr
Displaced Cost	$25,910	/yr
Installed Cost	$650,000	

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

1.3 Implementation Planning

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

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

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

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

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

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

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

Additional information on relevant incentive programs is located in Section 8 or: www.njcleanenergy.com/ci.

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 5 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Dr. Christopher Russo	Business Administrator	christopher.russo@ww-p.org	609-716-5000, extension 5020
TRC Energy Services			
Alex Klieverik	Auditor	AKlieverik@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On July 26, 2018, TRC performed an energy audit at Dutch Neck Elementary School located in West Windsor, New Jersey. TRC's team met with Dr. Christopher Russo to review the facility operations and help focus our investigation on specific energy-using systems.

Dutch Neck Elementary School is a 77,168 square foot facility comprised of various space types within a single building. The building is mostly one floor with a small section which has a second floor. The facility spaces include classrooms, gym, offices, media center, kitchen, cafeteria, and electrical and mechanical spaces.

Interior lighting at Dutch Neck Elementary School consists of primarily of T8 linear fluorescent lighting as well as a variety of other technologies such as incandescent, compact fluorescent, halogen, and mercury vapor lamps. Exterior lighting is mostly CFLs and high-pressure sodium fixtures. Cooling is provided by a water-cooled chiller and a variety of package and split-system air conditioners. The school is heated by condensing boilers which supply hot water to air handlers and fan coils in classrooms.

The building was constructed in 1925.

2.3 Building Occupancy

The school building is open Monday through Friday during the school year. The typical schedule is presented in the table below. During a typical day, the facility is occupied by approximately 119 staff and 702 students.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Dutch Neck ES	Weekday	6:00AM - 6:00PM
Dutch Neck ES	Weekend	Closed

2.4 Building Envelope

The building is constructed of brick and structural steel. The building has a flat roof covered with a membrane that is in poor condition. The building has double pane windows with a tint film which are in good condition and show little sign of excessive infiltration. The exterior doors are constructed of aluminum frames with glass panes and in good condition.

Figure 7 - Building Envelope

2.5 Energy-Using Systems

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

Lighting System

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

Lighting control is provided by wall switches.

The building's exterior lighting consists of a variety of technologies which include efficient high pressure sodium (HPS) fixtures, CFLs, incandescent lamps, and LEDs.

Figure 8 – Lighting Technologies

Chilled Water and Condenser Water System

The facility is served by an 83-ton Carrier water cooled screw chiller. The chiller is configured in with one variable flow 7.5 hp chilled water pump. Chilled water is distributed at about 44°F.

The chiller plant supplies chilled water to air handlers in the gym and fan coil units in classrooms throughout the facility.

The condenser water system consists of a BAC 87-ton cooling tower on the roof above the mechanical room where the chiller is located. Water is circulated to the tower by a constant flow 7.5 hp condenser water pump. The tower has a 5 hp fan motor. Condenser water is supplied to the chillers at about 85°F.

Both the chiller and cooling tower are relatively new and in good condition.

Figure 9 – Chilled Water Equipment



Hot Water Heating System

The hot water system consists of two Aerco 1,860 kBtu/hr output condensing boilers and two Raypack 658 kBtu/hr output condensing boilers. The boilers have a nominal combustion efficiency of at least 93%. The boilers are configured for constant flow distribution with four hot water pumps. Each boiler has a dedicated pump. The Aerco boiler hot water pumps are 7.5 hp each and the Raypack hot water pumps are 1 hp each. The boilers provide hot water to air handlers in the gym and fan coil units in classrooms throughout the facility.

The boilers are in good condition and well maintained.

Figure 10 – Heating Hot Water Equipment



Heating, Ventilation and Air Conditioning System (HVAC)

There are two Lennox air handling units that serve the gym, two air handlers serving the cafeteria, and three Venmar heat recovery units and a Greenheck energy recovery unit which serve the entire facility. There are also a large number of ventilators throughout the facility in the classrooms. Each AHU and recovery unit draws air from its own return air shaft and supplies air to its own air shaft.

Lennox units have 2 hp supply fan motors, and the AHUs serving the cafeteria have 1 hp supply fan motors. Two heat recovery units have 3 hp supply and exhaust fan motors, and one unit has a 1 hp supply and exhaust fan motor. The Greenheck energy recovery unit has a 5 hp supply fan motor and a 3 hp exhaust fan motor. All fan motors are constant speed. Air handlers receive chilled water and hot water from the chillers and boilers. Heat recovery units also receive hot water from the boilers.

The units are controlled by individual thermostats located in zones.

Figure 11 – HVAC Equipment



Direct Expansion Air Conditioning System (DX)

The facility is served by a number of package and split system air conditioning units as well as ductless mini-splits. There is a 15-ton McQuay package air conditioning (AC) unit, five Sanyo ductless mini-split air conditioners which range from ¾ ton to 4 tons each, a 10-ton Lennox split system air conditioner and a 15-ton Trane split-system air conditioning unit. There are also two 8-ton and two 12-ton LG variable refrigerant flow systems.

The units are controlled by individual thermostats located in zones.

Figure 12 – Air Conditioning Equipment



Domestic Hot Water Heating System

The domestic hot water heating system for the facility consists of one Bradford White gas fired, one A.O. Smith electric, and one Ruud electric hot water heaters. The gas fired water heater has an input rating of 250 kBtu/hr, a nominal efficiency of 80%, and a 100-gallon storage tank. The A.O. Smith water heater has a 4.5 kW input and a 50-gallon storage tank. The Ruud water heater has an 8 kW input rating and a 40-gallon storage tank.

Figure 13 – Domestic Hot Water Equipment



Food Service & Laundry Equipment

The school has an all-electric kitchen that is used to prepare lunches for the students and staff. Most of the cooking is done using two convection ovens. Prepared food is served from electric steam trays or insulated food cabinets.

Figure 14 – Food Service Equipment


Refrigeration

The kitchen has a walk-in freezer that is used to store food for school lunches. The freezer has a Bally compressor on the roof. The walk-in space temperature is maintained at about 0°F. The kitchen also has two free standing commercial size refrigerators and a freezer.

Figure 15 – Refrigeration Equipment


Building Plug Load

There are roughly 50 computer work stations and laptops throughout the facility. There are also a number of other appliances throughout the facility, such as projectors, refrigerators, mini-fridges, LCD TVs, microwaves, coffee makers, and an electric kiln.

The facility also has a refrigerated beverage vending machine in the work room.

Figure 16 - Building Schedule



2.6 Water-Using Systems

There are 14 faucet aerators in restrooms throughout this facility. A sampling of restrooms found that faucets are rated for 2 gallons per minute (gpm) or higher.

Figure 17 - Building Restrooms



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

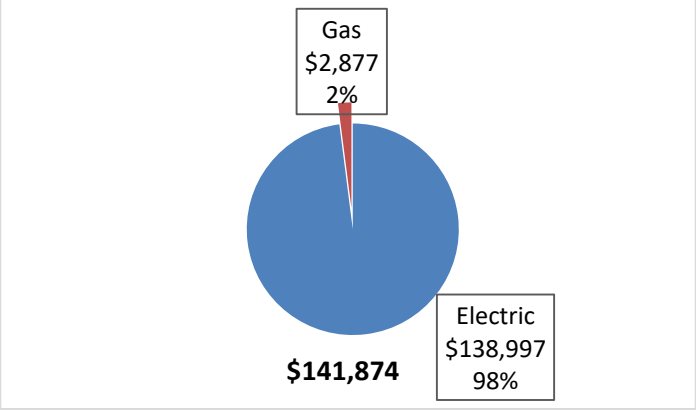
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 18 - Utility Summary

Utility Summary for Dutch Neck ES		
Fuel	**Usage**	**Cost**
Electricity	880,160 kWh	$138,997
Natural Gas	2,909 Therms	$2,877
Total		**$141,874**

The current annual energy cost for this facility is $141,874 as shown in the chart below.

Figure 19 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by PSE&G. The average electric cost over the past 12 months was $0.158/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. Electricity consumption and demand are relatively consistent throughout the year. While facility representatives stated there is little to no activity during the summer period when school is not in session, the data suggests equipment is still running. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 20 - Electric Usage & Demand

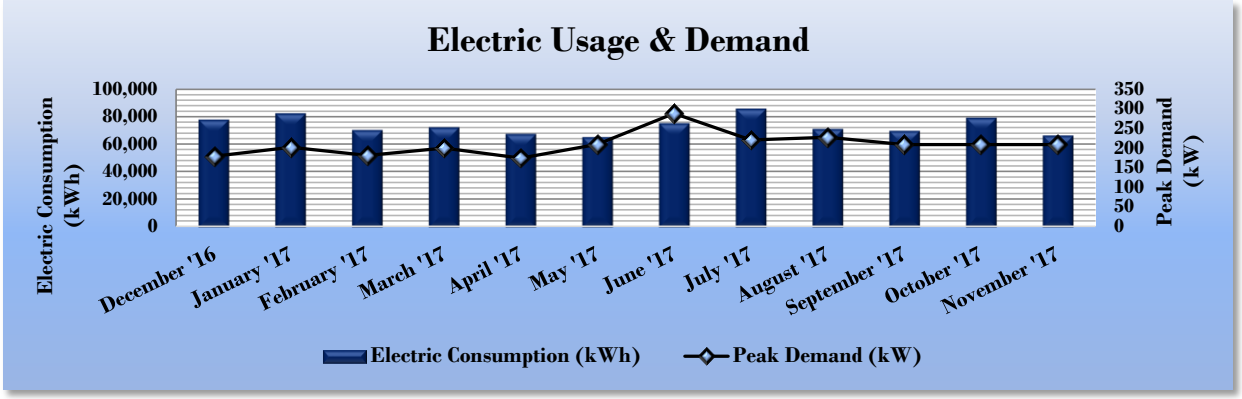


Figure 21 - Electric Usage & Demand

Electric Billing Data for Dutch Neck ES					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
12/13/16	28	77,600	179		$9,211
1/18/17	36	82,240	202		$9,851
2/16/17	29	70,080	181		$8,482
3/20/17	32	72,000	200		$8,763
4/27/17	38	67,360	174		$8,182
5/18/17	21	64,960	210		$8,201
6/19/17	32	75,040	288		$12,164
7/19/17	30	85,440	221		$12,434
8/17/17	29	70,880	227		$10,830
9/17/17	31	69,440	209		$8,309
10/17/17	30	79,040	209		$16,824
11/15/17	29	66,080	209		$25,746
Totals	**365**	**880,160**	**288**	**$0**	**$138,997**
Annual	**365**	**880,160**	**288**	**$0**	**$138,997**

3.3 Natural Gas Usage

Natural gas is provided by PSE&G. The average gas cost for the past 12 months is $0.989/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below.

Figure 22 - Natural Gas Usage

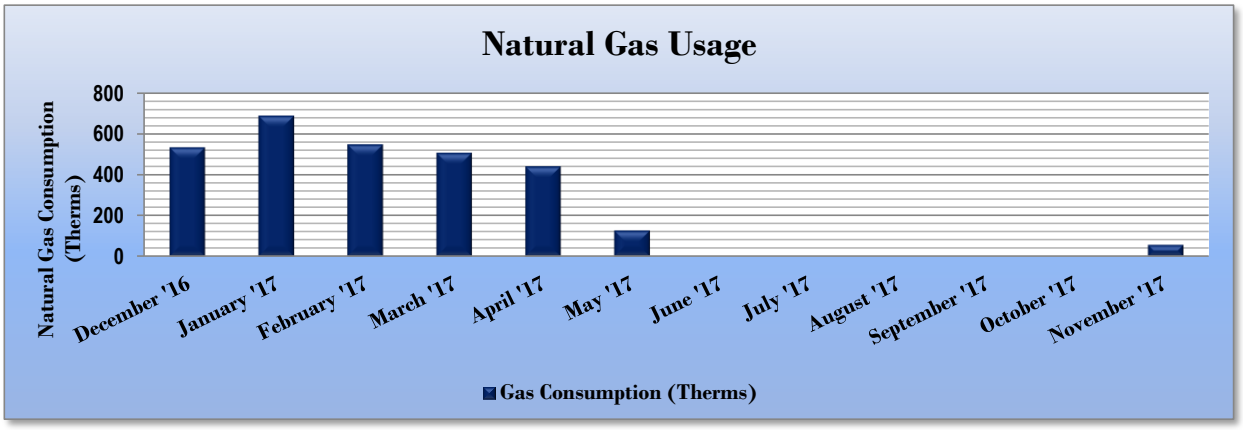


Figure 23 - Natural Gas Usage

Gas Billing Data for Dutch Neck ES			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
12/13/16	28	535	$523
1/18/17	36	691	$674
2/16/17	29	549	$540
3/20/17	32	509	$501
4/27/17	38	442	$389
5/18/17	21	127	$120
6/19/17	32	0	$12
7/19/17	30	0	$12
8/17/17	29	0	$12
9/17/17	31	0	$12
10/17/17	30	0	$12
11/15/17	29	56	$67
Totals	**365**	**2,909**	**$2,877**
Annual	**365**	**2,909**	**$2,877**

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 24 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Dutch Neck ES	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	126.2	141.4
Site Energy Use Intensity (kBtu/ft^2)	42.7	58.2

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

Figure 25 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Dutch Neck ES	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	93.4	141.4
Site Energy Use Intensity (kBtu/ft^2)	32.1	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 58.

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

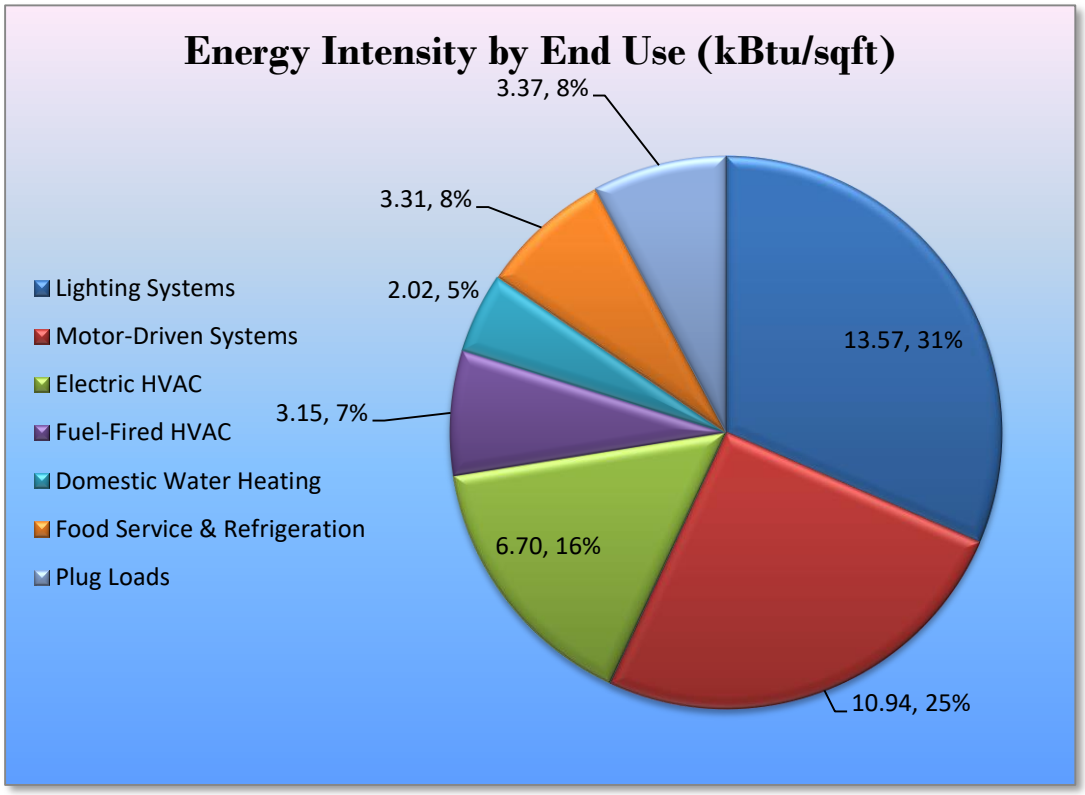
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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 26 - Energy Balance (% and kBtu/SF)



4 Energy Conservation Measures

Level of Analysis

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

The following sections describe the evaluated measures.

4.1 Recommended ECMs

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

Figure 27 – 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		**170,298**	**33.8**	**0.0**	**$26,893.85**	**$95,808.70**	**$18,360.00**	**$77,448.70**	**2.9**	**171,488**
ECM 1	Install LED Fixtures	52,065	7.8	0.0	$8,222.31	$41,120.62	$4,025.00	$37,095.62	4.5	52,429
ECM 2	Retrofit Fixtures with LED Lamps	117,917	26.0	0.0	$18,621.74	$54,398.41	$14,335.00	$40,063.41	2.2	118,741
ECM 3	Install LED Exit Signs	315	0.0	0.0	$49.80	$289.66	$0.00	$289.66	5.8	318
Lighting Control Measures		**32,282**	**7.0**	**0.0**	**$5,098.04**	**$27,240.00**	**$3,220.00**	**$24,020.00**	**4.7**	**32,508**
ECM 4	Install Occupancy Sensor Lighting Controls	32,282	7.0	0.0	$5,098.04	$27,240.00	$3,220.00	$24,020.00	4.7	32,508
Motor Upgrades		**1,079**	**0.2**	**0.0**	**$170.32**	**$4,995.06**	**$0.00**	**$4,995.06**	**29.3**	**1,086**
ECM 5	Premium Efficiency Motors	1,079	0.2	0.0	$170.32	$4,995.06	$0.00	$4,995.06	29.3	1,086
Variable Frequency Drive (VFD) Measures		**28,927**	**3.5**	**0.0**	**$4,568.25**	**$17,372.10**	**$1,000.00**	**$16,372.10**	**3.6**	**29,129**
ECM 6	Install VFDs on Constant Volume (CV) HVAC	5,812	1.7	0.0	$917.85	$6,882.65	$1,000.00	$5,882.65	6.4	5,853
ECM 7	Install VFDs on Hot Water Pumps	18,139	1.9	0.0	$2,864.51	$7,213.60	$0.00	$7,213.60	2.5	18,266
ECM 8	Install VFDs on Cooling Tower Fans	4,976	0.0	0.0	$785.89	$3,275.85	$0.00	$3,275.85	4.2	5,011
Domestic Water Heating Upgrade		**0**	**0.0**	**14.4**	**$142.74**	**$100.38**	**$0.00**	**$100.38**	**0.7**	**1,690**
ECM 9	Install Low-Flow Domestic Hot Water Devices	0	0.0	14.4	$142.74	$100.38	$0.00	$100.38	0.7	1,690
Plug Load Equipment Control - Vending Machine		**1,612**	**0.0**	**0.0**	**$254.55**	**$230.00**	**$0.00**	**$230.00**	**0.9**	**1,623**
ECM 10	Vending Machine Control	1,612	0.0	0.0	$254.55	$230.00	$0.00	$230.00	0.9	1,623
TOTALS		**234,197**	**44.6**	**14.4**	**$37,127.75**	**$145,746.24**	**$22,580.00**	**$123,166.24**	**3.3**	**237,524**

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

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

4.1.1 Lighting Upgrades

Our recommendations for upgrades to existing lighting fixtures are summarized in Figure 28 below.

Figure 28 – 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		**170,298**	**33.8**	**0.0**	**$26,893.85**	**$95,808.70**	**$18,360.00**	**$77,448.70**	**2.9**	**171,488**
ECM 1	Install LED Fixtures	52,065	7.8	0.0	$8,222.31	$41,120.62	$4,025.00	$37,095.62	4.5	52,429
ECM 2	Retrofit Fixtures with LED Lamps	117,917	26.0	0.0	$18,621.74	$54,398.41	$14,335.00	$40,063.41	2.2	118,741
ECM 3	Install LED Exit Signs	315	0.0	0.0	$49.80	$289.66	$0.00	$289.66	5.8	318

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	13,804	2.8	0.0	$2,179.97	$12,419.17	$1,200.00	$11,219.17	5.1	13,901
Exterior	38,261	5.1	0.0	$6,042.34	$28,701.45	$2,825.00	$25,876.45	4.3	38,529

Measure Description

We recommend replacing interior and exterior fixtures containing high pressure sodium and mercury vapor 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 nearly twice those of the fixtures recommended for replacement.

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	116,286	25.8	0.0	$18,364.24	$53,778.06	$14,305.00	$39,473.06	2.1	117,099
Exterior	1,631	0.2	0.0	$257.50	$620.35	$30.00	$590.35	2.3	1,642

Measure Description

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

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

ECM 3: Install LED Exit Signs

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	315	0.0	0.0	$49.80	$289.66	$0.00	$289.66	5.8	318
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend replacing all compact fluorescent exit signs with LED exit signs. LED exit signs require virtually no maintenance and have a life expectancy of at least 20 years. This measure saves energy by installing LED fixtures, which use less power than other technologies with an equivalent lighting output.

4.1.2 Lighting Control Measures

Our recommendations for lighting control measures are summarized in Figure 29 below.

Figure 29 – 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		**32,282**	**7.0**	**0.0**	**$5,098.04**	**$27,240.00**	**$3,220.00**	**$24,020.00**	**4.7**	**32,508**
ECM 4	Install Occupancy Sensor Lighting Controls	32,282	7.0	0.0	$5,098.04	$27,240.00	$3,220.00	$24,020.00	4.7	32,508

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 4: 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)
32,282	7.0	0.0	$5,098.04	$27,240.00	$3,220.00	$24,020.00	4.7	32,508

Measure Description

We recommend installing occupancy sensors to control lighting fixtures that are currently controlled by manual switches in restrooms, classrooms, offices areas, the kitchen, gym, media center, and conference rooms. 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.

4.1.3 Motor Upgrades

Our recommendations for motor upgrades are summarized in Figure 30 below.

Figure 30 - Summary of Motor Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Motor Upgrades		**1,079**	**0.2**	**0.0**	**$170.32**	**$4,995.06**	**$0.00**	**$4,995.06**	**29.3**	**1,086**
ECM 5	Premium Efficiency Motors	1,079	0.2	0.0	$170.32	$4,995.06	$0.00	$4,995.06	29.3	1,086

ECM 5: Premium Efficiency Motors

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,079	0.2	0.0	$170.32	$4,995.06	$0.00	$4,995.06	29.3	1,086

Measure Description

The replacement of standard efficiency motors with NEMA Premium® efficiency motors has been proposed to account for costs associated with the requirement for upgrading to inverter duty rated motors when installing variable frequency drives. Due to the marginal payback of this measure, motor replacement should be reconsidered if variable frequency drives are not going to be installed. Our evaluation assumes that existing motors will be replaced with motors of equivalent size and type. Although occasionally additional savings can be achieved by downsizing motors to better meet the motor's current load requirements. The base case motor efficiencies are estimated from nameplate information and our best estimates of motor run hours. Efficiencies of proposed motor upgrades are obtained from the *New Jersey's Clean Energy Program Protocols to Measure Resource Savings (2016)*. Savings are based on the difference between baseline and proposed efficiencies and the assumed annual operating hours.

4.1.4 Variable Frequency Drive Measures

Our recommendations for variable frequency drive (VFD) measures are summarized in Figure 31 below.

Figure 31 – 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		**28,927**	**3.5**	**0.0**	**$4,568.25**	**$17,372.10**	**$1,000.00**	**$16,372.10**	**3.6**	**29,129**
ECM 6	Install VFDs on Constant Volume (CV) HVAC	5,812	1.7	0.0	$917.85	$6,882.65	$1,000.00	$5,882.65	6.4	5,853
ECM 7	Install VFDs on Hot Water Pumps	18,139	1.9	0.0	$2,864.51	$7,213.60	$0.00	$7,213.60	2.5	18,266
ECM 8	Install VFDs on Cooling Tower Fans	4,976	0.0	0.0	$785.89	$3,275.85	$0.00	$3,275.85	4.2	5,011

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

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
5,812	1.7	0.0	$917.85	$6,882.65	$1,000.00	$5,882.65	6.4	5,853

Measure Description

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

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

ECM 7: Install VFDs on Hot Water Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
18,139	1.9	0.0	$2,864.51	$7,213.60	$0.00	$7,213.60	2.5	18,266

Measure Description

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

ECM 8: Install VFDs on Cooling Tower Fans

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
4,976	0.0	0.0	$785.89	$3,275.85	$0.00	$3,275.85	4.2	5,011

Measure Description

We recommend installing a variable frequency drives (VFD) to control the cooling tower fan motors. The VFD will allow the cooling tower fan to operate at the minimum speed necessary to maintain the temperature of the condenser water returning to the chiller. Energy savings results from reducing fan speed (and power) when there is a reduced load on the chiller and outside air wet bulb temperatures are depressed. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

4.1.5 Domestic Hot Water Heating System Upgrades

Our recommendations for domestic water heating system improvements are summarized in Figure 32 below.

Figure 32 - 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**	**14.4**	**$142.74**	**$100.38**	**$0.00**	**$100.38**	**0.7**	**1,690**
ECM 10	Install Low-Flow Domestic Hot Water Devices	0	0.0	14.4	$142.74	$100.38	$0.00	$100.38	0.7	1,690

ECM 9: 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	14.4	$142.74	$100.38	$0.00	$100.38	0.7	1,690

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. Low-flow faucet aerators can reduce hot water usage which saves 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.

4.1.6 Plug Load Equipment Control - Vending Machines

Our recommendations for plug load equipment control measures are summarized in Figure 33 below.

Figure 33 - Summary of Plug Load Equipment Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Plug Load Equipment Control - Vending Machine		**1,612**	**0.0**	**0.0**	**$254.55**	**$230.00**	**$0.00**	**$230.00**	**0.9**	**1,623**
ECM 10	Vending Machine Control	1,612	0.0	0.0	$254.55	$230.00	$0.00	$230.00	0.9	1,623

ECM 10: 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	$254.55	$230.00	$0.00	$230.00	0.9	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 34 – 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	**16,976**	**17.5**	**0.0**	**$2,680.96**	**$199,196.45**	**$7,444.42**	**$191,752.03**	**71.5**	**17,095**
Install High Efficiency Electric AC	13,646	14.1	0.0	$2,154.94	$153,719.71	$5,900.67	$147,819.05	68.6	13,741
Install High Efficiency Packaged Terminal AC/HP	3,331	3.4	0.0	$526.02	$45,476.74	$1,543.75	$43,932.99	83.5	3,354
TOTALS	**16,976**	**17.5**	**0.0**	**$2,680.96**	**$199,196.45**	**$7,444.42**	**$191,752.03**	**71.5**	**17,095**

* - 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)
13,646	14.1	0.0	$2,154.94	$153,719.71	$5,900.67	$147,819.05	68.6	13,741

Measure Description

We evaluated replacing standard efficiency packaged and split-system air conditioning units with high efficiency 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

The payback for replacing these units is longer than the effective useful life of the replacement equipment.

Install High Efficiency PTAC

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)
3,331	3.4	0.0	$526.02	$45,476.74	$1,543.75	$43,932.99	83.5	3,354

Measure Description

We evaluated replacing packaged terminal air conditioners (PTAC) with high efficiency PTAC. 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 heating and cooling loads, and the estimated annual operating hours.

Reasons for not Recommending

The payback for replacing these units is longer than the effective useful life of the replacement equipment.

5 ENERGY EFFICIENT PRACTICES

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

Perform Proper Lighting Maintenance

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

Develop a Lighting Maintenance Schedule

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

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.

Perform Proper Boiler Maintenance

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

Perform 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.

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 4.1.5 for any low-flow ECM recommendations.

6 On-Site Generation Measures

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

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

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

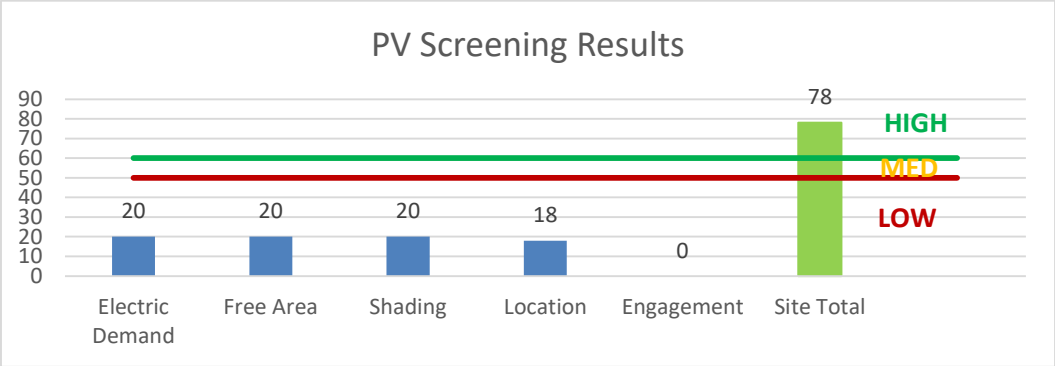
6.1 Photovoltaic

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

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

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

Figure 35 - Photovoltaic Screening



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

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

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

6.2 Combined Heat and Power

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

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

A preliminary screening based on heating and electrical demand, siting, and interconnection shows that the facility has a **low** potential for installing a cost-effective CHP system.

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

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

7 DEMAND RESPONSE

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

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

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

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

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

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

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

In our opinion, this site is not a good candidate for demand response.

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

Figure 36 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Install LED Fixtures	X			X		
ECM 2	Retrofit Fixtures with LED Lamps	X			X		
ECM 3	Install LED Exit Signs				X		
ECM 4	Install Occupancy Sensor Lighting Controls	X			X		
ECM 5	Premium Efficiency Motors				X		
ECM 6	Install VFDs on Constant Volume (CV) HVAC	X			X		
ECM 7	Install VFDs on Hot Water Pumps				X		
ECM 8	Install VFDs on Cooling Tower Fans				X		
ECM 9	Install Low-Flow Domestic Hot Water Devices	X			X		
ECM 10	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 Pay for Performance - Existing Buildings

Overview

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

Incentives

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

How to Participate

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

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

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

8.3 SREC Registration Program

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

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

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

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

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

8.4 Energy Savings Improvement Program

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

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

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

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

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

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

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

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

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

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

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

9.2 Retail Natural Gas Supply Options

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

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

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

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

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room 2	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,500	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,500	0.11	297	0.0	$46.90	$219.09	$60.00	3.39
Boiler Room 2	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
Mechanical Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,500	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,500	0.06	171	0.0	$26.97	$109.55	$30.00	2.95
Boiler Room 1	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,500	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,500	0.11	285	0.0	$44.95	$182.58	$50.00	2.95
Main Office Area	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,200	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,240	0.43	2,431	0.0	$383.91	$927.27	$215.00	1.86
Main Office Elec. Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,500	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,500	0.01	30	0.0	$4.77	$18.26	$5.00	2.78
Main Office Faculty Restroom 1	2	Incandescent: One Lamp Screw-in	Wall Switch	60	3,200	Relamp	No	2	LED Screw-In Lamps: One Lamp Screw-in Fixture	Wall Switch	9	3,200	0.07	375	0.0	$59.28	$34.45	$10.00	0.41
Main Office Hallway	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,200	Relamp	Yes	6	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,240	0.15	859	0.0	$135.64	$634.76	$0.00	4.68
Main Office 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
Main Office Faculty Restroom 2	2	Incandescent: One Lamp Screw-in	Wall Switch	60	3,200	Relamp	No	2	LED Screw-In Lamps: One Lamp Screw-in Fixture	Wall Switch	9	3,200	0.07	375	0.0	$59.28	$34.45	$10.00	0.41
Principal's Secretary	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,200	Relamp	No	4	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,200	0.04	236	0.0	$37.19	$130.06	$40.00	2.42
Faculty Work Room	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,200	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,240	0.38	2,161	0.0	$341.25	$854.24	$195.00	1.93
Main Office Kitchen Area	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,200	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,240	0.10	540	0.0	$85.31	$416.06	$75.00	4.00
Principal's Office	6	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,200	Relamp	Yes	6	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,240	0.08	466	0.0	$73.57	$465.09	$95.00	5.03
Asst. Principal's Office	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,200	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,200	0.02	118	0.0	$18.60	$65.03	$20.00	2.42
Media Center	20	Mercury Vapor: (1) 250W Lamp	Wall Switch	290	3,200	Fixture Replacement	Yes	20	LED - Fixtures: Architectural Flood/Spot Luminaire	Occupancy Sensor	87	2,240	3.00	16,862	0.0	$2,662.85	$10,889.31	$1,070.00	3.69
Media Center	2	Exit Signs: Fluorescent	None	15	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	181	0.0	$28.64	$144.83	$0.00	5.06
Media Center	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,200	Relamp	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,240	0.24	1,351	0.0	$213.28	$635.15	$135.00	2.34
Media Center	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,200	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,240	0.11	614	0.0	$96.94	$416.06	$75.00	3.52
Media Center	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,200	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,200	0.02	121	0.0	$19.18	$36.52	$10.00	1.38
Media Center Display Cabinet 1 and 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,200	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,200	0.04	243	0.0	$38.36	$73.03	$20.00	1.38
Media Center Library Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,200	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,240	0.11	614	0.0	$96.94	$416.06	$75.00	3.52
Faculty Room	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,200	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,240	0.14	767	0.0	$121.17	$452.58	$85.00	3.03
Faculty Room	3	Incandescent: One Lamp Screw-in	Wall Switch	60	3,200	Relamp	No	3	LED Screw-In Lamps: One Lamp Screw-in Fixture	Wall Switch	9	3,200	0.10	563	0.0	$88.92	$51.68	$15.00	0.41
Faculty Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,200	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,200	0.01	59	0.0	$9.30	$32.52	$10.00	2.42

	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
Boys Restroom	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,200	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,240	0.19	1,080	0.0	$170.63	$562.12	$115.00	2.62
Custodial Closet	1	Incandescent: One Lamp Screw-in	Wall Switch	60	1,500	Relamp	No	1	LED Screw-In Lamps: One Lamp Screw-in Fixture	Wall Switch	9	1,500	0.03	88	0.0	$13.89	$17.23	$5.00	0.88
Elec Closet	1	Compact Fluorescent: One Lamp Screw-in	Wall Switch	18	1,500	Relamp	No	1	LED Screw-In Lamps: One Lamp Screw-in Fixture	Wall Switch	13	1,500	0.00	9	0.0	$1.47	$17.23	$5.00	8.31
Girls Restroom	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,200	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,240	0.19	1,080	0.0	$170.63	$562.12	$115.00	2.62
Faculty Restroom	1	Halogen Incandescent: One Lamp Screw-in	Wall Switch	18	3,200	Relamp	No	1	LED Screw-In Lamps: One Lamp Screw-in Fixture	Wall Switch	3	3,200	0.01	56	0.0	$8.89	$17.23	$5.00	1.37
CR 2	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,200	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,240	0.58	3,241	0.0	$511.88	$1,146.36	$275.00	1.70
CR 3	26	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,200	Relamp	Yes	26	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,240	0.71	3,990	0.0	$630.09	$1,489.39	$330.00	1.84
CR 3 Storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,500	Relamp	No	3	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,500	0.11	290	0.0	$45.77	$219.09	$60.00	3.48
CR 4	15	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,200	Relamp	Yes	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,240	0.72	4,052	0.0	$639.85	$1,365.45	$335.00	1.61
CR 5	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,200	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,240	0.44	2,455	0.0	$387.75	$1,124.24	$230.00	2.31
CR 6	15	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,200	Relamp	Yes	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,240	0.72	4,052	0.0	$639.85	$1,365.45	$335.00	1.61
CR 7	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,200	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,240	0.44	2,455	0.0	$387.75	$1,124.24	$230.00	2.31
CR 8	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,848	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,294	0.33	1,063	0.0	$167.94	$708.18	$155.00	3.29
CR 10	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,200	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,240	0.38	2,161	0.0	$341.25	$854.24	$195.00	1.93
CR 12	10	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,200	Relamp	Yes	10	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,240	0.48	2,701	0.0	$426.57	$1,000.30	$235.00	1.79
CR 14	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,848	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,294	0.33	1,063	0.0	$167.94	$708.18	$155.00	3.29
CR 14 IDF Room	1	Incandescent: One Lamp Screw-in	Wall Switch	60	3,200	Relamp	No	1	LED Screw-In Lamps: One Lamp Screw-in Fixture	Wall Switch	9	3,200	0.03	188	0.0	$29.64	$17.23	$5.00	0.41
CR 16	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,848	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,294	0.33	1,063	0.0	$167.94	$708.18	$155.00	3.29
CR 16 Restroom	1	Compact Fluorescent: Two Lamp Screw-in	Wall Switch	26	3,200	Relamp	No	1	LED Screw-In Lamps: Two Lamp Screw-in Fixture	Wall Switch	18	3,200	0.01	29	0.0	$4.53	$34.45	$10.00	5.39
CR 15	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,200	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,240	0.58	3,241	0.0	$511.88	$1,146.36	$275.00	1.70
CR 18	18	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,200	Relamp	Yes	18	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,240	0.87	4,862	0.0	$767.82	$1,854.54	$430.00	1.86
CR 17	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,200	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,240	0.58	3,241	0.0	$511.88	$1,146.36	$275.00	1.70
CR 20	16	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,200	Relamp	Yes	16	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,240	0.77	4,322	0.0	$682.51	$1,708.48	$390.00	1.93
CR 28	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,848	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,294	0.25	798	0.0	$125.96	$598.64	$125.00	3.76
CR30	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,848	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,294	0.25	798	0.0	$125.96	$598.64	$125.00	3.76

	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
Utility Closet	1	Incandescent: One Lamp Screw-in	Wall Switch	60	1,500	Relamp	No	1	LED Screw-In Lamps: One Lamp Screw-in Fixture	Wall Switch	9	1,500	0.03	88	0.0	$13.89	$17.23	$5.00	0.88
CR 32	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,848	0.19	886	0.0	$139.95	$525.61	$105.00	3.01
CR 34	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,848	0.08	380	0.0	$59.98	$379.55	$65.00	5.24
CR 19	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,640	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,848	0.58	2,674	0.0	$422.30	$1,146.36	$275.00	2.06
CR 22	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,848	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,294	0.25	798	0.0	$125.96	$598.64	$125.00	3.76
CR 21	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,640	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,848	0.58	2,674	0.0	$422.30	$1,146.36	$275.00	2.06
CR 24	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,848	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,294	0.25	798	0.0	$125.96	$598.64	$125.00	3.76
CR 26	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,640	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,848	0.58	2,674	0.0	$422.30	$1,146.36	$275.00	2.06
CR 23	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,640	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,848	0.58	2,674	0.0	$422.30	$1,146.36	$275.00	2.06
CR 25	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,848	0.44	2,026	0.0	$319.89	$1,124.24	$230.00	2.80
Boys Restroom	1	Incandescent: One Lamp Screw-in	Wall Switch	60	2,640	Relamp	No	1	LED Screw-In Lamps: One Lamp Screw-in Fixture	Wall Switch	9	2,640	0.03	155	0.0	$24.45	$17.23	$5.00	0.50
Girls Restroom	1	Incandescent: One Lamp Screw-in	Wall Switch	60	2,640	Relamp	No	1	LED Screw-In Lamps: One Lamp Screw-in Fixture	Wall Switch	9	2,640	0.03	155	0.0	$24.45	$17.23	$5.00	0.50
CR 27	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,640	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,848	0.58	2,674	0.0	$422.30	$1,146.36	$275.00	2.06
CR 104	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,640	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,848	0.58	2,674	0.0	$422.30	$1,146.36	$275.00	2.06
CR 105	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,640	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,848	0.38	1,783	0.0	$281.54	$854.24	$195.00	2.34
CR 103	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,640	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,848	0.58	2,674	0.0	$422.30	$1,146.36	$275.00	2.06
Conference Room	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,640	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,848	0.33	1,519	0.0	$239.92	$708.18	$155.00	2.31
CR 100	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,848	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,294	0.21	665	0.0	$104.96	$543.86	$110.00	4.13
CR 100	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,640	0.02	88	0.0	$13.90	$72.46	$0.00	5.21
Power Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,500	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,500	0.06	171	0.0	$26.97	$109.55	$30.00	2.95
Bldg Foreman Room	7	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,640	Relamp	Yes	7	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,848	0.34	1,560	0.0	$246.34	$781.21	$175.00	2.46
Bldg Foreman Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,640	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,640	0.04	170	0.0	$26.85	$73.03	$20.00	1.98
teacher's supply storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.02	100	0.0	$15.82	$36.52	$10.00	1.68
CR 200	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,640	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,848	0.58	2,674	0.0	$422.30	$1,146.36	$275.00	2.06
CR 200	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.02	100	0.0	$15.82	$36.52	$10.00	1.68

	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
Office 207CST	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.04	200	0.0	$31.64	$73.03	$20.00	1.68
CR 201	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,640	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,848	0.58	2,674	0.0	$422.30	$1,146.36	$275.00	2.06
CR 201	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.02	100	0.0	$15.82	$36.52	$10.00	1.68
CR 201	1	Incandescent: One Lamp Screw-in	Wall Switch	60	2,640	Relamp	No	1	LED Screw-In Lamps: One Lamp Screw-in Fixture	Wall Switch	9	2,640	0.03	155	0.0	$24.45	$17.23	$5.00	0.50
Office CR CST	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.02	100	0.0	$15.82	$36.52	$10.00	1.68
Office 209 CST	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.02	100	0.0	$15.82	$36.52	$10.00	1.68
CR 203	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,640	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,848	0.58	2,674	0.0	$422.30	$1,146.36	$275.00	2.06
CR 202	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,640	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,848	0.58	2,674	0.0	$422.30	$1,146.36	$275.00	2.06
CR 205	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,640	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,848	0.58	2,674	0.0	$422.30	$1,146.36	$275.00	2.06
CR 204	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,640	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,848	0.58	2,674	0.0	$422.30	$1,146.36	$275.00	2.06
300 Section Storage Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,500	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,500	0.04	114	0.0	$17.98	$73.03	$20.00	2.95
300 Sec. elec Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,500	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,500	0.02	57	0.0	$8.99	$36.52	$10.00	2.95
CR 300	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,848	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,294	0.37	1,196	0.0	$188.94	$762.95	$170.00	3.14
CR 300	4	Compact Fluorescent: One Lamp PL	Occupancy Sensor	23	1,848	Relamp	No	4	LED Screw-In Lamps: One Lamp PL Fixture	Occupancy Sensor	16	1,848	0.02	59	0.0	$9.26	$92.00	$0.00	9.93
CR 300 Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,640	Relamp	No	1	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	26	2,640	0.02	83	0.0	$13.18	$48.77	$15.00	2.56
CR 300	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Occupancy Sensor	53	1,848	Relamp	No	1	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,848	0.02	58	0.0	$9.23	$48.77	$15.00	3.66
CR 301	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,848	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,294	0.37	1,196	0.0	$188.94	$762.95	$170.00	3.14
CR 301	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Occupancy Sensor	53	1,848	Relamp	No	1	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,848	0.02	58	0.0	$9.23	$48.77	$15.00	3.66
CR 301	4	Compact Fluorescent: One Lamp PL	Occupancy Sensor	23	1,848	Relamp	No	4	LED Screw-In Lamps: One Lamp PL Fixture	Occupancy Sensor	16	1,848	0.02	59	0.0	$9.26	$92.00	$0.00	9.93
CR 301 Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,640	Relamp	No	1	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	26	2,640	0.02	83	0.0	$13.18	$48.77	$15.00	2.56
CR 302	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,848	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,294	0.49	1,595	0.0	$251.91	$927.27	$215.00	2.83
CR 302	4	Compact Fluorescent: One Lamp PL	Occupancy Sensor	23	1,848	Relamp	No	4	LED Screw-In Lamps: One Lamp PL Fixture	Occupancy Sensor	16	1,848	0.02	59	0.0	$9.26	$92.00	$0.00	9.93
CR 302	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Occupancy Sensor	53	1,848	Relamp	No	1	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,848	0.02	58	0.0	$9.23	$48.77	$15.00	3.66
CR 302 Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,640	Relamp	No	1	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	26	2,640	0.02	83	0.0	$13.18	$48.77	$15.00	2.56
CR 303	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,848	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,294	0.49	1,595	0.0	$251.91	$927.27	$215.00	2.83

	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 303	4	Compact Fluorescent: One Lamp PL	Occupancy Sensor	42	1,848	Relamp	No	4	LED Screw-In Lamps: One Lamp PL Fixture	Occupancy Sensor	29	1,848	0.03	107	0.0	$16.92	$92.00	$0.00	5.44
CR 303	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Occupancy Sensor	53	1,848	Relamp	No	1	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,848	0.02	58	0.0	$9.23	$48.77	$15.00	3.66
CR 303 Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,640	Relamp	No	1	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	26	2,640	0.02	83	0.0	$13.18	$48.77	$15.00	2.56
CR 304	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,848	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,294	0.49	1,595	0.0	$251.91	$927.27	$215.00	2.83
CR 304	4	Compact Fluorescent: One Lamp PL	Occupancy Sensor	42	1,848	Relamp	No	4	LED Screw-In Lamps: One Lamp PL Fixture	Occupancy Sensor	29	1,848	0.03	107	0.0	$16.92	$92.00	$0.00	5.44
CR 304	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Occupancy Sensor	53	1,848	Relamp	No	1	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,848	0.02	58	0.0	$9.23	$48.77	$15.00	3.66
CR 304 restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,640	Relamp	No	1	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	26	2,640	0.02	83	0.0	$13.18	$48.77	$15.00	2.56
CR 305	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,848	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,294	0.49	1,595	0.0	$251.91	$927.27	$215.00	2.83
CR 305	4	Compact Fluorescent: One Lamp PL	Occupancy Sensor	42	1,848	Relamp	No	4	LED Screw-In Lamps: One Lamp PL Fixture	Occupancy Sensor	29	1,848	0.03	107	0.0	$16.92	$92.00	$0.00	5.44
CR 305	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Occupancy Sensor	53	1,848	Relamp	No	1	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,848	0.02	58	0.0	$9.23	$48.77	$15.00	3.66
CR 305 rstroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,640	Relamp	No	1	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	26	2,640	0.02	83	0.0	$13.18	$48.77	$15.00	2.56
CR 401	22	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	Yes	22	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,848	0.60	2,785	0.0	$439.85	$1,343.33	$290.00	2.39
CR 401 Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	22	2,640	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	2,640	0.01	41	0.0	$6.47	$16.26	$5.00	1.74
CR 401	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
Stroage Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,500	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,500	0.02	60	0.0	$9.53	$36.52	$10.00	2.78
CR 403	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,640	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,848	0.16	760	0.0	$119.96	$489.09	$95.00	3.29
CR 403	21	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	Yes	21	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,848	0.57	2,659	0.0	$419.86	$1,306.82	$280.00	2.45
CR 403	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 403 Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	22	2,640	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	2,640	0.01	41	0.0	$6.47	$16.26	$5.00	1.74
400 Setion Storage Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,500	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,500	0.02	60	0.0	$9.53	$36.52	$10.00	2.78
CR 405	22	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	Yes	22	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,848	0.60	2,785	0.0	$439.85	$1,343.33	$290.00	2.39
CR 405	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 405 Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	22	2,640	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	2,640	0.01	41	0.0	$6.47	$16.26	$5.00	1.74
CR 406	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,848	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,294	0.45	1,462	0.0	$230.92	$872.50	$200.00	2.91
CR 406 Resroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.02	100	0.0	$15.82	$36.52	$10.00	1.68

	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 407	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,848	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,294	0.45	1,462	0.0	$230.92	$872.50	$200.00	2.91
CR 407 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.02	100	0.0	$15.82	$36.52	$10.00	1.68
CR 408	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,848	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,294	0.45	1,462	0.0	$230.92	$872.50	$200.00	2.91
CR 408 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.02	100	0.0	$15.82	$36.52	$10.00	1.68
CR 409	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,848	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,294	0.45	1,462	0.0	$230.92	$872.50	$200.00	2.91
CR 409 restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.02	100	0.0	$15.82	$36.52	$10.00	1.68
MPR/Gym	18	Linear Fluorescent - T5HO: 4' T5HO (54W) - 2L	Wall Switch	117	2,640	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,848	1.14	5,284	0.0	$834.54	$1,197.27	$250.00	1.14
MPR/Gym	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Stage	2	Compact Fluorescent: One Lamp PL	Wall Switch	23	1,000	Relamp	No	2	LED Screw-In Lamps: One Lamp PL Fixture	Wall Switch	16	1,000	0.01	16	0.0	$2.51	$46.00	$0.00	18.35
Stage	4	Mercury Vapor: (1) 250W Lamp	Wall Switch	290	1,000	Fixture Replacement	Yes	4	LED - Fixtures: Architectural Flood/Spot Luminaire	Occupancy Sensor	87	700	0.60	1,054	0.0	$166.43	$2,339.86	$235.00	12.65
Stage	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
Gym Storage 1	1	Incandescent: One Lamp Screw-in	Wall Switch	60	1,500	Relamp	No	1	LED Screw-In Lamps: One Lamp Screw-in Fixture	Wall Switch	9	1,500	0.03	88	0.0	$13.89	$17.23	$5.00	0.88
Gym Storage 2	1	LED Screw-In Lamps: One Lamp Screw-in	Wall Switch	9	1,500	None	No	1	LED Screw-In Lamps: One Lamp Screw-in	Wall Switch	9	1,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Gym Storage 2	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
Stage Storage 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,500	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,500	0.01	30	0.0	$4.77	$18.26	$5.00	2.78
Stage Storage 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,500	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,500	0.02	60	0.0	$9.53	$36.52	$10.00	2.78
Elec Room	1	Incandescent: One Lamp Screw-in	Wall Switch	60	1,500	Relamp	No	1	LED Screw-In Lamps: One Lamp Screw-in Fixture	Wall Switch	9	1,500	0.03	88	0.0	$13.89	$17.23	$5.00	0.88
Meter Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,500	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,500	0.01	30	0.0	$4.77	$18.26	$5.00	2.78
PE Storage	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,500	Relamp	No	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,500	0.19	512	0.0	$80.91	$328.64	$90.00	2.95
PE Storage Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.02	100	0.0	$15.82	$36.52	$10.00	1.68
PE Storage	2	Compact Fluorescent: One Lamp PL	Wall Switch	23	1,500	Relamp	No	2	LED Screw-In Lamps: One Lamp PL Fixture	Wall Switch	16	1,500	0.01	24	0.0	$3.76	$46.00	$0.00	12.24
PE Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,640	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,848	0.10	446	0.0	$70.38	$416.06	$75.00	4.85
Nurse's Office	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Nurse's Office	9	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,640	Relamp	Yes	9	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,848	0.12	577	0.0	$91.05	$562.64	$125.00	4.81
Exam Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.02	100	0.0	$15.82	$36.52	$10.00	1.68

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Nurse's Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.02	100	0.0	$15.82	$36.52	$10.00	1.68
Cafeteria	16	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,640	Relamp	Yes	16	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,848	0.23	1,061	0.0	$167.62	$832.12	$150.00	4.07
Cafeteria	8	Linear Fluorescent - T8: 8' T8 (59W) - 1L	Wall Switch	58	2,640	Relamp	Yes	8	LED - Linear Tubes: (1) 8' Lamp	Occupancy Sensor	36	1,848	0.17	797	0.0	$125.81	$624.06	$35.00	4.68
Cafeteria	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
Cafeteria	24	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,640	Relamp	Yes	24	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,848	0.98	4,558	0.0	$719.76	$1,854.54	$430.00	1.98
Kitchen	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,848	0.27	1,266	0.0	$199.93	$635.15	$135.00	2.50
Vent Hood	2	Incandescent: One Lamp Screw-in	Wall Switch	60	1,500	Relamp	No	2	LED Screw-In Lamps: One Lamp Screw-in Fixture	Wall Switch	9	1,500	0.07	176	0.0	$27.79	$34.45	$10.00	0.88
Kitchen Back Hallway	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,848	0.08	380	0.0	$59.98	$309.55	$30.00	4.66
Kitchen Back Hallway Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,640	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,640	0.01	49	0.0	$7.67	$32.52	$10.00	2.93
Kitchen Office	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,848	0.16	760	0.0	$119.96	$489.09	$95.00	3.29
Walk-in Freezer	1	Incandescent: One Lamp Screw-in	Wall Switch	60	1,500	Relamp	No	1	LED Screw-In Lamps: One Lamp Screw-in Fixture	Wall Switch	9	1,500	0.03	88	0.0	$13.89	$17.23	$5.00	0.88
Serving Area	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,640	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,848	0.08	380	0.0	$59.98	$379.55	$65.00	5.24
Kitchen Boys Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.02	100	0.0	$15.82	$36.52	$10.00	1.68
Kitchen Boys Restroom	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,640	0.04	176	0.0	$27.81	$144.92	$0.00	5.21
Kitchen Girls Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,640	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,848	0.10	446	0.0	$70.38	$416.06	$75.00	4.85
Kitchen Girls Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.02	100	0.0	$15.82	$36.52	$10.00	1.68
Faculty Restroom 1	2	Incandescent: One Lamp Screw-in	Wall Switch	60	2,640	Relamp	No	2	LED Screw-In Lamps: One Lamp Screw-in Fixture	Wall Switch	9	2,640	0.07	310	0.0	$48.90	$34.45	$10.00	0.50
Faculty Restroom 2	2	Incandescent: One Lamp Screw-in	Wall Switch	60	2,640	Relamp	No	2	LED Screw-In Lamps: One Lamp Screw-in Fixture	Wall Switch	9	2,640	0.07	310	0.0	$48.90	$34.45	$10.00	0.50
Work Room	11	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,640	Relamp	Yes	11	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,848	0.15	705	0.0	$111.28	$627.67	$145.00	4.34
Work Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.02	100	0.0	$15.82	$36.52	$10.00	1.68
400 Sectin Hall	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,848	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,294	0.38	1,241	0.0	$195.93	$711.21	$140.00	2.92
400 section Hall	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
400 section Hall	1	Exit Signs: Fluorescent	None	15	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	91	0.0	$14.32	$72.42	$0.00	5.06
300 Section Hall	22	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,848	Relamp	Yes	22	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,294	0.60	1,950	0.0	$307.90	$1,203.33	$220.00	3.19
300 Section Hall	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

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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
300 Section Hall	6	Compact Fluorescent: One Lamp PL	Wall Switch	13	2,640	Relamp	No	6	LED Screw-In Lamps: One Lamp PL Fixture	Wall Switch	9	2,640	0.02	71	0.0	$11.22	$138.00	$0.00	12.30
Kitchen/MPR	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	Yes	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,848	0.30	1,393	0.0	$219.93	$671.67	$145.00	2.39
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
Nurse's OFfice	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,848	0.19	886	0.0	$139.95	$525.61	$105.00	3.01
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 7/Main Office	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,848	0.38	1,772	0.0	$279.90	$781.21	$175.00	2.17
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
100/200 Stairs 1	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,640	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,640	0.01	49	0.0	$7.67	$32.52	$10.00	2.93
100/200 Stairs 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.02	100	0.0	$15.82	$36.52	$10.00	1.68
100 Section Halls	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,640	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,848	0.29	1,337	0.0	$211.15	$638.18	$120.00	2.45
100 Section Halls	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,848	0.08	380	0.0	$59.98	$309.55	$30.00	4.66
100 Section Halls	1	Exit Signs: Fluorescent	None	15	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	91	0.0	$14.32	$72.42	$0.00	5.06
100 Section Halls	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
100 Section Halls	7	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,640	Relamp	Yes	7	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,848	0.34	1,560	0.0	$246.34	$711.21	$140.00	2.32
200 Section Hall	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.02	100	0.0	$15.82	$36.52	$10.00	1.68
200 Section Hall	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
Interior Corridor	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,640	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,848	0.19	891	0.0	$140.77	$492.12	$80.00	2.93
Interior Corridor	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
Interior Corridor	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,640	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,848	0.22	1,013	0.0	$159.95	$492.12	$80.00	2.58
Door 15 Corridor	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,640	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,848	0.19	891	0.0	$140.77	$492.12	$80.00	2.93
Door 15 Corridor	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 23-15 Hallway	10	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,640	Relamp	Yes	10	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,848	0.48	2,228	0.0	$351.92	$930.30	$200.00	2.08
CR 23-15 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
Bldg Lighting	2	Compact Fluorescent: Two PL lamp fixture	None	48	4,300	Relamp	No	2	LED Screw-In Lamps: Two Lamp PL Fixture	None	34	4,300	0.02	142	0.0	$22.49	$80.00	$0.00	3.56
Bldg Lighting	3	High-Pressure Sodium: (1) 400W Lamp	None	465	4,300	Fixture Replacement	No	3	LED - Fixtures: Outdoor Porch Wall Mount	None	140	4,300	0.64	4,829	0.0	$762.58	$1,481.19	$15.00	1.92

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Bldg Lighting	1	Compact Fluorescent: Box Fixture	None	120	4,300	Fixture Replacement	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	None	84	4,300	0.02	178	0.0	$28.11	$965.97	$100.00	30.80
Parking Lot	11	High-Pressure Sodium: (1) 400W Lamp	None	465	4,300	Fixture Replacement	No	11	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	None	140	4,300	2.35	17,706	0.0	$2,796.11	$10,236.21	$1,100.00	3.27
Door 16	1	Compact Fluorescent: One Screw-in lamp fixutre	None	18	4,300	Relamp	No	1	LED Screw-In Lamps: One Lamp Screw-in Fixture	None	13	4,300	0.00	25	0.0	$3.90	$17.23	$5.00	3.13
Side Door	2	Compact Fluorescent: One Screw-in lamp fixutre	None	18	4,300	Relamp	No	2	LED Screw-In Lamps: One Lamp Screw-in Fixture	None	13	4,300	0.01	49	0.0	$7.81	$34.45	$10.00	3.13
Canopy between door 12, 13	13	Compact Fluorescent: One PL lamp fixture	None	32	4,300	Relamp	No	13	LED Screw-In Lamps: One Lamp PL Fixture	None	22	4,300	0.08	617	0.0	$97.46	$299.00	$0.00	3.07
Wall packs	6	Compact Fluorescent: One PL lamp fixture	None	32	4,300	Relamp	No	6	LED Screw-In Lamps: One Lamp PL Fixture	None	22	4,300	0.04	285	0.0	$44.98	$138.00	$0.00	3.07
Wall packs	4	High-Pressure Sodium: (1) 70W Lamp	None	95	4,300	Fixture Replacement	No	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	None	29	4,300	0.17	1,315	0.0	$207.73	$3,863.86	$400.00	16.68
Door 10 wallpack	1	Incandescent: One Screw-in lamp fixutre	None	60	4,300	Relamp	No	1	LED Screw-In Lamps: One Lamp Screw-in Fixture	None	9	4,300	0.03	252	0.0	$39.83	$17.23	$5.00	0.31
Parking lot	12	High-Pressure Sodium: (1) 400W Lamp	None	465	4,300	Fixture Replacement	No	12	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	None	140	4,300	2.56	19,315	0.0	$3,050.30	$11,166.77	$1,200.00	3.27
Wall packs	6	LED - Fixtures: Outdoor Porch Wall Mount	None	13	4,300	None	No	6	LED - Fixtures: Outdoor Porch Wall Mount	None	13	4,300	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Door 5	2	Incandescent: One Screw-in lamp fixutre	None	60	4,300	Relamp	No	2	LED Screw-In Lamps: One Lamp Screw-in Fixture	None	9	4,300	0.07	504	0.0	$79.65	$34.45	$10.00	0.31
Door 17	2	High-Pressure Sodium: (1) 70W Lamp	None	95	4,300	Fixture Replacement	No	2	LED - Fixtures: Outdoor Porch Wall Mount	None	29	4,300	0.09	658	0.0	$103.86	$987.46	$10.00	9.41

Motor Inventory & Recommendations

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room 2	Heating Hot Water Supply	2	Heating Hot Water Pump	7.5	88.5%	No	3,391	Yes	91.0%	Yes	2	2.03	18,934	0.0	$2,990.07	$9,476.48	$0.00	3.17
Boiler Room 2	Heating Hot Water Return	2	Heating Hot Water Pump	1.0	85.5%	No	2,745	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Condenser Water System	1	Condenser Water Pump	7.5	91.0%	No	3,391	No	91.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Chilled Water System	1	Chilled Water Pump	7.5	91.0%	Yes	3,391	No	91.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room 1	Heating Hot Water Supply	2	Heating Hot Water Pump	1.0	85.5%	No	2,745	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room 1	Heating Hot Water Return	2	Heating Hot Water Pump	1.0	85.5%	No	2,745	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Condenser Water System	1	Cooling Tower Fan	5.0	93.0%	No	2,745	Yes	89.5%	Yes	1	-0.08	4,686	0.0	$740.00	$4,076.22	$0.00	5.51
Boiler Room 2	Pneumatic Controls	2	Air Compressor	2.0	78.5%	No	4,957	No	78.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room 1	Hot Water System	2	Water Supply Pump	1.5	86.5%	No	2,745	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Elec Room	DHW recirculation	1	Heating Hot Water Pump	0.3	68.5%	No	2,745	No	68.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Gym	AHU	2	Supply Fan	2.0	86.5%	No	2,745	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Exhaust	10	Exhaust Fan	0.3	68.5%	No	2,745	No	68.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classrooms	Package Terminal AC units	10	Supply Fan	0.5	76.2%	No	2,745	No	76.2%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classrooms	Window AC fans	13	Supply Fan	0.3	72.4%	No	2,745	No	72.4%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classrooms	Package Terminal AC units	7	Supply Fan	0.8	81.8%	No	2,745	No	81.8%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classrooms	Slit System fans	1	Supply Fan	0.1	62.2%	No	2,745	No	62.2%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classrooms	Slit System fans	3	Supply Fan	0.0	62.2%	No	2,745	No	62.2%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classrooms	Slit System fans	15	Supply Fan	0.0	62.2%	No	2,745	No	62.2%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Multiple Locations	Cafeteria	2	Supply Fan	1.0	85.5%	No	2,745	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	HRU1, 2	2	Supply Fan	3.0	86.5%	No	2,745	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	HRU1, 2	2	Exhaust Fan	3.0	86.5%	No	2,745	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ERV	1	Supply Fan	5.0	87.5%	No	2,745	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ERV	1	Exhaust Fan	3.0	86.5%	No	2,745	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	McQuay Package Unit	1	Supply Fan	7.5	88.5%	No	3,391	Yes	91.0%	Yes	1	1.08	4,150	0.0	$655.44	$4,738.24	$600.00	6.31
Roof	McQuay Package Unit	1	Return Fan	5.0	87.5%	No	2,745	Yes	89.5%	Yes	1	0.72	2,236	0.0	$353.07	$4,076.22	$400.00	10.41
Multiple Locations	Classroom Ventilators	60	Supply Fan	0.3	68.5%	No	2,745	No	68.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	HRU3	1	Supply Fan	1.0	85.5%	No	2,745	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	HRU3	1	Exhaust Fan	1.0	85.5%	No	2,745	No	85.5%	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
Classroom	Room Air Conditioning	1	Ductless Mini-Split AC	1.00		Yes	1	Ductless Mini-Split AC	1.00		18.00		No	0.03	25	0.0	$4.03	$2,739.49	$0.00	680.54
Multiple Locations	Classrooms	13	Window AC	2.00		Yes	13	Window AC	2.00		12.00		No	4.82	4,674	0.0	$738.20	$28,307.76	$0.00	38.35
Classroom	Room Air Conditioning	1	Ductless Mini-Split AC	3.00		Yes	1	Ductless Mini-Split AC	3.00		18.00		No	1.07	1,040	0.0	$164.24	$8,218.48	$0.00	50.04
Classroom	Room Air Conditioning	1	Ductless Mini-Split AC	1.00		Yes	1	Ductless Mini-Split AC	1.00		18.00		No	0.36	347	0.0	$54.75	$2,739.49	$0.00	50.04
Classroom	Room Air Conditioning	1	Ductless Mini-Split AC	0.75		Yes	1	Ductless Mini-Split AC	0.75		18.00		No	0.27	260	0.0	$41.06	$2,054.62	$0.00	50.04
Multiple Locations	Classrooms	5	Packaged Terminal AC	3.00		Yes	5	Packaged Terminal AC	3.00		12.00		No	1.89	1,834	0.0	$289.66	$28,722.15	$975.00	95.79
Roof	Room Air Conditioning	2	Split-System AC	12.00		Yes	2	Split-System AC	12.00		11.50		No	0.45	436	0.0	$68.86	$27,836.37	$1,896.00	376.72
Multiple Locations	Room Air Conditioning	2	Ductless Mini-Split AC	2.76		Yes	2	Ductless Mini-Split AC	2.76		18.00		No	0.49	478	0.0	$75.50	$15,112.87	$0.00	200.16
Multiple Locations	Classrooms	7	Packaged Terminal AC	1.25		Yes	7	Packaged Terminal AC	1.25		12.00		No	1.54	1,497	0.0	$236.36	$16,754.59	$568.75	68.48
Exterior Pad	Cafeteria	1	Split-System AC	15.00		Yes	1	Split-System AC	15.00		11.50		No	0.38	367	0.0	$57.90	$17,397.73	$1,185.00	280.02
Nurse's Office	Room Air Conditioning	1	Ductless Mini-Split AC	0.75		Yes	1	Ductless Mini-Split AC	0.75		18.00		No	0.04	41	0.0	$6.42	$2,054.62	$0.00	320.25
Roof	Room Air Conditioning	1	Packaged AC	15.00		Yes	1	Packaged AC	15.00		11.50		No	2.91	2,826	0.0	$446.30	$20,907.75	$1,185.00	44.19
Roof	Room Air Conditioning	1	Split-System AC	2.83		Yes	1	Split-System AC	2.83		14.00		No	0.61	588	0.0	$92.87	$4,239.29	$260.67	42.84
Roof	Room Air Conditioning	1	Split-System AC	3.00		Yes	1	Split-System AC	3.00		14.00		No	0.13	129	0.0	$20.30	$4,488.66	$276.00	207.48
Roof	Room Air Conditioning	1	Split-System AC	4.00		Yes	1	Split-System AC	4.00		14.00		No	0.86	830	0.0	$131.12	$5,984.88	$368.00	42.84
Roof	Room Air Conditioning	2	Split-System AC	8.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room Air Conditioning	1	Split-System AC	10.00		Yes	1	Split-System AC	10.00		11.50		No	1.65	1,604	0.0	$253.39	$11,637.70	$730.00	43.05

Electric Chiller Inventory & Recommendations

		Existing Conditions			Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Chiller Quantity	System Type	Cooling Capacity per Unit (Tons)	Install High Efficiency Chillers?	Chiller Quantity	System Type	Constant/ Variable Speed	Cooling Capacity (Tons)	Full Load Efficiency (kW/Ton)	IPLV Efficiency (kW/Ton)	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
Mechanical Room	Entire Facility	1	Water-Cooled Screw Chiller	83.30	No							0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room 2	Heating Hot Water	2	Condensing Hot Water Boiler	1,860.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room 1	Heating Hot Water	2	Condensing Hot Water Boiler	658.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

DHW Inventory & Recommendations

		Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room 2	Entire Facility	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Main Office Elec Room	Entire Facility	1	Storage Tank Water Heater (≤ 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Electric Room	Entire Facility	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
Multiple Locations	14	Faucet Aerator (Lavatory)	2.00	1.00	0.00	0	14.4	$142.74	$100.38	$0.00	0.70

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

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions			Proposed Condit	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 (>50 cu. ft.)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Stand-Up Freezer, Solid Door (>50 cu. ft.)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Novelty Cooler Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Cooler Description	Install Automatic Shutoff 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
Cafeteria	1	Ice Cream Chest	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cafeteria	2	Milk and Juice Chest	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	3	Electric Steamer	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
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?
Multiple Locations	49	Desktops	75.0	
Multiple Locations	17	Desktop Printers	25.0	
Multiple Locations	5	Photocopiers	515.0	
Multiple Locations	20	LCD TV	120.0	
Multiple Locations	21	Minifridge	50.0	
Multiple Locations	2	Water Coolers	500.0	
Multiple Locations	2	Refrigerator	600.0	
Multiple Locations	8	Microwaves	1,000.0	
Multiple Locations	2	Coffee Makers	400.0	
Multiple Locations	35	Projectors	200.0	
Multiple Locations	8	Dehumidifiers	1,500.0	
Multiple Locations	2	Laptops	50.0	
Multiple Locations	6	Chromebook/Tablet Carts	50.0	
Multiple Locations	3	CRT TV	120.0	
Multiple Locations	2	Toaster Oven	1,200.0	
Classroom	1	Kiln	10,000.0	

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
Work Room	1	Refrigerated	Yes	0.00	1,612	0.0	$254.55	$230.00	$0.00	0.90

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

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ENERGY STAR® Score[1]

Dutch Neck Elementary School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 77,168
Built: 1925

For Year Ending: November 30, 2017
Date Generated: October 12, 2018

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
Dutch Neck Elementary School 392 Village Road East West Windsor, New Jersey 08550	_____ , (___)___-_____	___ _____ , (___)___-_____ _____

Property ID: 6389283

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
42.3 kBtu/ft²

Source EUI
112.1 kBtu/ft²

Annual Energy by Fuel

Electric - Grid (kBtu)	2,980,782 (91%)
Natural Gas (kBtu)	286,361 (9%)

National Median Comparison

National Median Site EUI (kBtu/ft²)	46.1
National Median Source EUI (kBtu/ft²)	121.9
% Diff from National Median Source EUI	-8%

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO2e/year)	317

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)