Local Government Energy Audit:
Energy Audit Report

Town Center Elementary School

700 Wyndhurst Drive

Plainsboro, New Jersey 08536

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 Town Center 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 local governments in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

1.1 Facility Summary

Town Center Elementary School is a two-story, 115,500 square foot building built in 2002. Spaces include: classrooms, gymnasium, auditorium, offices, cafeteria, corridors, stairwells, storage rooms, library, media center, a commercial kitchen and mechanical room including mechanical equipment.

There have been no recent improvements in this site and the site is interested in a new energy management system but has been unable to fund the project.

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 13 measures and recommends 10 measures which represent an opportunity to reduce annual energy costs by $47,385 and annual greenhouse gas emissions by 301,220 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 3.5 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 annual energy use by 18%.

Figure 1 – Previous 12 Month Utility Costs

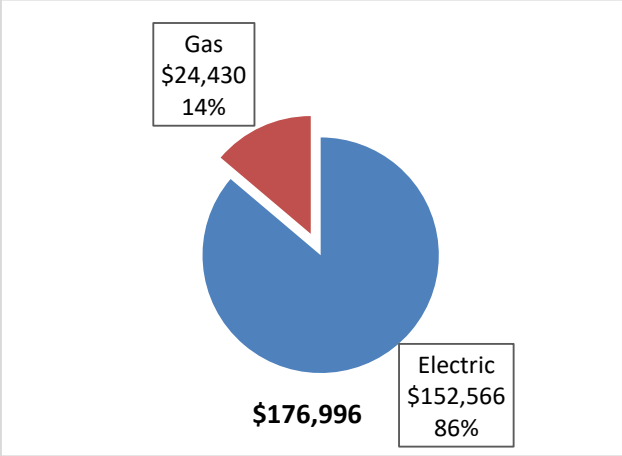
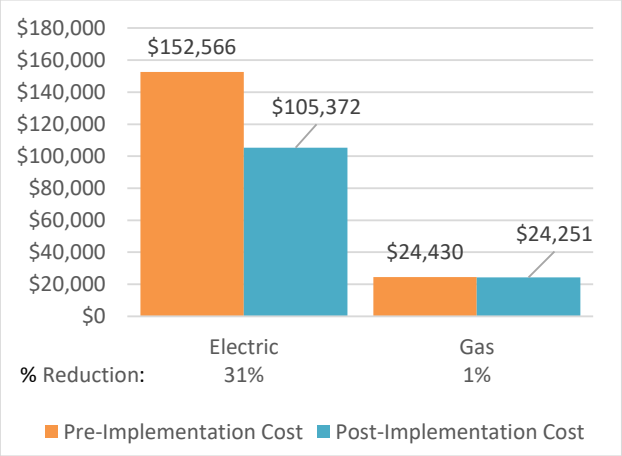


Figure 2 – Potential Post-Implementation Costs



A detailed description of Town Center 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 Natural Gas Savings (MMBtu)	Annual N/A Savings (MMBtu)	Annual N/A Savings (MMBtu)	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			**154,572**	**38.3**	**0.0**	**0.0**	**0.0**	**0.0**	**$24,576.79**	**$80,067.80**	**$16,450.00**	**$63,617.80**	**2.6**	**155,652**
ECM 1	Install LED Fixtures	Yes	15,329	2.4	0.0	0.0	0.0	0.0	$2,437.32	$21,544.58	$1,350.00	$20,194.58	8.3	15,436
ECM 2	Retrofit Fixtures with LED Lamps	Yes	139,242	35.9	0.0	0.0	0.0	0.0	$22,139.47	$58,523.22	$15,100.00	$43,423.22	2.0	140,216
Lighting Control Measures			**34,229**	**8.1**	**0.0**	**0.0**	**0.0**	**0.0**	**$5,442.38**	**$31,000.00**	**$3,500.00**	**$27,500.00**	**5.1**	**34,468**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	29,775	7.1	0.0	0.0	0.0	0.0	$4,734.16	$27,000.00	$3,500.00	$23,500.00	5.0	29,983
ECM 4	Install High/Low Lighitng Controls	Yes	4,454	1.1	0.0	0.0	0.0	0.0	$708.22	$4,000.00	$0.00	$4,000.00	5.6	4,485
Motor Upgrades			**6,376**	**1.4**	**0.0**	**0.0**	**0.0**	**0.0**	**$1,013.70**	**$35,402.25**	**$0.00**	**$35,402.25**	**34.9**	**6,420**
ECM 5	Premium Efficiency Motors	Yes	6,376	1.4	0.0	0.0	0.0	0.0	$1,013.70	$35,402.25	$0.00	$35,402.25	34.9	6,420
Variable Frequency Drive (VFD) Measures			**91,595**	**10.9**	**0.0**	**0.0**	**0.0**	**0.0**	**$14,563.61**	**$37,550.75**	**$1,040.00**	**$36,510.75**	**2.5**	**92,236**
	Install VFDs on Constant Volume (CV) HVAC	No	2,140	1.8	0.0	0.0	0.0	0.0	$340.22	$9,559.35	$1,040.00	$8,519.35	25.0	2,155
ECM 6	Install VFDs on Chilled Water Pumps	Yes	53,728	5.5	0.0	0.0	0.0	0.0	$8,542.71	$17,602.50	$0.00	$17,602.50	2.1	54,104
ECM 7	Install VFDs on Hot Water Pumps	Yes	35,728	3.7	0.0	0.0	0.0	0.0	$5,680.68	$10,388.90	$0.00	$10,388.90	1.8	35,978
Electric Chiller Replacement			**47,580**	**24.5**	**0.0**	**0.0**	**0.0**	**0.0**	**$7,565.19**	**$221,678.89**	**$11,250.00**	**$210,428.89**	**27.8**	**47,913**
	Install High Efficiency Chillers	No	47,580	24.5	0.0	0.0	0.0	0.0	$7,565.19	$221,678.89	$11,250.00	$210,428.89	27.8	47,913
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**109.6**	**0.0**	**0.0**	**109.6**	**$1,022.10**	**$69,299.62**	**$5,823.00**	**$63,476.62**	**62.1**	**12,834**
	Install High Efficiency Hot Water Boilers	No	0	0.0	109.6	0.0	0.0	109.6	$1,022.10	$69,299.62	$5,823.00	$63,476.62	62.1	12,834
HVAC System Improvements			**9,724**	**0.0**	**19.3**	**0.0**	**0.0**	**19.3**	**$1,725.61**	**$8,156.52**	**$0.00**	**$8,156.52**	**4.7**	**12,046**
ECM 8	Implement Demand Control Ventilation	Yes	9,724	0.0	19.3	0.0	0.0	19.3	$1,725.61	$8,156.52	$0.00	$8,156.52	4.7	12,046
Food Service Equipment & Refrigeration Measures			**923**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**$146.69**	**$909.90**	**$0.00**	**$909.90**	**6.2**	**929**
ECM 9	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	923	0.1	0.0	0.0	0.0	0.0	$146.69	$909.90	$0.00	$909.90	6.2	929
Plug Load Equipment Control - Vending Machine			**1,612**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**$256.28**	**$230.00**	**$0.00**	**$230.00**	**0.9**	**1,623**
ECM 10	Vending Machine Control	Yes	1,612	0.0	0.0	0.0	0.0	0.0	$256.28	$230.00	$0.00	$230.00	0.9	1,623
TOTALS FOR HIGH PRIORITY MEASURES			**296,890**	**57.1**	**19.3**	**0.0**	**0.0**	**19.3**	**$47,384.86**	**$183,757.87**	**$19,950.00**	**$163,807.87**	**3.5**	**301,220**
TOTALS FOR ALL EVALUATED MEASURES			**346,610**	**83.3**	**128.9**	**0.0**	**0.0**	**128.9**	**$56,312.37**	**$484,295.73**	**$38,063.00**	**$446,232.73**	**7.9**	**364,121**

* - 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 Chiller measures generally involve replacing older inefficient hydronic chillers with modern energy efficient systems. New chillers can provide equivalent cooling compared to older chillers at a reduced energy cost. These measures save energy by reducing chiller energy usage, due to improved electrical and heat transfer efficiency.

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

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.

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

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

Energy Efficient Practices

TRC also identified seven low cost (or no cost) energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral or operational adjustments and by performing better routine maintenance on building systems. These practices can extend equipment lifetime, improve occupant comfort, provide better health and safety, as well as reduce annual energy and O&M costs. Potential opportunities identified at Town Center Elementary School include:

- Use Window Treatments/Coverings
- Assess Chillers & Request Tune-Ups
- Clean and/or Replace HVAC Filters
- Check for and Seal Duct Leakage
- Perform Boiler Maintenance
- Perform 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 Town Center 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	170	kW DC STC
Electric Generation	202,533	kWh/yr
Displaced Cost	$17,620	/yr
Installed Cost	$442,000	

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)
- SREC (Solar Renewable Energy Certificate) Registration Program (SRP)
- Energy Savings Improvement Program (ESIP)
- Demand Response Energy Aggregator

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

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

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

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 Extn: 5020
Daniel Riggle	Account Executive	daniel.riggle@schneider-electric.com	808-346-2907
TRC Energy Services			
Alex Klieverik	Auditor	aklieverik@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On August 10, 2018, TRC performed an energy audit at Town Center Elementary School located in Plainsboro, New Jersey. TRC's team met with Daniel Riggle to review the facility operations and help focus our investigation on specific energy-using systems.

Town Center Elementary School is a two-story, 115,500 square foot building built in 2002. Spaces include: classrooms, gymnasium, auditorium, offices, cafeteria, corridors, stairwells, storage rooms, library, media center, a commercial kitchen and mechanical room including mechanical equipment.

The building was constructed in 2002. There have been no recent energy improvements in this site. The school is interested in a new energy management system but has been unable to fund the project thus far.

2.3 Building Occupancy

The facility is occupied about 10 months a year, from September through June, from Monday to Friday from 7:00 AM to 4:00 PM and partially from 6:00 AM to 6:00 PM during week days. Typical weekday occupancy is 98 staff and 575 students. Summer activities in this school are unknown. There are no weekend activities. The typical schedule is presented in the table below.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Town Center Elementary School	Weekday	M-F, 7:00 AM - 4:00 PM (full) 6:00 AM - 6:00 PM (partial)
Town Center Elementary School	Weekend	No Operation

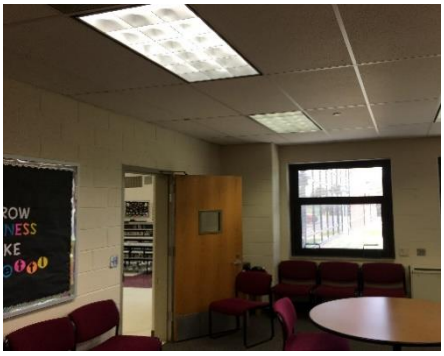
2.4 Building Envelope

Building walls are concrete block over structural steel with a brick facade. The roof is flat and covered with black membrane, and it is in good condition.

The walls are made of concrete masonry units (CMUs) with a decorative CMU veneer and painted CMU interior finish.

Most of the windows are single glazed and have aluminum frames. The glass-to-frame seals are in fair condition. The operable window weather seals are in fair condition, showing little evidence of excessive wear. Exterior doors have aluminum frames and are in good condition with undamaged door seals. Degraded window and door seals increase drafts and outside air infiltration.

Exterior Door and Windows



Typical Classroom

Building Exterior and Roof

Gymnasium

2.5 On-Site Generation

Town Center Elementary School has a 250 kW generator installed for emergency power loss. There is no additional on-site electric generation capacity.

2.6 Energy-Using Systems

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

Lighting System

Lighting at the facility is provided mostly by 32-Watt linear fluorescent T8 lamps. Additionally, there are some compact fluorescent lamps (CFL) and incandescent general-purpose lamps. Typically, T8 fluorescent lamps use electronic ballasts.

Fixture types include 2- 3- lamp, 2- or 4-foot long surface mounted fixtures and 2-foot fixtures with linear tube lamps. Most fixtures are in fair condition. The gymnasium fixtures have high bay linear fluorescent lamps and are manually controlled. Interior lighting levels were generally sufficient. All exit signs are LED.

Lighting control in most spaces is provided by wall switches. Most lighting fixtures contain wall switches and there is no additional lighting control system in place.

Exterior lighting includes wall packs canopy lights with CFL and LED lamps. The pole-mounted flood fixtures have with High Pressure Sodium (HPS).

Exterior light fixtures are controlled by a time clock.

Chilled Water or Condenser Water System

The chiller plant consists of a 450-ton, Trane, R-123, centrifugal chiller. The chiller is configured in a primary-secondary distribution loop with two constant flow primary pumps (SCHWP 1 and 2) and two constant flow secondary pumps (SCHWP 3 and 4). The chiller is supplied by a dedicated 15 hp primary pump. The secondary distribution system is supplied by a 7.5 hp pump.

The facility engineers manually stage the chillers on to meet the load, operating the least number of chillers required. The chiller plant has been in place since the construction of the building, so the age of the equipment is estimated at 16 years but is well maintained and within its remaining useful life.

The condenser water system consists of one, two-cell cooling tower. The cooling tower has two fan motors. The fan motor nameplates could not be accessed at the time of inspection and thus are estimated 10 hp each. Fan motors have a variable frequency drive to maintain basin water temperature. Condenser water is supplied to the chillers by two 15 hp, constant flow pumps (CWP 1 and CWP 2). The cooling tower was found in good condition.

Hot Water (or Steam) Heating System

Two Smith 1,941 MBh hot water boilers serve the building heating load and hot water needs. The burners are fully-modulating with a nominal efficiency of 80%. The boilers are configured in an automated control scheme. Both boilers are required under high load conditions. Installed in 2002, they are in fair condition. There is a service contract in place.

The boilers serve a primary only distribution system with two constant speed 5 hp heating hot water pumps operating in lead/lag fashion.

Chilled Water Air Conditioning System (CHW)

There are seven AHUs with constant speed supply fan motors, along with cooling and heating coils providing conditioned air to areas such as gymnasium, cafeteria, library and media center. The information regarding the operating conditions and control system associated with these units were not available at the time of energy audit and does not impact the result of this study. The AHUs are original to the building and appears to be in fair operating condition.

Direct Expansion Air Conditioning System (DX)

The speech rooms throughout the school are served with three split system air source heat pump units controlled by room thermostats. These 11 EER units have a heating capacity of 36 MBh and 3-ton cooling capacity.

The classrooms are served with packaged terminal air conditioning (PTAC) units. The units also have constant speed fans with both cooling and heating coils.

Domestic Hot Water Heating System

Hot water is produced with a 100 gallon 300 MBh gas-fired storage water heater with an 84% efficiency. At the time of the site visit, the temperature of the domestic water heaters were not visible to the auditor.

A 1/6 hp circulation pumps distribute water to end uses. The circulation pumps operate continuously.

The domestic hot water pipes are insulated and the insulation is in good condition.

Food Service & Laundry Equipment

The kitchen has mixed gas and electric equipment that is used to prepare meals for students and staff. Most cooking is done using a gas-fired and electric oven. Bulk prepared foods are held in several electric holding cabinets. Equipment is high efficiency and is in good condition.

Refrigeration

The kitchen has several stand-up refrigerators with either solid or glass doors. All equipment is standard and in good condition.

There are two walk-in refrigerators which each have estimated 2-ton compressors located on the rooftop. One unit has a single fan evaporator and the other has two evaporator fans.

Building Plug Load

The utility bill analysis indicates that plug loads consume approximately 4% of total building energy use. You seem to already be doing a great job managing your electrical plug loads. This report makes additional suggestions for ECMs in this area as well as Energy Efficient Best Practices.

There are approximately 53 computer work stations throughout the school. Plug loads throughout the building include general café and office equipment. There are classroom typical loads such as some TVs, projectors, VCR, printers, coffee maker and photocopiers.

There is a refrigerated beverage vending machine. Vending machine is not equipped with occupancy-based controls.

2.7 Water-Using Systems

There are 10 restrooms with toilets, urinals, and sinks. Faucet flow rates are at 1.5 gallons per minute (gpm) or higher.

3 SITE ENERGY USE AND COSTS

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

3.1 Total Cost of Energy

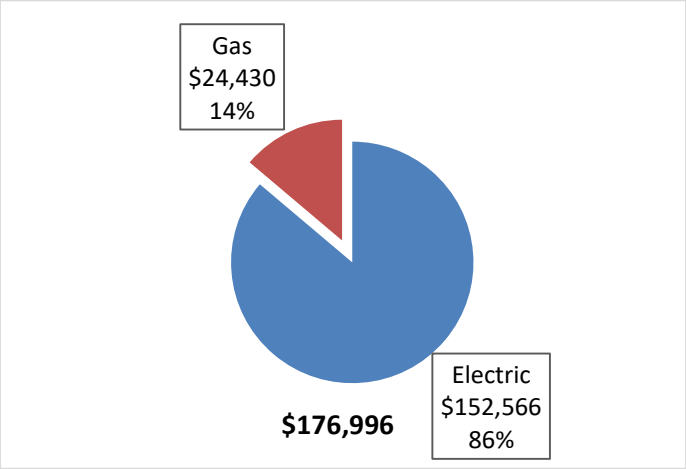
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 7 - Utility Summary

Utility Summary for Town Center Elementary School		
Fuel	**Usage**	**Cost**
Electricity	959,537 kWh	$152,566
Natural Gas	26,199 Therms	$24,430
Total		**$176,996**

The current annual energy cost for this facility is $176,996 as shown in the chart below.

Figure 8 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by PSE&G. The average electric cost over the past 12 months was $0.159/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 9 - Electric Usage & Demand

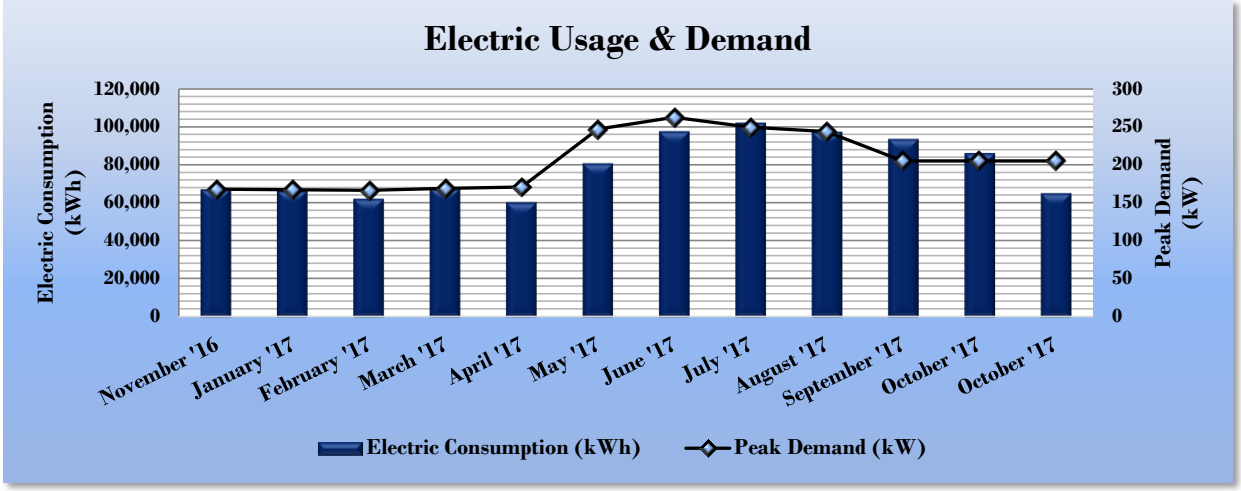


Figure 10 - Electric Usage & Demand

Electric Billing Data for Town Center Elementary School					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
12/13/16	33	66,965	168		$8,062
1/18/17	35	66,269	167		$8,027
2/16/17	28	61,983	166		$7,569
3/20/17	31	67,399	169		$8,159
4/17/17	27	60,173	171		$7,405
5/18/17	30	80,528	247		$21,630
6/19/17	31	97,343	262		$14,253
7/19/17	29	101,908	250		$14,585
8/17/17	28	97,067	244		$13,871
9/17/17	30	93,265	205		$18,247
10/17/17	29	85,982	205		$19,957
11/15/17	28	64,882	205		$8,292
Totals	**359**	**943,764**	**262.4**	**$0**	**$150,058**
Annual	**365**	**959,537**	**262.4**	**$0**	**$152,566**

3.3 Natural Gas Usage

Natural gas is provided by PSE&G. The average gas cost for the past 12 months is $0.932/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below.

Figure 11 - Natural Gas Usage

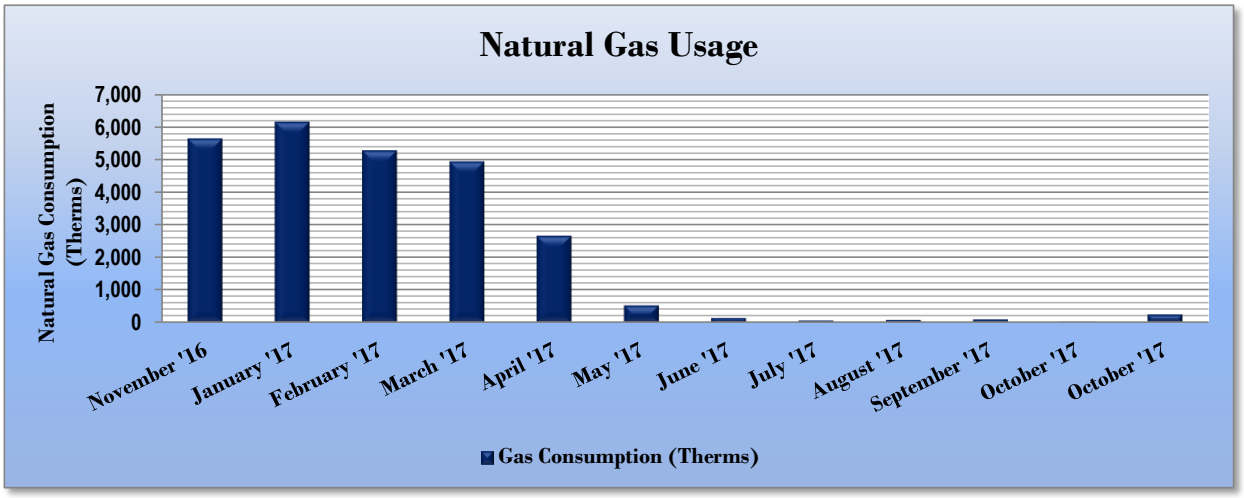


Figure 12 - Natural Gas Usage

Gas Billing Data for Town Center Elementary School			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
12/13/16	33	5,633	$4,908
1/18/17	35	6,148	$5,430
2/16/17	28	5,273	$4,808
3/20/17	31	4,933	$4,553
4/17/17	27	2,656	$1,771
5/18/17	30	521	$435
6/19/17	31	132	$191
7/19/17	29	55	$142
8/17/17	28	75	$151
9/17/17	30	88	$109
10/17/17	29	12	$73
11/15/17	28	242	$1,458
Totals	**359**	**25,768**	**$24,029**
Annual	**365**	**26,199**	**$24,430**

3.4 Benchmarking

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

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

Figure 13 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Town Center Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	133.0	141.4
Site Energy Use Intensity (kBtu/ft^2)	60.1	58.2

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

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

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Town Center Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	100.3	141.4
Site Energy Use Intensity (kBtu/ft^2)	49.6	58.2

Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. This facility has a current score of 68.

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

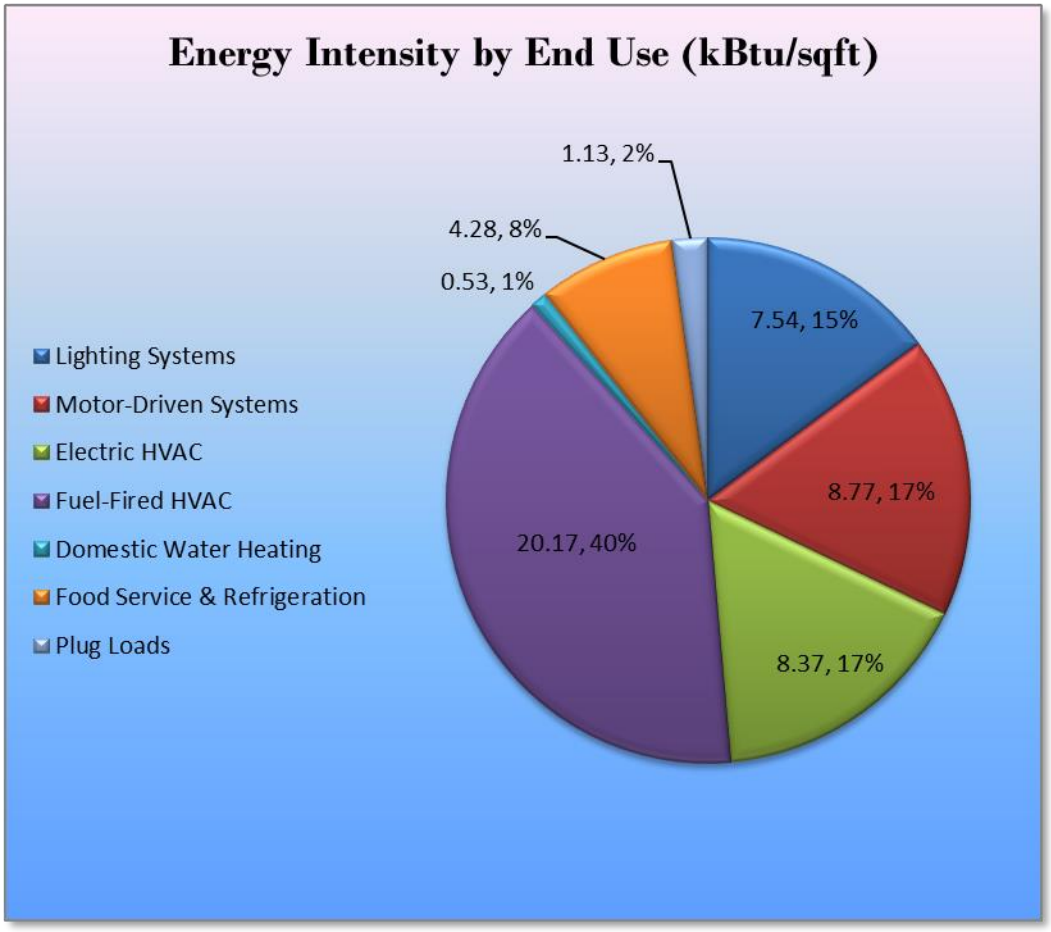
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

A Portfolio Manager® account has been created online for your facility and you will be provided with the login information for the account. We encourage you to update your utility information in Portfolio Manager® regularly, so that you can keep track of your building's performance. Free online training is available to help you use ENERGY STAR® Portfolio Manager® to track your building's performance at: https://www.energystar.gov/buildings/training.

3.5 Energy End-Use Breakdown

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

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



4 ENERGY CONSERVATION MEASURES

Level of Analysis

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information to the Town Center 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*, approved by the New Jersey Board of Public Utilities. Further analysis or investigation may be required to calculate more precise savings based on specific circumstances. A higher level of investigation may be necessary to support any custom SmartStart or Pay for Performance, or Direct Install incentive applications. Financial incentives for the ECMs identified in this report have been calculated based the NJCEP prescriptive SmartStart program. Some measures and proposed upgrade projects may be eligible for higher incentives than those shown below through other NJCEP programs as described in Section 8.

4.1 Recommended ECMs

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

Figure 16 – Summary of Recommended ECMs

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	*Annual Natural Gas Savings (MMBtu)*	*Annual N/A Savings (MMBtu)*	*Annual N/A Savings (MMBtu)*	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			**154,572**	**38.3**	**0.0**	**0.0**	**0.0**	**0.0**	**$24,576.79**	**$80,067.80**	**$16,450.00**	**$63,617.80**	**2.6**	**155,652**
ECM 1	Install LED Fixtures	Yes	15,329	2.4	0.0	0.0	0.0	0.0	$2,437.32	$21,544.58	$1,350.00	$20,194.58	8.3	15,436
ECM 2	Retrofit Fixtures with LED Lamps	Yes	139,242	35.9	0.0	0.0	0.0	0.0	$22,139.47	$58,523.22	$15,100.00	$43,423.22	2.0	140,216
Lighting Control Measures			**34,229**	**8.1**	**0.0**	**0.0**	**0.0**	**0.0**	**$5,442.38**	**$31,000.00**	**$3,500.00**	**$27,500.00**	**5.1**	**34,468**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	29,775	7.1	0.0	0.0	0.0	0.0	$4,734.16	$27,000.00	$3,500.00	$23,500.00	5.0	29,983
ECM 4	Install High/Low Lighitng Controls	Yes	4,454	1.1	0.0	0.0	0.0	0.0	$708.22	$4,000.00	$0.00	$4,000.00	5.6	4,485
Motor Upgrades			**6,376**	**1.4**	**0.0**	**0.0**	**0.0**	**0.0**	**$1,013.70**	**$35,402.25**	**$0.00**	**$35,402.25**	**34.9**	**6,420**
ECM 5	Premium Efficiency Motors	Yes	6,376	1.4	0.0	0.0	0.0	0.0	$1,013.70	$35,402.25	$0.00	$35,402.25	34.9	6,420
Variable Frequency Drive (VFD) Measures			**91,595**	**10.9**	**0.0**	**0.0**	**0.0**	**0.0**	**$14,563.61**	**$37,550.75**	**$1,040.00**	**$36,510.75**	**2.5**	**92,236**
ECM 6	Install VFDs on Chilled Water Pumps	Yes	53,728	5.5	0.0	0.0	0.0	0.0	$8,542.71	$17,602.50	$0.00	$17,602.50	2.1	54,104
ECM 7	Install VFDs on Hot Water Pumps	Yes	35,728	3.7	0.0	0.0	0.0	0.0	$5,680.68	$10,388.90	$0.00	$10,388.90	1.8	35,978
HVAC System Improvements			**9,724**	**0.0**	**19.3**	**0.0**	**0.0**	**19.3**	**$1,725.61**	**$8,156.52**	**$0.00**	**$8,156.52**	**4.7**	**12,046**
ECM 8	Implement Demand Control Ventilation	Yes	9,724	0.0	19.3	0.0	0.0	19.3	$1,725.61	$8,156.52	$0.00	$8,156.52	4.7	12,046
Food Service Equipment & Refrigeration Measures			**923**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**$146.69**	**$909.90**	**$0.00**	**$909.90**	**6.2**	**929**
ECM 9	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	923	0.1	0.0	0.0	0.0	0.0	$146.69	$909.90	$0.00	$909.90	6.2	929
Plug Load Equipment Control - Vending Machine			**1,612**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**$256.28**	**$230.00**	**$0.00**	**$230.00**	**0.9**	**1,623**
ECM 10	Vending Machine Control	Yes	1,612	0.0	0.0	0.0	0.0	0.0	$256.28	$230.00	$0.00	$230.00	0.9	1,623
TOTALS FOR HIGH PRIORITY MEASURES			**296,890**	**57.1**	**19.3**	**0.0**	**0.0**	**19.3**	**$47,384.86**	**$183,757.87**	**$19,950.00**	**$163,807.87**	**3.5**	**301,220**
TOTALS FOR ALL EVALUATED MEASURES			**346,610**	**83.3**	**128.9**	**0.0**	**0.0**	**128.9**	**$56,312.37**	**$484,295.73**	**$38,063.00**	**$446,232.73**	**7.9**	**364,121**

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

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

4.1.1 Lighting Upgrades

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

Figure 17 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**154,572**	**38.3**	**0.0**	**$24,576.79**	**$80,067.80**	**$16,450.00**	**$63,617.80**	**2.6**	**155,652**
ECM 1	Install LED Fixtures	15,329	2.4	0.0	$2,437.32	$21,544.58	$1,350.00	$20,194.58	8.3	15,436
ECM 2	Retrofit Fixtures with LED Lamps	139,242	35.9	0.0	$22,139.47	$58,523.22	$15,100.00	$43,423.22	2.0	140,216

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

ECM 1: Install LED Fixtures

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0
Exterior	15,329	2.4	0.0	$2,437.32	$21,544.58	$1,350.00	$20,194.58	8.3	15,436

Measure Description

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

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

ECM 2: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	136,761	35.5	0.0	$21,744.92	$57,214.12	$15,100.00	$42,114.12	1.9	137,717
Exterior	2,481	0.4	0.0	$394.55	$1,309.10	$0.00	$1,309.10	3.3	2,499

Measure Description

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

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

4.1.2 Lighting Control Measures

Our recommendations for lighting control measures are summarized in Figure 18 below.

Figure 18 – Summary of Lighting Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**34,229**	**8.1**	**0.0**	**$5,442.38**	**$31,000.00**	**$3,500.00**	**$27,500.00**	**5.1**	**34,468**
ECM 3	Install Occupancy Sensor Lighting Controls	29,775	7.1	0.0	$4,734.16	$27,000.00	$3,500.00	$23,500.00	5.0	29,983
ECM 4	Install High/Low Lighitng Controls	4,454	1.1	0.0	$708.22	$4,000.00	$0.00	$4,000.00	5.6	4,485

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

ECM 3: Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
29,775	7.1	0.0	$4,734.16	$27,000.00	$3,500.00	$23,500.00	5.0	29,983

Measure Description

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

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

ECM 4: Install High/Low Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
4,454	1.1	0.0	$708.22	$4,000.00	$0.00	$4,000.00	5.6	4,485

Measure Description

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

Lighting fixtures with these controls operate at default low levels when the area is not occupied to provide minimal lighting to meet security or safety requirements. Sensors detect occupancy using ultrasonic and/or infrared sensors. The lighting systems are switched to full lighting levels whenever an occupant is detected. Fixtures are automatically switched back to low level after an area has been vacant for a preset period of time. In hallways with significant ambient lighting this control can sometimes be combined with photocell controls to turn the lights off when there is sufficient daylighting. Energy savings results from only providing full lighting levels when it is required.

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

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

4.1.3 Motor Upgrades

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

Figure 19 - 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		**6,376**	**1.4**	**0.0**	**$1,013.70**	**$35,402.25**	**$0.00**	**$35,402.25**	**34.9**	**6,420**
ECM 5	Premium Efficiency Motors	6,376	1.4	0.0	$1,013.70	$35,402.25	$0.00	$35,402.25	34.9	6,420

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)
6,376	**1.4**	**0.0**	**$1,013.70**	**$35,402.25**	**$0.00**	**$35,402.25**	**34.9**	**6,420**
6,376	1.4	0.0	$1,013.70	$35,402.25	$0.00	$35,402.25	34.9	6,420

Measure Description

We recommend replacing standard efficiency motors with NEMA Premium® efficiency motors. Our evaluation assumes that existing motors will be replaced with motors of equivalent size and type. Although occasionally additional savings can be achieved by downsizing motors to better meet the motor's current load requirements. The base case motor efficiencies are estimated from nameplate information and our best estimates of motor run hours. Efficiencies of proposed motor upgrades are obtained from the *New Jersey's Clean Energy Program Protocols to Measure Resource Savings*. 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 20 below.

Figure 20 – Summary of Variable Frequency Drive ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**89,456**	**9.1**	**0.0**	**$14,223.39**	**$27,991.40**	**$0.00**	**$27,991.40**	**2.0**	**90,081**
ECM 6	Install VFDs on Chilled Water Pumps	53,728	5.5	0.0	$8,542.71	$17,602.50	$0.00	$17,602.50	2.1	54,104
ECM 7	Install VFDs on Hot Water Pumps	35,728	3.7	0.0	$5,680.68	$10,388.90	$0.00	$10,388.90	1.8	35,978

ECM 6: Install VFDs on Chilled 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)
53,728	5.5	0.0	$8,542.71	$17,602.50	$0.00	$17,602.50	2.1	54,104

Measure Description

We recommend installing a variable frequency drives (VFD) to control chilled water pumps. This measure requires that chilled water coils be served by 2-way valves and that a differential pressure sensor be installed in the chilled water loop. As the chilled 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 chilled water valves close. The magnitude of energy savings is based on the estimated amount of time that the system operates at reduced loads.

For systems with variable chilled water flow through the chiller, the minimum flow to prevent the chiller from tripping off will have to be determined during the final project design. The control system should be programmed to maintain the minimum flow through the chiller and to prevent pump cavitation.

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)
35,728	3.7	0.0	$5,680.68	$10,388.90	$0.00	$10,388.90	1.8	35,978

Measure Description

We recommend installing a variable frequency drives (VFD) to control a 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.

4.1.5 HVAC System Upgrades

Our recommendation for HVAC system improvements are summarized in Figure 21 below.

Figure 21 - Summary of HVAC System Improvement 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)
HVAC System Improvements		**9,724**	**0.0**	**19.3**	**$1,725.61**	**$8,156.52**	**$0.00**	**$8,156.52**	**4.7**	**12,046**
ECM 8	Implement Demand Control Ventilation	9,724	0.0	19.3	$1,725.61	$8,156.52	$0.00	$8,156.52	4.7	12,046

ECM 8: Implement Demand Control Ventilation (DCV)

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
9,724	0.0	19.3	$1,725.61	$8,156.52	$0.00	$8,156.52	4.7	12,046

Measure Description

Demand control ventilation (DCV) monitors indoor air CO_2 content to measure room occupancy. This data is used to regulate the amount of outdoor provided to the space for ventilation. In order to ensure adequate air quality, standard ventilation systems often provide outside air based on a space's estimated maximum occupancy. However, during low occupancy periods, the space may be over ventilated. This wastes energy through excessive fan more usage and additional cost to heat and cool the excessive air flow. DCV reduces unnecessary outdoor air intake by regulating ventilation based on actual occupancy levels, saving significant amounts of energy. DCV is most suited for facilities where occupancy levels vary significantly hour to hour and day to day.

Energy savings associated with DCV are based on hours of operation, space occupancy, system air flow, outside air reduction, and other factors. Energy savings results from eliminating unnecessary ventilation and space conditioning.

4.1.6 Food Service Equipment & Refrigeration Measures

Our recommendations for food service and refrigeration measures are summarized in Figure 22 below.

Figure 22 - Summary of Food Service Equipment & Refrigeration 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)
Food Service Equipment & Refrigeration Measures		**923**	**0.1**	**0.0**	**$146.69**	**$909.90**	**$0.00**	**$909.90**	**6.2**	**929**
ECM 9	Refrigerator/Freezer Case Electrically Commutated Motors	923	0.1	0.0	$146.69	$909.90	$0.00	$909.90	6.2	929

ECM 9: Refrigerator/Freezer Case Electrically Commutated 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)
923	0.1	0.0	$146.69	$909.90	$0.00	$909.90	6.2	929

Measure Description

We recommend replacing shaded pole or permanent split capacitor (PSC) motors with electronically commutated (EC) motors in existing walk-in freezers. These fractional horsepower EC motors are significantly more efficient than mechanically commutated, brushed motors, particularly at low speeds or partial load. By employing variable-speed technology, EC motors are able to optimize fan usage. Because these motors are brushless and utilize DC power, losses due to friction and phase shifting are eliminated. Savings for this measure take into account both the increased efficiency of the motor as well as the reduction in refrigeration load due to motor heat loss.

4.1.7 Plug Load Equipment Control - Vending Machines

Our recommendations for plug load equipment control measures are summarized in Figure 23 below.

Figure 23 - 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**	**$256.28**	**$230.00**	**$0.00**	**$230.00**	**0.9**	**1,623**
ECM 10	Vending Machine Control	1,612	0.0	0.0	$256.28	$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	$256.28	$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 were evaluated but are not recommended for implementation. Reasons for exclusion can be found in each measure description section.

Figure 24 – 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)
Variable Frequency Drive (VFD) Measures	**2,142**	**1.8**	**0.0**	**$340.51**	**$9,559.35**	**$1,040.00**	**$8,519.35**	**25.0**	**2,157**
Install VFDs on Constant Volume (CV) HVAC	2,142	1.8	0.0	$340.51	$9,559.35	$1,040.00	$8,519.35	25.0	2,157
Electric Chiller Replacement	**47,580**	**24.5**	**0.0**	**$7,565.19**	**$221,678.89**	**$11,250.00**	**$210,428.89**	**27.8**	**47,913**
Install High Efficiency Chillers	47,580	24.5	0.0	$7,565.19	$221,678.89	$11,250.00	$210,428.89	27.8	47,913
Gas Heating (HVAC/Process) Replacement	**0**	**0.0**	**109.6**	**$1,022.10**	**$69,299.62**	**$5,823.00**	**$63,476.62**	**62.1**	**12,834**
Install High Efficiency Hot Water Boilers	0	0.0	109.6	$1,022.10	$69,299.62	$5,823.00	$63,476.62	62.1	12,834
TOTALS	**49,722**	**26.3**	**109.6**	**$8,927.80**	**$300,537.86**	**$18,113.00**	**$282,424.86**	**31.6**	**62,903**

* - 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 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)
2,142	1.8	0.0	$340.51	$9,559.35	$1,040.00	$8,519.35	25.0	2,157

Measure Description

We evaluated the installation of variable frequency drives (VFDs) to control supply fan motor speeds to convert the 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.

VAV systems should not be controlled such that the supply air temperature is raised at the expense of the fan power. A common mistake is to reset the supply air temperature to achieve chiller energy savings, which can lead to additional air flow requirements. Supply air temperature should be kept low, e.g. 55°F, until the minimum fan speed (typically about 50%) is met. At this point, it is efficient to raise the supply air temperature as the load decreases, but not such that additional air flow and thus fan energy is required.

Reasons for not Recommending

This measure is not recommended due to the high simple payback period of 25 years with respect to the estimated annual energy savings and demand reduction.

Install High Efficiency Chillers

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)
47,580	24.5	0.0	$7,565.19	$221,678.89	$11,250.00	$210,428.89	27.8	47,913

Measure Description

We evaluated replacing older inefficient electric chillers with new high efficiency chillers. The type of chiller to be installed depends on the magnitude of the cooling load and variability of the cooling load profile. Positive displacement chillers are usually under 600 tons of cooling capacity and centrifugal chillers generally start at 150 tons of cooling capacity. Constant speed chillers should be used to meet cooling loads with little or no variation while variable speed chillers are more efficient for variable cooling load profiles. Water cooled chillers are more efficient than air cooled chillers but require cooling towers and additional pumps to circulate the cooling water. In any given size range variable speed chillers tend to have better partial load efficiency, but worse full load efficiency, than constant speed chillers.

The savings result from the improvement in chiller efficiency and matching the right type of chiller to the cooling load. The energy savings associated with this measure is based on the cooling capacity of the new chiller, the improvement in efficiency compared with the base case equipment, the cooling load profile, and the estimated annual operating hours of the chiller before and after the upgrade. Energy savings are maximized by proper selection of new equipment based on the cooling load profile.

Reasons for not Recommending

The assessment of replacing the existing chiller with a higher efficiency chiller was estimated and studied as the existing chiller has reached the standard useful life of the equipment (13 years). However, this measure is not recommended as the existing chiller is in good operating condition and the estimated simple payback exceeds the estimated useful life of the equipment.

Install High Efficiency Hot Water Boilers

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	109.6	$1,022.10	$69,299.62	$5,823.00	$63,476.62	62.1	12,834

Measure Description

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

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

Reasons for not Recommending

The assessment of replacing the existing boiler with a higher efficiency boiler was estimated and studied as the existing boiler has reached the standard useful life of the equipment (13 years). However, this measure is not recommended as the existing boiler is observed to be a non-condensing unit and thus the recommended measure evaluated was the replacement of the existing with a higher efficiency non-condensing boiler which does not present a valuable savings amount as well as the fact that the estimated simple payback exceeds the estimated useful life of the 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.

Use Window Treatments/Coverings

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

Assess Chillers & Request Tune-Ups

Chillers are responsible for a substantial portion of a commercial building's overall energy usage. When components of a chiller are not optimized, this can quickly result in a noticeable increase in energy bills. Chiller diagnostics can produce a 5% to 10% cost avoidance potential from discovery and implementation of low/no cost optimization strategies.

Clean and/or Replace HVAC Filters

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

Check for and Seal Duct Leakage

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

Perform Boiler Maintenance

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

Perform Water Heater Maintenance

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

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).

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.

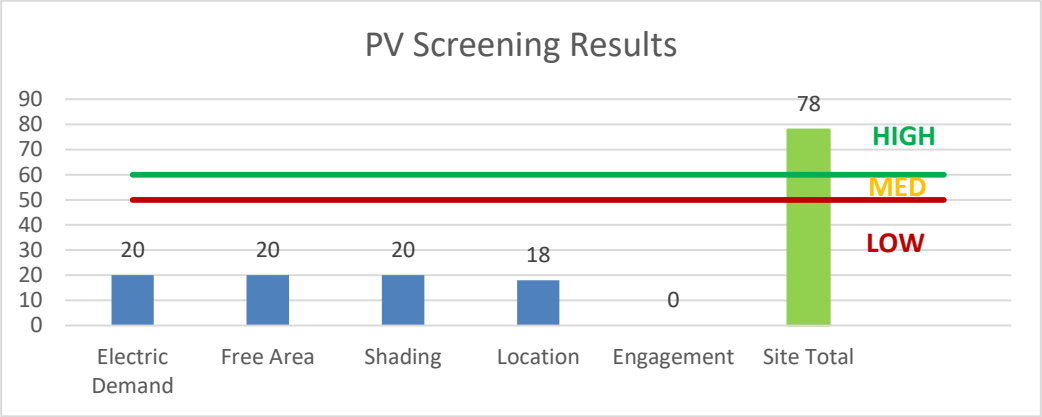
6.1 Photovoltaic

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 or ground next to the building may be feasible. If Town Center Elementary School is interested in pursuing the installation of PV, we recommended a full feasibility study be conducted.

Figure 25 - Photovoltaic Screening



Potential	High	
System Potential	170	kW DC STC
Electric Generation	202,533	kWh/yr
Displaced Cost	$17,620	/yr
Installed Cost	$442,000	

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

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

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

6.2 Combined Heat and Power

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

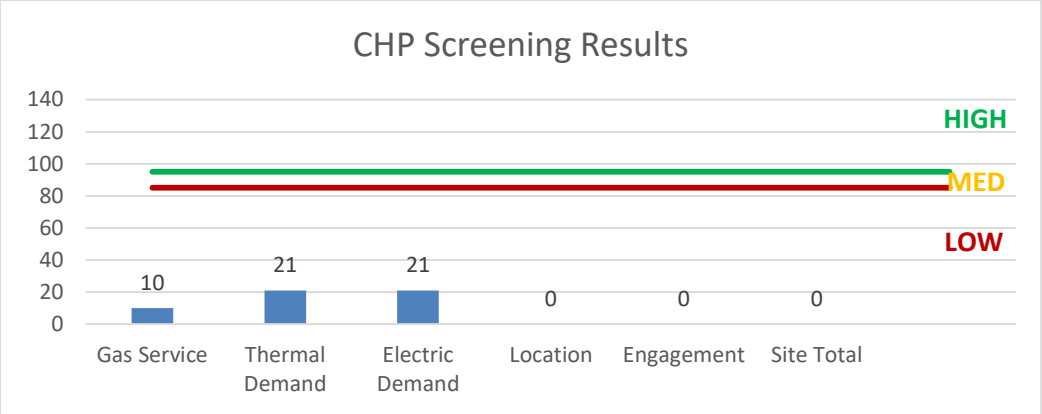
CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste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

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

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

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

Figure 26 - Combined Heat and Power Screening



7 DEMAND RESPONSE

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

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

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

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

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

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

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

Based on this study, TRC recommends the evaluation of DR program participation for this site.

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

Figure 27 - 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 Occupancy Sensor Lighting Controls	x			x		
ECM 4	Install High/Low Lighitng Controls	x			x		
ECM 5	Premium Efficiency Motors	x			x		
ECM 6	Install VFDs on Chilled Water Pumps	x			x		
ECM 7	Install VFDs on Hot Water Pumps				x		
ECM 8	Implement Demand Control Ventilation				x		
ECM 9	Refrigerator/Freezer Case Electrically Commutated Motors				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

SmartStart 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.

8.5 Demand Response Energy Aggregator

The first step toward participation in a Demand Response (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 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 the program rules and requirements for metering and controls, a facility's ability to temporarily reduce electric load, as well as the payments involved in participating in the program. Also, these providers usually offer multiple options for DR to larger facilities and may also install controls or remote monitoring equipment to help ensure compliance of all terms and conditions of a DR contract.

See Section 7 for additional information.

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
A72 - Mechanical Room	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
A72 - Mechanical Room	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	480	Relamp	No	14	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	480	0.30	255	0.0	$40.55	$511.21	$140.00	9.15
A73C - Rec Breakroom	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,680	0.08	345	0.0	$54.90	$379.55	$65.00	5.73
A73 - Rec Breakroom	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,680	0.22	921	0.0	$146.40	$562.12	$115.00	3.05
Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.08	345	0.0	$54.90	$379.55	$65.00	5.73
Main Office Area	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.57	2,417	0.0	$384.29	$1,036.82	$245.00	2.06
Main Office Area	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,400	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,400	0.01	26	0.0	$4.17	$54.77	$15.00	9.54
A12 - Conference Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.16	691	0.0	$109.80	$489.09	$95.00	3.59
A-15 Work Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.16	691	0.0	$109.80	$489.09	$95.00	3.59
A15 - Principal Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.16	691	0.0	$109.80	$489.09	$95.00	3.59
A14 - Assistance Principal Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.16	691	0.0	$109.80	$489.09	$95.00	3.59
RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
Server Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.04	182	0.0	$28.96	$73.03	$20.00	1.83
A25 - Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.08	345	0.0	$54.90	$379.55	$65.00	5.73
Office Suite	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.16	691	0.0	$109.80	$489.09	$95.00	3.59
Office Suite	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
A25-Conference Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.16	691	0.0	$109.80	$489.09	$95.00	3.59
A24- CST Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.16	691	0.0	$109.80	$489.09	$95.00	3.59
A21 - CST Conf Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.16	691	0.0	$109.80	$489.09	$95.00	3.59
A22 - Cst Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.16	691	0.0	$109.80	$489.09	$95.00	3.59
A23 - Cst office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.16	691	0.0	$109.80	$489.09	$95.00	3.59
N/A	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,400	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,400	0.01	26	0.0	$4.17	$54.77	$15.00	9.54
Nurses' Office	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.33	1,381	0.0	$219.59	$708.18	$155.00	2.52
Nurses' Office	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,400	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,400	0.01	26	0.0	$4.17	$54.77	$15.00	9.54
A41-Nueses' Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.16	691	0.0	$109.80	$489.09	$95.00	3.59

	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
A42-Treatment Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.08	345	0.0	$54.90	$379.55	$65.00	5.73
A43-Exam Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.08	345	0.0	$54.90	$379.55	$65.00	5.73
A44-Storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	480	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	480	0.06	55	0.0	$8.69	$109.55	$30.00	9.15
A44-RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
Women's RestRoom(t3)	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
Men's RestRoom(t4)	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
Media Center	45	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	45	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	1.85	7,769	0.0	$1,235.22	$3,274.76	$780.00	2.02
Media Center	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
Speech Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.08	345	0.0	$54.90	$379.55	$65.00	5.73
A32-Work Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.25	1,036	0.0	$164.70	$598.64	$125.00	2.88
A33-Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	480	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	480	0.09	73	0.0	$11.59	$146.06	$40.00	9.15
A34	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,680	0.11	460	0.0	$73.20	$416.06	$75.00	4.66
Men's RestRoom(T5)	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.08	345	0.0	$54.90	$379.55	$65.00	5.73
Men's RestRoom(T5)	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.04	182	0.0	$28.96	$73.03	$20.00	1.83
Women's RestRoom(T8)	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.08	345	0.0	$54.90	$379.55	$65.00	5.73
Women's RestRoom(T8)	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.04	182	0.0	$28.96	$73.03	$20.00	1.83
A80-Gym	34	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,400	Relamp	Yes	34	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,680	1.64	6,888	0.0	$1,095.16	$3,293.02	$785.00	2.29
A80-Gym	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Elec Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	480	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	480	0.02	18	0.0	$2.90	$36.52	$10.00	9.15
Mech Room	2	Compact Fluorescent: (42 W) - 1L / Pin Base	Wall Switch	42	480	Relamp	No	2	LED Screw-In Lamps: 20 W - LED PL	Wall Switch	29	480	0.02	14	0.0	$2.21	$34.46	$0.00	15.58
Mech Room	2	LED - Fixtures: (42 W) - 1L / Pin Base	Wall Switch	42	480	None	No	2	LED - Fixtures: (42 W) - 1L / Pin Base	Wall Switch	42	480	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mech Room	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	480	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	480	0.26	219	0.0	$34.76	$438.18	$120.00	9.15
Mech Room	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
A84-Gym Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.16	691	0.0	$109.80	$489.09	$95.00	3.59
A84-Gym RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83

	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
Gym Storage	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	480	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	480	0.26	219	0.0	$34.76	$438.18	$120.00	9.15
A81-Gear Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,680	0.11	460	0.0	$73.20	$416.06	$75.00	4.66
A81-Gear Room	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
A82-Gen Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,680	0.11	460	0.0	$73.20	$416.06	$75.00	4.66
IDF-CRH1 Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
A71-Kitchen	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,680	0.38	1,611	0.0	$256.19	$781.21	$175.00	2.37
A71-Kitchen	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
A71-Kitchen/Vent Hood	4	Incandescent: (60 Watt) - 1L	Wall Switch	60	2,400	Relamp	No	4	LED Screw-In Lamps: 1 Lamp	Wall Switch	8	2,400	0.14	574	0.0	$91.28	$68.92	$0.00	0.76
A71-Kitchen/Change Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
A71D - RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
Walk-in Refregirator	1	Incandescent: (60 Watt) - 1L	Wall Switch	60	2,400	Relamp	No	1	LED Screw-In Lamps: 1 Lamp	Wall Switch	8	2,400	0.03	144	0.0	$22.82	$17.23	$0.00	0.76
Walk-in Freezer	1	Incandescent: (60 Watt) - 1L	Wall Switch	60	2,400	Relamp	No	1	LED Screw-In Lamps: 1 Lamp	Wall Switch	8	2,400	0.03	144	0.0	$22.82	$17.23	$0.00	0.76
Kitchen Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.08	345	0.0	$54.90	$379.55	$65.00	5.73
MPR/Cafeteria	26	Linear Fluorescent - T5: 4' T5 (28W) - 3L	Wall Switch	90	2,400	Relamp	Yes	26	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	1.01	4,273	0.0	$679.45	$1,964.09	$460.00	2.21
MPR/Cafeteria	36	Compact Fluorescent: (42 W) - 2L / Pin Base	Wall Switch	84	2,400	Relamp	Yes	36	LED Screw-In Lamps: 20 W - LED PL	Occupancy Sensor	59	1,680	1.01	4,257	0.0	$676.79	$2,050.20	$105.00	2.87
MPR/Cafeteria	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
A90-Faculty Dining	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.45	1,899	0.0	$301.94	$872.50	$200.00	2.23
A90-Phone Room	1	Compact Fluorescent: (26 W) - 2L / Pin Base	Wall Switch	52	8,760	Relamp	No	1	LED Screw-In Lamps: LED pin base	Wall Switch	36	8,760	0.01	157	0.0	$24.99	$34.45	$0.00	1.38
Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	480	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	480	0.02	18	0.0	$2.90	$36.52	$10.00	9.15
Storage	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
Storage	15	Incandescent: (300 Watt) - 1L	Wall Switch	300	480	Relamp	No	15	LED Screw-In Lamps: 1 Lamp	Wall Switch	45	480	2.51	2,111	0.0	$335.71	$453.15	$0.00	1.35
Back Access to Storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.06	273	0.0	$43.44	$109.55	$30.00	1.83
Back Access to Storage	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
J1-Janitor Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
A60-Art Room	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.57	2,417	0.0	$384.29	$1,036.82	$245.00	2.06

	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
A60-Art Room	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
A61	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.08	345	0.0	$54.90	$379.55	$65.00	5.73
A61-Storage room	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	480	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	480	0.13	109	0.0	$17.38	$219.09	$60.00	9.15
A63-Art Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.08	345	0.0	$54.90	$379.55	$65.00	5.73
S1-Storage Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	480	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	480	0.06	55	0.0	$8.69	$109.55	$30.00	9.15
B100-KR	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,000	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,000	0.01	22	0.0	$3.47	$54.77	$15.00	11.45
B100-KR	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
B100-KR	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.57	2,014	0.0	$320.24	$1,036.82	$245.00	2.47
B100-KR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
B101	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.25	1,036	0.0	$164.70	$598.64	$125.00	2.88
B101-Breakroom	1	Compact Fluorescent: (26 W) - 2L / Pin Base	Wall Switch	52	2,400	Relamp	No	1	LED Screw-In Lamps: LED pin base	Wall Switch	36	2,400	0.01	43	0.0	$6.85	$34.45	$0.00	5.03
B101-RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
B102-CR	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.57	2,417	0.0	$384.29	$1,036.82	$245.00	2.06
B102-CR	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,400	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,400	0.01	26	0.0	$4.17	$54.77	$15.00	9.54
B102-CR	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
B102-RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
B104-CR	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.57	2,417	0.0	$384.29	$1,036.82	$245.00	2.06
B104-CR	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
B104-CR	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,400	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,400	0.01	26	0.0	$4.17	$54.77	$15.00	9.54
B104-RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
B103-CR	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.45	1,899	0.0	$301.94	$872.50	$200.00	2.23
B103-RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
B105-CR	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.45	1,899	0.0	$301.94	$872.50	$200.00	2.23
B105-RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
B107-CR	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.45	1,899	0.0	$301.94	$872.50	$200.00	2.23

	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
B107-RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
B106-CR	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.57	2,417	0.0	$384.29	$1,036.82	$245.00	2.06
B106-CR	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,400	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,400	0.01	26	0.0	$4.17	$54.77	$15.00	9.54
B106-CR	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
B106-RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
Men/Women RR (T18)	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
Men/Women RR (T19)	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
s2-Work Room	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.33	1,381	0.0	$219.59	$708.18	$155.00	2.52
J2-Janitor Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
E1-Electric Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
B108-CR	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.66	2,762	0.0	$439.19	$1,146.36	$275.00	1.98
B110-CR	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,680	0.16	691	0.0	$109.80	$489.09	$95.00	3.59
Girls RR (T20)	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,400	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,400	0.01	26	0.0	$4.17	$54.77	$15.00	9.54
Girls RR (T20)	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.12	518	0.0	$82.35	$434.32	$80.00	4.30
Girls RR (T20)	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,680	0.11	460	0.0	$73.20	$416.06	$75.00	4.66
Boys RR (T21)	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,400	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,400	0.01	26	0.0	$4.17	$54.77	$15.00	9.54
Boys RR (T21)	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.12	518	0.0	$82.35	$434.32	$80.00	4.30
B109-CR	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.45	1,899	0.0	$301.94	$872.50	$200.00	2.23
B109-RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
B112-CR	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.45	1,899	0.0	$301.94	$872.50	$200.00	2.23
B112-RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
B111-CR	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.45	1,899	0.0	$301.94	$872.50	$200.00	2.23
B111-RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
B114-CR	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.45	1,899	0.0	$301.94	$872.50	$200.00	2.23
B114-RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83

	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
B116-CR	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.45	1,899	0.0	$301.94	$872.50	$200.00	2.23
B116-RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
B113-CR	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.45	1,899	0.0	$301.94	$872.50	$200.00	2.23
B113-RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
B118-CR	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.33	1,381	0.0	$219.59	$708.18	$155.00	2.52
B118-RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
B115-CR	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.33	1,381	0.0	$219.59	$708.18	$155.00	2.52
B120-CR	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.82	3,453	0.0	$548.99	$1,635.45	$370.00	2.31
B117-CR	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.16	691	0.0	$109.80	$489.09	$95.00	3.59
S4-Storage Room	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.17	729	0.0	$115.85	$292.12	$80.00	1.83
A50-CR	24	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	24	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.98	4,143	0.0	$658.78	$1,854.54	$430.00	2.16
Entry Hall	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,400	0.03	137	0.0	$21.72	$54.77	$15.00	1.83
Room1	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.08	345	0.0	$54.90	$379.55	$65.00	5.73
Room2	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.16	691	0.0	$109.80	$489.09	$95.00	3.59
Room3	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.08	345	0.0	$54.90	$379.55	$65.00	5.73
Stairwell3	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.06	273	0.0	$43.44	$109.55	$30.00	1.83
Stairwell3	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
Stairwell3	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,400	0.13	546	0.0	$86.89	$219.09	$60.00	1.83
B219-CR	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.33	1,381	0.0	$219.59	$708.18	$155.00	2.52
S6-Storage Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.09	364	0.0	$57.93	$146.06	$40.00	1.83
B222	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.33	1,381	0.0	$219.59	$708.18	$155.00	2.52
B217-CR	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.49	2,072	0.0	$329.39	$927.27	$215.00	2.16
B215-CR	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.49	2,072	0.0	$329.39	$927.27	$215.00	2.16
B220-CR	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.49	2,072	0.0	$329.39	$927.27	$215.00	2.16
B213-CR	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.49	2,072	0.0	$329.39	$927.27	$215.00	2.16

	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
B218-CR	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.49	2,072	0.0	$329.39	$927.27	$215.00	2.16
B211-CR	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.49	2,072	0.0	$329.39	$927.27	$215.00	2.16
B216-CR	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.49	2,072	0.0	$329.39	$927.27	$215.00	2.16
Boys RR (T32)	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,400	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,400	0.01	26	0.0	$4.17	$54.77	$15.00	9.54
Boys RR (T32)	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.12	518	0.0	$82.35	$434.32	$80.00	4.30
Boys RR (T32)	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,680	0.08	345	0.0	$54.90	$379.55	$65.00	5.73
Girls RR (T31)	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,680	0.11	460	0.0	$73.20	$416.06	$75.00	4.66
Girls RR (T31)	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.12	518	0.0	$82.35	$434.32	$80.00	4.30
Girls RR (T31)	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,400	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,400	0.01	26	0.0	$4.17	$54.77	$15.00	9.54
B214-CR	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.49	2,072	0.0	$329.39	$927.27	$215.00	2.16
B212-CR	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.49	2,072	0.0	$329.39	$927.27	$215.00	2.16
S58-Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
Men/Women RR(T30)	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
Men/Women RR(T29)	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
B210-CR	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.49	2,072	0.0	$329.39	$927.27	$215.00	2.16
B208-CR	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.49	2,072	0.0	$329.39	$927.27	$215.00	2.16
B209-CR	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.49	2,072	0.0	$329.39	$927.27	$215.00	2.16
B206-CR	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.49	2,072	0.0	$329.39	$927.27	$215.00	2.16
B207-CR	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.49	2,072	0.0	$329.39	$927.27	$215.00	2.16
B204-CR	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.49	2,072	0.0	$329.39	$927.27	$215.00	2.16
B205-CR	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.49	2,072	0.0	$329.39	$927.27	$215.00	2.16
B202-CR	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.33	1,381	0.0	$219.59	$708.18	$155.00	2.52
B203-Faculty Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.25	1,036	0.0	$164.70	$598.64	$125.00	2.88
B203-RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.02	91	0.0	$14.48	$36.52	$10.00	1.83
B203-PhoneRoom	1	Compact Fluorescent: (26 W) - 2L / Pin Base	Wall Switch	52	2,400	Relamp	No	1	LED Screw-In Lamps: LED pin base	Wall Switch	36	2,400	0.01	43	0.0	$6.85	$34.45	$0.00	5.03

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
B201-CR	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.33	1,381	0.0	$219.59	$708.18	$155.00	2.52
B200-CR	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,680	0.33	1,381	0.0	$219.59	$708.18	$155.00	2.52
Stairwell1	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,400	0.13	546	0.0	$86.89	$219.09	$60.00	1.83
Stairwell1	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.06	273	0.0	$43.44	$109.55	$30.00	1.83
Stairwell1	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
Stairwell2	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,400	0.13	546	0.0	$86.89	$219.09	$60.00	1.83
Stairwell2	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,400	0.06	273	0.0	$43.44	$109.55	$30.00	1.83
Stairwell2	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
Hallway-Door 20 - 19	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	1,680	0.66	2,762	0.0	$439.19	$1,276.36	$240.00	2.36
Hallway-Door 20 - 19	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
Hallway-Door 14 - CR108	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	1,680	0.62	2,590	0.0	$411.74	$1,221.59	$225.00	2.42
Hallway-Door 14 - CR108	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
Hallway CRB100 - Lobby	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	20	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	1,680	0.82	3,453	0.0	$548.99	$1,695.45	$300.00	2.54
Hallway CRB100 - Lobby	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
Hallway- Door5 to Elevator	25	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	25	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	1,680	1.03	4,316	0.0	$686.23	$2,169.31	$375.00	2.61
Hallway- Door5 to Elevator	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
Door5	2	Compact Fluorescent: (26 W) - 2L / Pin Base	Wall Switch	52	2,400	Relamp	No	2	LED Screw-In Lamps: LED pin base	Wall Switch	36	2,400	0.02	86	0.0	$13.69	$68.90	$0.00	5.03
Display Lab	4	Linear Fluorescent - T8: 3' T8 (25W) - 1L	Wall Switch	27	2,400	Relamp	No	4	LED - Linear Tubes: (1) 3' Lamp	Wall Switch	11	2,400	0.04	182	0.0	$28.96	$73.03	$0.00	2.52
Hallways	31	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	31	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	1,680	1.27	5,352	0.0	$850.93	$2,697.95	$465.00	2.62
Hallways	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
Lobby Area	19	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,400	Relamp	Yes	19	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,680	0.52	2,187	0.0	$347.69	$1,293.79	$190.00	3.17
Lobby Area	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,400	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	1,680	0.16	691	0.0	$109.80	$419.09	$60.00	3.27
Lobby Area	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior	38	Compact Fluorescent: (26 W) - 2L / Pin Base	Timeclock	52	3,640	Relamp	No	38	LED Screw-In Lamps: MR11 - 3Watt	Timeclock	36	3,640	0.39	2,481	0.0	$394.55	$1,309.10	$0.00	3.32
Exterior	17	LED - Fixtures: Wall Sconces	Timeclock	19	3,640	None	No	17	LED - Fixtures: Wall Sconces	Timeclock	19	3,640	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Exterior-Pole Light	19	Metal Halide: (1) 175W Lamp	Timeclock	215	3,640	Fixture Replacement	No	19	LED - Fixtures: Outdoor Pole/Arm-Mounted Decorative Fixture	Timeclock	45	3,640	2.12	13,521	0.0	$2,149.80	$17,680.72	$950.00	7.78
Exterior-Entrance	4	Metal Halide: (1) 100W Lamp	Timeclock	128	3,640	Fixture Replacement	No	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	20	3,640	0.28	1,808	0.0	$287.53	$3,863.86	$400.00	12.05

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
A72 - Mechanical Room	Heating HW Supply	2	Heating Hot Water Pump	15.0	91.0%	No	3,391	Yes	92.4%	Yes	2	3.84	36,581	0.0	$5,816.30	$14,171.74	$0.00	2.44
A72 - Mechanical Room	Cooling Tower	2	Condenser Water Pump	15.0	87.5%	No	3,391	Yes	92.4%	No		0.75	3,450	0.0	$548.48	$3,782.84	$0.00	6.90
A72 - Mechanical Room	Domestic Hot Water	1	Water Supply Pump	0.2	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
A72 - Mechanical Room	Chiller	2	Chilled Water Pump	15.0	91.0%	No	3,391	Yes	92.4%	Yes	2	3.84	36,581	0.0	$5,816.30	$14,171.74	$0.00	2.44
A72 - Mechanical Room	Chiller	2	Chilled Water Pump	7.5	88.5%	No	3,391	Yes	91.7%	Yes	2	2.06	19,010	0.0	$3,022.61	$9,521.18	$0.00	3.15
Mechanical Room	Gym - AHU1	1	Supply Fan	3.0	86.9%	No	2,745	Yes	89.5%	Yes	1	0.44	633	0.0	$100.62	$3,884.01	$240.00	36.22
Mechanical Room	Cafeteria - AHU2	1	Supply Fan	5.0	89.5%	No	2,745	Yes	89.5%	Yes	1	0.68	824	0.0	$130.97	$4,076.22	$400.00	28.07
Mechanical Room	Library - AHU3	1	Supply Fan	5.0	89.5%	No	2,745	Yes	89.5%	Yes	1	0.68	824	0.0	$130.97	$4,076.22	$400.00	28.07
Mechanical Room	AHU4	1	Supply Fan	1.5	83.8%	No	2,745	No	83.8%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	AHU5	1	Supply Fan	1.0	82.6%	No	2,745	No	82.6%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	AHU 6	1	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
Gym Storage	Gym - AHU1A	1	Supply Fan	1.5	83.8%	No	2,745	No	83.8%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Whole Building	1	Cooling Tower Fan	10.0	91.7%	No	3,391	Yes	91.7%	No		0.00	0	0.0	$0.00	$1,567.05	$0.00	0.00
Roof	Speech Rooms	1	Supply Fan	0.1	68.5%	No	2,745	No	68.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Speech Rooms	2	Supply Fan	0.1	68.5%	No	2,745	No	68.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Class Rooms	Class Rooms	40	Supply Fan	0.3	69.5%	No	2,745	Yes	69.5%	No		0.00	0	0.0	$0.00	$17,702.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof Top	Speech Room	3	Split-System Air-Source HP	3.00	36.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

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	School	1	Water-Cooled Centrifugal Chiller	450.00	Yes	1	Water-Cooled Centrifugal Chiller	Variable	450.00	0.59	0.37	24.52	47,580	0.0	$7,565.19	$221,678.89	$11,250.00	27.82

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
A72 - Mechanical Room	Whole Building	2	Non-Condensing Hot Water Boiler	1,941.00	Yes	2	Non-Condensing Hot Water Boiler	1,941.00	85.00%	Et	0.00	0	109.6	$1,022.10	$69,299.62	$5,823.00	62.10

Demand Control Ventilation Recommendations

		Recommendation Inputs				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	Number of Zones	Cooling Capacity of Controlled System (Tons)	Electric Heating Capacity of Controlled System (kBtu/hr)	Output Heating Capacity of Controlled System (MBh)	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	Gym - AHU1	2	76.00		160.00	0.00	2,239	4.4	$397.10	$2,718.84	$0.00	6.85
Mechanical Room	Cafeteria - AHU2	2	127.00		270.00	0.00	3,742	7.4	$664.26	$2,718.84	$0.00	4.09
Mechanical Room	Library - AHU3	2	127.00		270.00	0.00	3,742	7.4	$664.26	$2,718.84	$0.00	4.09

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
A72 - Mech Room	Whole Building	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions		Proposed Conditions			Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Evaporator Fan Control?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Cooler (35F to 55F)	Yes	No	No	0.02	308	0.0	$48.90	$303.30	$0.00	6.20
Kitchen	1	Medium Temp Freezer (0F to 30F)	Yes	No	No	0.05	615	0.0	$97.80	$606.60	$0.00	6.20

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	2	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Cooking Equipment Inventory & Recommendations

	Existing Conditions			Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	High Efficiency Equipement?	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Gas Convection Oven (Half Size)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Gas Combination Oven/Steam Cooker (15 - 28 Pans)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Electric Convection Oven (Full Size)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Gas Rack Oven (Single)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
CST Office Suit	1	Printer	192.0	No
Various	53	Desktop	120.0	No
Various	28	Desk Printer	13.0	No
Various	22	VCR	40.0	No
Various	35	Photo Copier	335.0	No
Various	9	Microwave	800.0	No
Various	7	Mini Fridge	150.0	No
Various	7	Coffe Maker	900.0	No
Various	3	LCD TV	150.0	No
Various	22	VCR	40.0	No

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
Faculty Dining Room	1	Refrigerated	Yes	0.00	1,612	0.0	$256.28	$230.00	$0.00	0.90

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Town Center Elementary School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 115,500
Built: 2002

For Year Ending: November 30, 2017
Date Generated: February 20, 2019

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
Town Center Elementary School 700 Wyndhurst Drive, Plainsboro, New Jersey 08536	West Windsor - Plainsboro Regional School District 321 VIllage Rd E West Windsor, NJ 08550 (____)____-_____	Smruti Srinivasan 321 VIllage Rd E West Windsor, NJ 08550 7328552897 ssrinivasan@trcsolutions.com

Property ID: 6389353

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
49.6 kBtu/ft²

Source EUI
100.6 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	3,200,858 (56%)
Natural Gas (kBtu)	2,529,303 (44%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	60.5
National Median Source EUI (kBtu/ft²)	122.6
% Diff from National Median Source EUI	-18%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	459

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

Smruti Srinivasan
321 VIllage Rd E
West Windsor, NJ 08550
7328552897
ssrinivasan@trcsolutions.com

Professional Engineer Stamp (if applicable)