Local Government Energy Audit:
Energy Audit Report

Results you can rely on

Stewartsville Middle School

642 S Main St.

Stewartsville, New Jersey 08886

Greenwich Township

October 3, 2018

Final Report by:

TRC Energy Services

Disclaimer

The intent of this energy analysis report is to identify energy savings opportunities and recommend upgrades to the building's energy using equipment and systems. Approximate savings are included in this report to help make decisions about reducing energy use at the building. This report, however, is not intended to serve as a detailed engineering design document. Further design and analysis may be necessary in order to implement some of the measures recommended in this report.

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

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

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

Table of Contents

Table of Figures

1 EXECUTIVE SUMMARY

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

The goal of an LGEA report is to provide you with information on how your building 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 Building Summary

Stewartsville Middle School is a 52,415 square-foot building comprised of various space types including classrooms, offices, kitchen, multi-purpose room, library, gymnasium, and various mechanical and storage spaces.

Lighting at Stewartsville Middle School consists of aging and inefficient linear fluorescent fixtures and some incandescent fixtures. Heating and cooling is supplied by a geothermal system serving most of the building. Domestic hot water is produced by an electric storage tank water heater. A thorough description of the building and our observations are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated nine measures and recommends eight, which together represent an opportunity for Stewartsville Middle School to reduce annual energy costs by roughly $14,792 and annual greenhouse gas emissions by 125,208 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in roughly 6.5 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 Stewartsville Middle School's annual energy use by 10%.

Figure 1 – Previous 12 Month Utility Costs

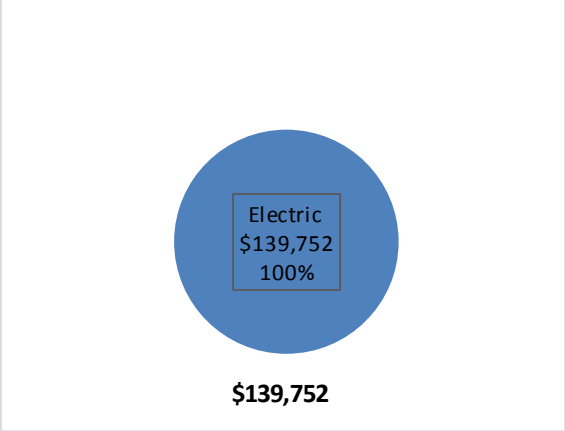
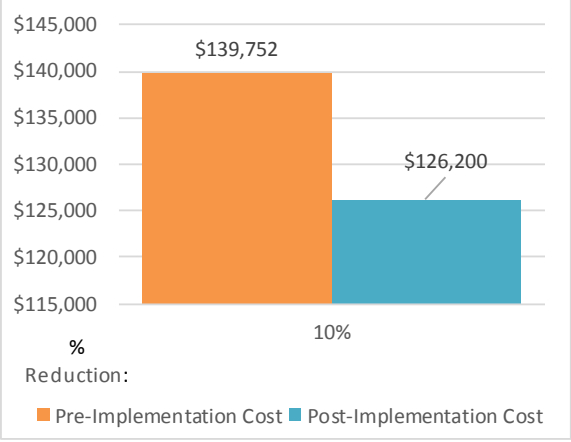


Figure 2 – Potential Post-Implementation Costs



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

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

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**84,224**	**16.4**	**0.0**	**$10,019.77**	**$53,633.49**	**$9,195.00**	**$44,438.49**	**4.4**	**84,813**
ECM 1	Install LED Fixtures	Yes	5,065	1.3	0.0	$602.62	$5,078.80	$1,300.00	$3,778.80	6.3	5,101
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	477	0.1	0.0	$56.79	$555.00	$50.00	$505.00	8.9	481
ECM 3	Retrofit Fixtures with LED Lamps	Yes	77,384	14.9	0.0	$9,206.12	$46,063.70	$7,845.00	$38,218.70	4.2	77,925
ECM 4	Install LED Exit Signs	Yes	1,296	0.1	0.0	$154.24	$1,935.99	$0.00	$1,935.99	12.6	1,306
Lighting Control Measures			**20,125**	**3.8**	**0.0**	**$2,394.19**	**$35,502.00**	**$2,940.00**	**$32,562.00**	**13.6**	**20,266**
ECM 5	Install Occupancy Sensor Lighting Controls	Yes	16,726	3.3	0.0	$1,989.79	$33,502.00	$2,940.00	$30,562.00	15.4	16,843
ECM 6	Install High/Low Lighitng Controls	Yes	3,399	0.5	0.0	$404.40	$2,000.00	$0.00	$2,000.00	4.9	3,423
Motor Upgrades			**9,567**	**1.7**	**0.0**	**$1,138.16**	**$11,176.98**	**$0.00**	**$11,176.98**	**9.8**	**9,634**
ECM 7	Premium Efficiency Motors	Yes	9,567	1.7	0.0	$1,138.16	$11,176.98	$0.00	$11,176.98	9.8	9,634
Variable Frequency Drive (VFD) Measures			**6,522**	**2.0**	**0.0**	**$775.89**	**$9,827.55**	**$1,200.00**	**$8,627.55**	**11.1**	**6,568**
	Install VFDs on Constant Volume (CV) HVAC	No	6,522	2.0	0.0	$775.89	$9,827.55	$1,200.00	$8,627.55	11.1	6,568
Electric Unitary HVAC Measures			**10,423**	**4.8**	**0.0**	**$1,239.97**	**$9,075.84**	**$368.00**	**$8,707.84**	**7.0**	**10,496**
ECM 8	Install High Efficiency Electric AC	Yes	10,423	4.8	0.0	$1,239.97	$9,075.84	$368.00	$8,707.84	7.0	10,496
TOTAL FOR ALL MEASURES			**130,861**	**28.8**	**0.0**	**$15,567.98**	**$119,215.86**	**$13,703.00**	**$105,512.86**	**6.8**	**131,776**
TOTAL FOR RECOMMENDED MEASURES			**124,339**	**26.7**	**0.0**	**$14,792.09**	**$109,388.31**	**$12,503.00**	**$96,885.31**	**6.5**	**125,208**

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

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

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

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

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

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

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

Energy Efficient Practices

TRC also identified 12 low cost (or no cost) energy efficient practices. A building'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 Stewartsville Middle School include:

- Reduce Air Leakage
- Use Window Treatments/Coverings
- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Use Fans to Reduce Cooling Load
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Perform Proper Water Heater Maintenance
- Install Plug Load Controls
- Replace Computer Monitors
- Water Conservation

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

On-Site Generation Measures

TRC evaluated the potential for installing on-site generation for Stewartsville Middle School. Based on the configuration of the site and its loads there is a moderate potential for installing a photovoltaic (PV) array.

Figure 4 – Photovoltaic Potential

Potential	Medium	
System Potential	207	kW DC STC
Electric Generation	155,756	kWh/yr
Displaced Cost	$13,550	/yr
Installed Cost	$807,300	

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

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

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 8.3 for additional information on the ESIP Program.

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

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

2 BUILDING INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 5 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Tim Mantz	Business Administrator	mantzt@gtsd.net	908-859-2022 ext. 1605
Ranea Pesaresi	Assitant to the Business Administrator	pesaresir@gtsd.net	908-859-2022 ext. 1600
Maria Eppolite	Superintendant	eppolitem@gtsd.net	908-859-2022 ext. 1606
Designated Representative			
Dan Ricker	Maintenance Supervisor	rickerd@gtsd.net	908-859-2022 ext. 2511
TRC Energy Services			
Alexander Klieverik	Auditor	aklieverik@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On March 15, 2018, TRC performed an energy audit at Stewartsville Middle School located in Stewartsville, New Jersey. TRC's team met with Dan Ricker to review the building operations and help focus our investigation on specific energy-using systems.

Stewartsville Middle School is a 52,415 square-foot building comprised of various space types including classrooms, offices, kitchen, multi-purpose room, library, gymnasium, and various mechanical and storage spaces.

The front half of the building was constructed in 1965. An addition was constructed in 1994 which added the back half of the building including the gymnasium, nurse's office, and classrooms.

2.3 Building Occupancy

The building is open Monday through Friday throughout the school year. The building is also open on Saturdays during the fall and winter months for use by the community. There is no summer program, but there are cleaning crews present during the summer for eight hour shifts. The typical schedule is presented in the table below. During a typical day, the building is occupied by approximately 50 staff and 250 students.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Stewartsville Middle School	Weekday	6:00 AM to 11:00 PM
Stewartsville Middle School	Weekend	8:00 AM to 6:00 PM for part of the year

2.4 Building Envelope

The building is constructed of concrete block, and structural steel with a brick facade. The building has a flat roof covered with reflective membrane that is in good condition. The building has double pane windows which are in good condition and show little sign of excessive infiltration. The exterior doors are constructed of aluminum and in good condition except that the door seals have worn out which increases the level of outside air infiltration.

Image 1: Building Envelope

2.5 On-Site Generation

Stewartsville Middle School installed a solar energy project on the roof of the building in 2013. There are approximately 870 PV panels in total. The system provides 24% of the electricity required by the building.

Image 2: PV Array

Hudson Energy, a national power-purchase agreement provider, was the financier of these solar energy systems.

2.6 Energy-Using Systems

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

Lighting System

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

Image 3: Lighting Systems

Lighting control in all spaces of the building is provided by wall switches. Stairwells, hallways and main lobby areas have wall switches operated by a special key used by staff and maintenance crews.

The building's exterior lighting consists primarily of high pressure sodium (HPS) fixtures and that are controlled by schedule timer. There is also a mixture of LED, compact fluorescent, metal halide, and incandescent fixtures controlled by schedule timers. The timers are set to turn exterior lighting on at dusk and off at midnight. Maintenance staff manually changes the hours depending on the season.

Ground-Source Geothermal Water Loop System

The building is primarily served by a heating and cooling geothermal system. The system consists of a vertical water-only closed ground loop, two alternating variable flow distribution pumps, and 22 water-to-air heat pumps. The 22 heat pumps are located in classrooms throughout the building. The variable flow pumps are 40 horsepower each, and run 24 hours a day, seven days a week to ensure constant water movement through the loop. In temperate climate, when heating or cooling are not needed, the supply fan in the individual heat pumps is turned off while the distribution pump continues to run.

Image 4: Ground Source Geothermal Water Loop System

The building loop also distributes water to two rooftop units, and five air handlers (AHU1-5) throughout the building. The two rooftop units are identical Trane models WCD048C300BA with a 1 horsepower supply fan, providing heating and cooling to the media center. The air handler units condition the gymnasium (AHU1 & AHU2), stage area (AHU3), and main office (AHU4 & AHU5). AHU 1, 2, and 3 are manufactured by Trane, and are located in the penthouse above the gymnasium. Each unit has a 5-horsepower supply fan, with no VFDs installed. The main office is served by two different types of units. AHU4 has a direct expansion cooling component with electric resistance heat. AHU5 is an American AirFilter model H-15LPHVFYA with coils providing heating and cooling from the geothermal system.

Direct Expansion Air Conditioning (DX) and Electric Heating System

The art room, room 125, room 100, the kitchen, and hallways are not served by the geothermal system and are heated by electric resistance baseboard or ceiling heaters.

The air handler unit serving the main office (AHU4) has direct expansion cooling component. The compressor and condenser is a roof mounted Lennox model HS17-1353-5Y with a cooling capacity of 10 tons.

Image 5: DX Cooling Systems

Building Energy Management System (BEMS)

The geothermal system is controlled with a Trane Tracker EMS building energy management system (BEMS). The BEMS aggregates the DDC points from seven zones throughout the building. The system is capable of providing trends for individual DDC points for up to one-year of historical data.

Image 6: BEMS

Domestic Hot Water Heating System

The domestic hot water system for the building consists of a Patterson Kelly electric water heater with an input rating of 54kW and a storage tank of 250 gallons, as well as a booster water heater with an input rating of 4.5 kW. One fractional HP recirculation pump distributes 110°F water to the entire building. The recirculation pump operates continuously.

Image 7: DHW Heating System

Food Service Equipment

The school has an all-electric kitchen that is used to prepare lunches for students. The kitchen is also used to prepare hot snacks for three fund raising events each year. Most of the cooking is done using the three convection ovens and the single stove.

Refrigeration

The building has two different storage cold storage areas: a walk-in cooler area and a walk-in freezer area. The cooler area is maintained at a constant temperature of 35°F and freezer area is maintained at a constant -1°F. Cooler area is served by two evaporators and freezer area is served by two evaporators each having a single 1/4 HP fan. There are two condensing units with reciprocating compressors connected to evaporators serving the cooler and freezer areas.

Building Plug Load

There are roughly 70 computer work stations throughout the building. Roughly 60% of the computers are desktop units with LCD monitors. The other 40% are laptops. There is no centralized PC power management software installed.

In addition to computers, there are 80 student Chromebooks, 16 projectors and smartboards, and 17 CRT televisions throughout the building contributing to the building plug load.

2.7 Water-Using Systems

There are seven restrooms at this building. A sampling of restrooms found that the faucets are rated for 2.2 gallon per minute (gpm) or higher, the toilets are rated at 2.5 gallons per flush (gpf) and the urinals are rated at 2 gpf. There are two restrooms with showers that bicycle commuters use in the morning. The showerheads are rated at 5 gpm.

3 SITE ENERGY USE AND COSTS

Utility data for electricity was analyzed to identify opportunities for savings. In addition, data for electricity was evaluated to determine the annual energy performance metrics for the building in energy cost per square foot and energy usage per square foot. These metrics are an estimate of the relative energy efficiency of this building. There are a number of factors that could cause the energy use of this building to vary from the "typical" energy usage profile for facilities with similar characteristics. Local weather conditions, building age and insulation levels, equipment efficiency, daily occupancy hours, changes in occupancy throughout the year, equipment operating hours, and energy efficient behavior of occupants all contribute to benchmarking scores. Please refer to the Benchmarking section within Section 3.3 for additional information.

3.1 Total Cost of Energy

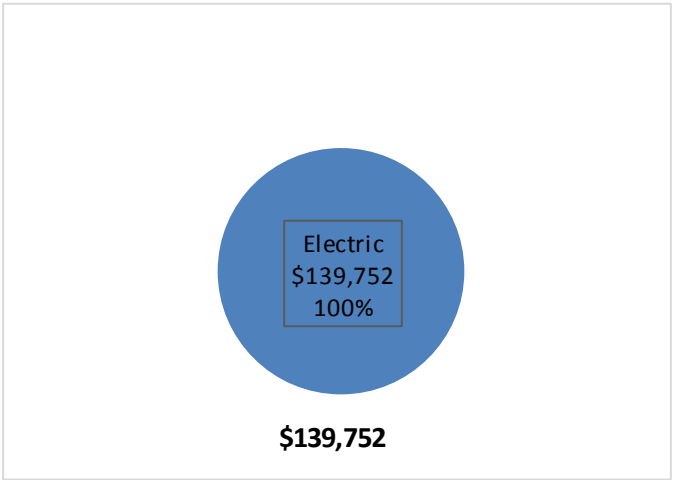
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the building was developed from this information.

Figure 7 - Utility Summary

Utility Summary for Stewartsville Middle School		
Fuel	**Usage**	**Cost**
Electricity	1,174,718 kWh	$139,752
Total		**$139,752**

The current annual energy cost for this building is $139,752 as shown in the chart below.

Figure 8 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by JCP&L. The average electric cost over the past 12 months was $0.119/kWh, which is the blended rate that includes energy supply, distribution, solar, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The energy profile is typical for a building with all electric equipment. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 9 - Electric Usage & Demand

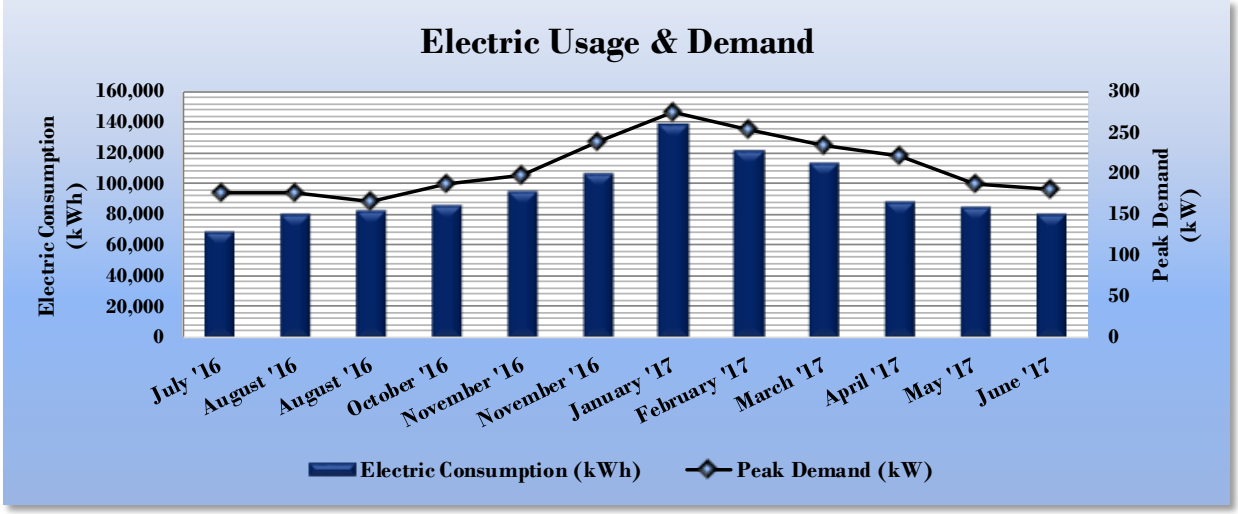


Figure 10 - Electric Usage & Demand

Electric Billing Data for Stewartsville Middle School					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
7/19/16	31	69,042	177	$1,063	$8,318
8/16/16	27	80,435	177	$1,063	$9,477
9/15/16	29	82,396	166	$998	$9,669
10/17/16	31	86,093	186	$1,042	$10,135
11/16/16	29	95,549	197	$1,105	$11,167
12/15/16	28	106,437	239	$1,339	$12,528
1/18/17	33	138,048	275	$1,690	$16,234
2/17/17	29	121,011	253	$1,675	$14,549
3/20/17	30	113,469	234	$1,550	$13,696
4/18/17	28	88,440	220	$1,457	$10,946
5/18/17	29	84,725	187	$1,237	$10,368
6/20/17	32	80,107	179	$1,274	$9,218
Totals	**356**	**1,145,752**	**275.1**	**$15,493**	**$136,306**
Annual	**365**	**1,174,718**	**275.1**	**$15,885**	**$139,752**

3.3 Benchmarking

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

Figure 11 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Stewartsville Middle School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	240.1	141.4
Site Energy Use Intensity (kBtu/ft^2)	76.5	58.2

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

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

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Stewartsville Middle School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	214.7	141.4
Site Energy Use Intensity (kBtu/ft^2)	76.5	58.2

Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. This building has a current score of 42.

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

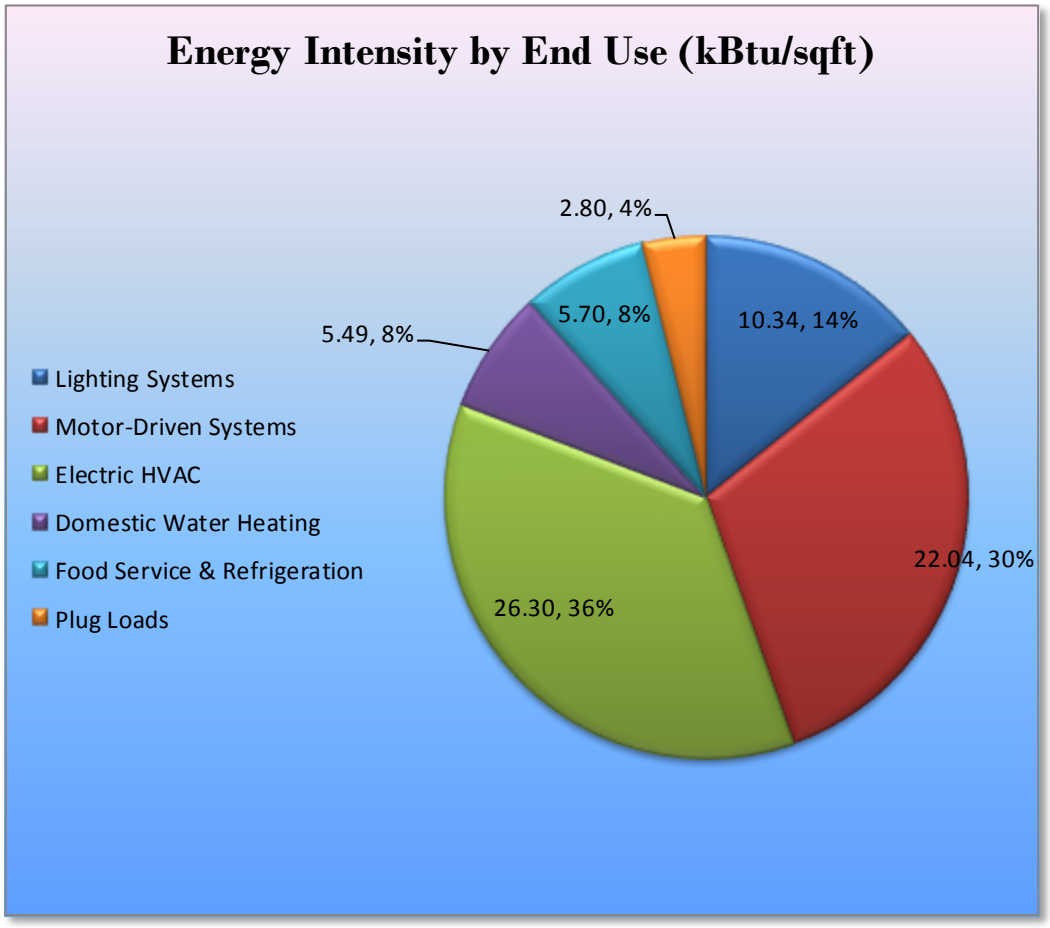
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/building-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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

3.4 Energy End-Use Breakdown

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

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



4 ENERGY CONSERVATION MEASURES

Level of Analysis

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

The following sections describe the evaluated measures.

4.1 Recommended ECMs

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

Figure 14 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**84,224**	**16.4**	**0.0**	**$10,019.77**	**$53,633.49**	**$9,195.00**	**$44,438.49**	**4.4**	**84,813**
ECM 1	Install LED Fixtures	5,065	1.3	0.0	$602.62	$5,078.80	$1,300.00	$3,778.80	6.3	5,101
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	477	0.1	0.0	$56.79	$555.00	$50.00	$505.00	8.9	481
ECM 3	Retrofit Fixtures with LED Lamps	77,384	14.9	0.0	$9,206.12	$46,063.70	$7,845.00	$38,218.70	4.2	77,925
ECM 4	Install LED Exit Signs	1,296	0.1	0.0	$154.24	$1,935.99	$0.00	$1,935.99	12.6	1,306
Lighting Control Measures		**20,125**	**3.8**	**0.0**	**$2,394.19**	**$35,502.00**	**$2,940.00**	**$32,562.00**	**13.6**	**20,266**
ECM 5	Install Occupancy Sensor Lighting Controls	16,726	3.3	0.0	$1,989.79	$33,502.00	$2,940.00	$30,562.00	15.4	16,843
ECM 6	Install High/Low Lighitng Controls	3,399	0.5	0.0	$404.40	$2,000.00	$0.00	$2,000.00	4.9	3,423
Motor Upgrades		**9,567**	**1.7**	**0.0**	**$1,138.16**	**$11,176.98**	**$0.00**	**$11,176.98**	**9.8**	**9,634**
ECM 7	Premium Efficiency Motors	9,567	1.7	0.0	$1,138.16	$11,176.98	$0.00	$11,176.98	9.8	9,634
Electric Unitary HVAC Measures		**10,423**	**4.8**	**0.0**	**$1,239.97**	**$9,075.84**	**$368.00**	**$8,707.84**	**7.0**	**10,496**
ECM 8	Install High Efficiency Electric AC	10,423	4.8	0.0	$1,239.97	$9,075.84	$368.00	$8,707.84	7.0	10,496
TOTALS		**124,339**	**26.7**	**0.0**	**$14,792.09**	**$109,388.31**	**$12,503.00**	**$96,885.31**	**6.5**	**125,208**

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

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

4.1.1 Lighting Upgrades

Our recommendations for upgrades to existing lighting fixtures are summarized in Figure 15 below

Figure 15 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**84,224**	**16.4**	**0.0**	**$10,019.77**	**$53,633.49**	**$9,195.00**	**$44,438.49**	**4.4**	**84,813**
ECM 1	Install LED Fixtures	5,065	1.3	0.0	$602.62	$5,078.80	$1,300.00	$3,778.80	6.3	5,101
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	477	0.1	0.0	$56.79	$555.00	$50.00	$505.00	8.9	481
ECM 3	Retrofit Fixtures with LED Lamps	77,384	14.9	0.0	$9,206.12	$46,063.70	$7,845.00	$38,218.70	4.2	77,925
ECM 4	Install LED Exit Signs	1,296	0.1	0.0	$154.24	$1,935.99	$0.00	$1,935.99	12.6	1,306

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	5,065	1.3	0.0	$602.62	$5,078.80	$1,300.00	$3,778.80	6.3	5,101

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 longer than most other lighting types.

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	477	0.1	0.0	$56.79	$555.00	$50.00	$505.00	8.9	481
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend retrofitting existing fluorescent fixtures by removing fluorescent tubes and ballasts and replacing them with LEDs and LED drivers (if necessary), which are designed to be used retrofitted fluorescent fixtures. The measure uses the existing fixture housing but replaces the rest of the components with more efficient lighting technology. This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space.

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

ECM 3: 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	76,320	14.6	0.0	$9,079.50	$45,109.52	$7,830.00	$37,279.52	4.1	76,854
Exterior	1,064	0.3	0.0	$126.62	$954.18	$15.00	$939.18	7.4	1,072

Measure Description

We recommend retrofitting existing fluorescent, incandescent, 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.

ECM 4: Install LED Exit Signs

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	1,296	0.1	0.0	$154.24	$1,935.99	$0.00	$1,935.99	12.6	1,306
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

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

4.1.2 Lighting Control Measures

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

Figure 16 – Summary of Lighting Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**20,125**	**3.8**	**0.0**	**$2,394.19**	**$35,502.00**	**$2,940.00**	**$32,562.00**	**13.6**	**20,266**
ECM 5	Install Occupancy Sensor Lighting Controls	16,726	3.3	0.0	$1,989.79	$33,502.00	$2,940.00	$30,562.00	15.4	16,843
ECM 6	Install High/Low Lighitng Controls	3,399	0.5	0.0	$404.40	$2,000.00	$0.00	$2,000.00	4.9	3,423

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 5: 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)
16,726	3.3	0.0	$1,989.79	$33,502.00	$2,940.00	$30,562.00	15.4	16,843

Measure Description

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

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

ECM 6: 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)
3,399	0.5	0.0	$404.40	$2,000.00	$0.00	$2,000.00	4.9	3,423

Measure Description

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

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

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

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

4.1.3 Motor Upgrades

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

Figure 17 – Summary of Motor Upgrades 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		**9,567**	**1.7**	**0.0**	**$1,138.16**	**$11,176.98**	**$0.00**	**$11,176.98**	**9.8**	**9,634**
ECM 7	Premium Efficiency Motors	9,567	1.7	0.0	$1,138.16	$11,176.98	$0.00	$11,176.98	9.8	9,634

ECM 7: 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)
9,567	1.7	0.0	$1,138.16	$11,176.98	$0.00	$11,176.98	9.8	9,634

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 (2016)*. Savings are based on the difference between baseline and proposed efficiencies and the assumed annual operating hours.

4.1.4 Electric Unitary HVAC Measures

Our recommendations for unitary HVAC measures are summarized in Figure 17 below.

Figure 17 - Summary of Unitary HVAC 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)
Electric Unitary HVAC Measures		**10,423**	**4.8**	**0.0**	**$1,239.97**	**$9,075.84**	**$368.00**	**$8,707.84**	**7.0**	**10,496**
ECM 8	Install High Efficiency Electric AC	10,423	4.8	0.0	$1,239.97	$9,075.84	$368.00	$8,707.84	7.0	10,496

ECM 8: Install High Efficiency Air Conditioning Units

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
10,423	4.8	0.0	$1,239.97	$9,075.84	$368.00	$8,707.84	7.0	10,496

Measure Description

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

4.2 ECMs Evaluated But Not Recommended

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

Figure 18 – 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	**6,522**	**2.0**	**0.0**	**$775.89**	**$9,827.55**	**$1,200.00**	**$8,627.55**	**11.1**	**6,568**
Install VFDs on Constant Volume (CV) HVAC	6,522	2.0	0.0	$775.89	$9,827.55	$1,200.00	$8,627.55	11.1	6,568
TOTALS	**6,522**	**2.0**	**0.0**	**$775.89**	**$9,827.55**	**$1,200.00**	**$8,627.55**	**11.1**	**6,568**

* - 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)
6,522	2.0	0.0	$775.89	$9,827.55	$1,200.00	$8,627.55	11.1	6,568

Measure Description

We evaluated installing 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.

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

Reasons for not Recommending

Due to the long payback period, we are not recommending the installation of Variable Frequency Drives at this time.

5 ENERGY EFFICIENT PRACTICES

In addition to the quantifiable savings estimated in Section 4, a building'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 building. Consult with qualified equipment specialists for details on proper maintenance and system operation.

Reduce Air Leakage

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

Use Window Treatments/Coverings

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

Perform Regular Lighting Maintenance

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

Develop a Lighting Maintenance Schedule

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

Ensure Lighting Controls Are Operating Properly

Lighting controls are very cost-effective energy efficient devices, when installed and operating correctly. As part of a lighting maintenance schedule, lighting controls should be tested annually to ensure proper functioning. For occupancy sensors, this requires triggering the sensor and verifying that the sensor's timer settings are correct. For daylight sensors, maintenance involves cleaning of sensor lenses and confirming setpoints and sensitivity are appropriately configured.

Use Fans to Reduce Cooling Load

Utilizing ceiling fans to supplement cooling is a low-cost strategy to reduce cooling load considerably. Thermostat settings can be increased by 4°F with no change in overall occupant comfort when the wind chill effect of moving air is employed for cooling.

Clean Evaporator/Condenser Coils on AC Systems

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

Clean and/or Replace HVAC Filters

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

Perform Regular Water Heater Maintenance

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

Plug Load Controls

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

Replace Computer Monitors

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

Water Conservation

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

Installing dual flush or low-flow toilets and low-flow or waterless urinals are additional ways to reduce the sites water use, however, these devices do not provide energy savings at the site level. Any reduction in water use does however ultimately reduce grid level electricity use since a significant amount of electricity is used to deliver water from reservoirs to end users. The EPA WaterSense™ ratings for urinals is 0.5 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 building, 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 building. Before making a decision to implement, a feasibility study should be conducted that would take a detailed look at existing energy profiles, siting, interconnection, and the costs associated with the generation project including interconnection costs, departing load charges, and any additional special facilities charges.

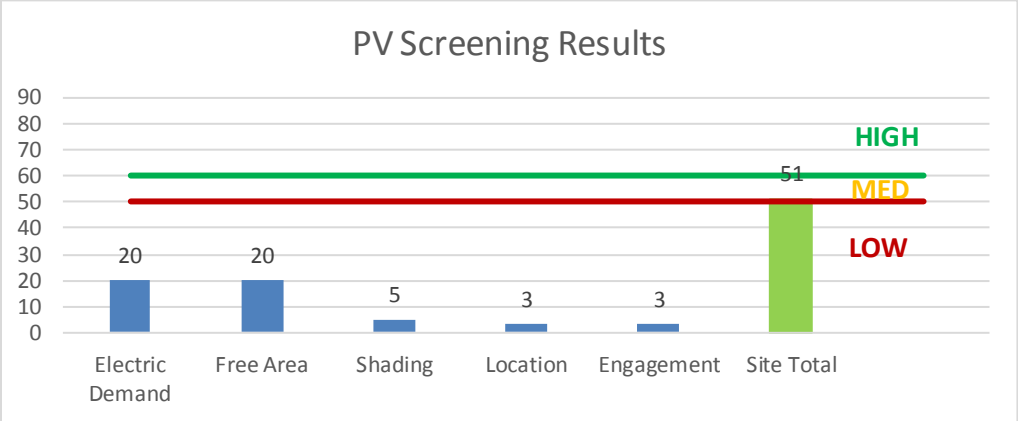
6.1 Photovoltaic

Sunlight can be converted into electricity using photovoltaics (PV) modules. Modules are racked together into an array that produces direct current (DC) electricity. The DC current is converted to alternating current (AC) through an inverter. The inverter is interconnected to the building'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 building's electric demand, size and location of free area, and shading elements shows that the building has a **Medium** to **Low** potential for installing additional PV arrays.

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

Figure 19 - Photovoltaic Screening



Potential	Medium	
System Potential	207	kW DC STC
Electric Generation	155,756	kWh/yr
Displaced Cost	$13,550	/yr
Installed Cost	$807,300	

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 8.2 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.

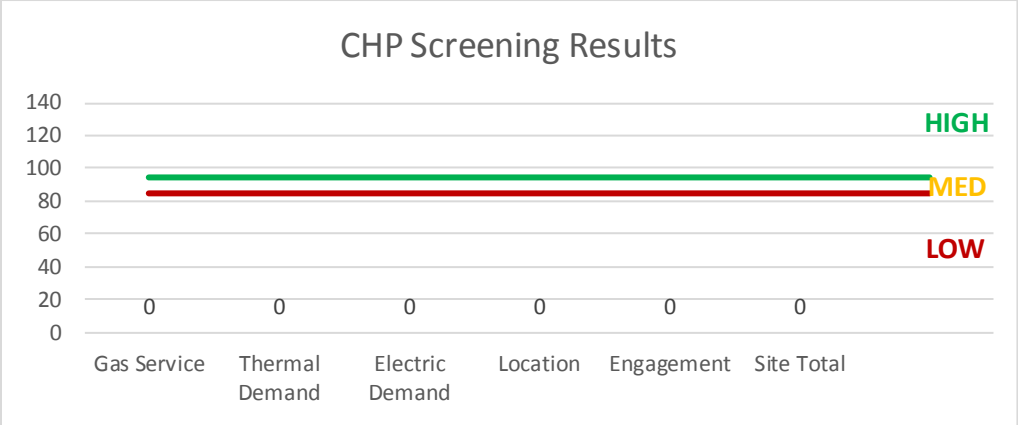
CHP systems are typically used to produce a portion of the electric power used onsite by a building, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste 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 building'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 building has a Low potential for installing a cost-effective CHP system.

Lack of gas service, and lack of space near the existing equipment are the most significant factors contributing to the **Low** potential for CHP at the site. In our opinion, the building 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 20 - 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 building 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 building 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 building's eligibility to participate in a DR program. They will provide details regarding program rules and requirements for metering and controls, assess a building'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.

It is our opinion that this building is not a good candidate for Demand Response.

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 21 for a list of the eligible programs identified for each recommended ECM.

Figure 21 - 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					
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	X					
ECM 3	Retrofit Fixtures with LED Lamps	X					
ECM 4	Install LED Exit Signs						
ECM 5	Install Occupancy Sensor Lighting Controls	X					
ECM 6	Install High/Low Lighitng Controls						
ECM 7	Premium Efficiency Motors						
ECM 8	Install High Efficiency Electric AC	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 building or several facilities, with incentives capped based on the entity's annual energy consumption. LEUP applicants can use in-house staff or a preferred contractor.

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

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

8.1 SmartStart

Overview

The SmartStart program offers incentives for installing prescriptive and custom energy efficiency measures at your building. 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 building 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 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.

8.3 Energy Savings Improvement Program

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

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

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

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

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

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

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

In 1999, New Jersey State Legislature passed the Electric Discount & Energy Competition Act (EDECA) to restructure the electric power industry in New Jersey. This law deregulated the retail electric markets, allowing all consumers to shop for service from competitive electric suppliers. The intent was to create a more competitive market for electric power supply in New Jersey. As a result, utilities could 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 building's interconnection to the grid and repair to local power distribution will still reside with the traditional utility company serving your region.

If your building is not purchasing electricity from a third-party supplier, consider shopping for a reduced rate from third-party electric suppliers. If your building 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 building is not purchasing natural gas from a third-party supplier, consider shopping for a reduced rate from third-party natural gas suppliers. If your building 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
Mechanical Room	1	Exit Signs: Incandescent	None	20	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	123	0.0	$14.59	$107.56	$0.00	7.37
Mechanical Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,588	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,512	0.08	516	0.0	$61.41	$445.50	$65.00	6.20
Mechanical Room	1	Compact Fluorescent: Screw-in: (13W) - 1L	Wall Switch	13	3,588	Relamp	Yes	1	LED Screw-In Lamps: Screw-In: LED (9W) - 1L	Occupancy Sensor	9	2,512	0.00	28	0.0	$3.29	$53.75	$0.00	16.34
Kitchen Storage Room 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,380	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	966	0.05	132	0.0	$15.75	$233.00	$20.00	13.53
Kitchen Storage Room 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,380	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	966	0.03	66	0.0	$7.87	$328.50	$10.00	40.46
Main Kitchen Area	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,380	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	966	0.38	926	0.0	$110.22	$1,359.00	$210.00	10.42
Main Kitchen Area	1	Exit Signs: Incandescent	None	20	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	141	0.0	$16.78	$107.56	$0.00	6.41
Kitchen Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,380	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	966	0.03	66	0.0	$7.87	$328.50	$10.00	40.46
Kitchen Serving Area	6	Incandescent: Screw-in: (75W) - 1L	Wall Switch	75	1,380	Relamp	Yes	6	LED Screw-In Lamps: Screw-In: LED (11W) - 1L	Occupancy Sensor	11	966	0.26	641	0.0	$76.24	$592.52	$65.00	6.92
Kitchen Storage Closet	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,380	Relamp & Reballast	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	966	0.04	107	0.0	$12.78	$387.00	$10.00	29.50
Kitchen Dishwashing Area	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,380	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	966	0.03	66	0.0	$7.87	$328.50	$10.00	40.46
Cafeteria / MPR	48	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,588	Relamp	Yes	48	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,512	1.31	8,259	0.0	$982.54	$3,078.00	$515.00	2.61
Cafeteria / MPR	5	Exit Signs: Incandescent	None	20	8,760	Fixture Replacement	No	5	LED Exit Signs: 2 W Lamp	None	6	8,760	0.05	705	0.0	$83.89	$537.78	$0.00	6.41
Maintenance Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,588	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,512	0.03	172	0.0	$20.47	$328.50	$10.00	15.56
Maintenance Office Storage Area	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,588	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,512	0.03	172	0.0	$20.47	$328.50	$10.00	15.56
Maintenance Office Storage Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	690	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	483	0.05	66	0.0	$7.87	$233.00	$20.00	27.05
Roof Penthouse	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,588	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,512	0.14	860	0.0	$102.35	$562.50	$85.00	4.67
Penthouse 2	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,588	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,512	0.14	860	0.0	$102.35	$562.50	$85.00	4.67
Storage Closet	1	Compact Fluorescent: Pin Style: (9W) - 2L	Wall Switch	18	690	Relamp	Yes	1	LED Screw-In Lamps: Pin Style: LED (5.5W) - 2L	Occupancy Sensor	6	483	0.01	11	0.0	$1.34	$358.10	$0.00	268.09
CR 109 (Art)	11	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,760	Relamp	Yes	11	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,932	0.53	2,563	0.0	$304.87	$1,316.47	$255.00	3.48
CR 109 Storage Closet	1	Compact Fluorescent: Pin Style: (9W) - 2L	Wall Switch	18	690	Relamp	Yes	1	LED Screw-In Lamps: Pin Style: LED (5.5W) - 2L	Occupancy Sensor	6	483	0.01	11	0.0	$1.34	$358.10	$0.00	268.09
Teacher's Lounge	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,760	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,932	0.14	699	0.0	$83.15	$555.40	$95.00	5.54
Copy Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,760	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,932	0.10	466	0.0	$55.43	$460.27	$75.00	6.95
Main Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.08	397	0.0	$47.24	$445.50	$65.00	8.06
Main Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,760	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,932	0.10	466	0.0	$55.43	$460.27	$75.00	6.95

	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
Principal's Office	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,588	Relamp	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,512	0.24	1,514	0.0	$180.15	$745.67	$135.00	3.39
Principal's Office kitchen/storage area	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,588	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,512	0.03	172	0.0	$20.47	$328.50	$10.00	15.56
Main Office RR	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	690	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	483	0.01	17	0.0	$1.99	$318.20	$10.00	154.73
Main Office RR	1	Compact Fluorescent: Screw-in: (13W) - 2L	Wall Switch	26	690	Relamp	Yes	1	LED Screw-In Lamps: Screw-In: LED (9W) - 2L	Occupancy Sensor	18	483	0.01	11	0.0	$1.26	$377.51	$0.00	298.43
Main Office Conference Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,588	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,512	0.10	606	0.0	$72.06	$460.27	$75.00	5.35
Main Office Conference Room Corridor	2	Compact Fluorescent: Screw-in: (13W) - 1L	Wall Switch	13	3,588	Relamp	No	2	LED Screw-In Lamps: Screw-In: LED (9W) - 1L	Wall Switch	9	3,588	0.01	33	0.0	$3.93	$107.51	$0.00	27.38
Main Office Conference Room RR 1	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	690	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	483	0.01	17	0.0	$1.99	$318.20	$10.00	154.73
Main Office Conference Room RR 1	1	Compact Fluorescent: Screw-in: (13W) - 1L	Wall Switch	13	690	Relamp	Yes	1	LED Screw-In Lamps: Screw-In: LED (9W) - 1L	Occupancy Sensor	9	483	0.00	5	0.0	$0.63	$53.75	$0.00	84.99
Main Office Conference Room RR 2	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	690	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	483	0.01	17	0.0	$1.99	$318.20	$10.00	154.73
Main Office Conference Room RR 2	1	Compact Fluorescent: Screw-in: (13W) - 1L	Wall Switch	13	690	Relamp	Yes	1	LED Screw-In Lamps: Screw-In: LED (9W) - 1L	Occupancy Sensor	9	483	0.00	5	0.0	$0.63	$53.75	$0.00	84.99
Girl's RR 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,760	Relamp	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.01	69	0.0	$8.25	$35.90	$5.00	3.75
Girl's RR 1	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,932	0.03	123	0.0	$14.69	$333.20	$0.00	22.68
Girl's RR 1	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,760	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,932	0.01	67	0.0	$7.97	$48.20	$10.00	4.79
Boys RR 1	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,932	0.05	247	0.0	$29.38	$242.40	$0.00	8.25
Boys RR 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,760	Relamp	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.01	69	0.0	$8.25	$35.90	$5.00	3.75
Custodial Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	690	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	483	0.03	33	0.0	$3.94	$328.50	$10.00	80.91
CR 104	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.25	1,191	0.0	$141.71	$796.50	$125.00	4.74
CR 103	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.25	1,191	0.0	$141.71	$796.50	$125.00	4.74
CR 106	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.25	1,191	0.0	$141.71	$796.50	$125.00	4.74
CR 105	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.25	1,191	0.0	$141.71	$796.50	$125.00	4.74
CR 108	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.25	1,191	0.0	$141.71	$796.50	$125.00	4.74
CR 107	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.25	1,191	0.0	$141.71	$796.50	$125.00	4.74
Media Center	2	Exit Signs: Fluorescent	None	7	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	20	0.0	$2.40	$215.11	$0.00	89.74
Media Center	33	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,588	Relamp	Yes	33	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,512	1.35	8,517	0.0	$1,013.25	$3,291.60	$600.00	2.66
Media Center Server Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,588	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,512	0.08	516	0.0	$61.41	$420.40	$65.00	5.79

	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
CST / Guidance Office Area	6	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,760	Relamp	Yes	6	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,932	0.14	669	0.0	$79.64	$640.20	$125.00	6.47
CST / Guidance Office Area	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,932	0.03	123	0.0	$14.69	$63.20	$0.00	4.30
CST social worker office	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,760	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,932	0.05	233	0.0	$27.72	$365.13	$20.00	12.45
CST Office 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,760	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,932	0.05	233	0.0	$27.72	$365.13	$20.00	12.45
CST Office 3	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,760	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,932	0.05	233	0.0	$27.72	$365.13	$20.00	12.45
CST Office 4	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	6	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,932	0.15	741	0.0	$88.13	$649.20	$35.00	6.97
CST Office Confernce Room	6	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,760	Relamp	Yes	6	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,932	0.14	669	0.0	$79.64	$640.20	$125.00	6.47
CST Office Confernce Room	2	Incandescent: Screw-in: (75W) - 1L	Wall Switch	75	2,760	Relamp	Yes	2	LED Screw-In Lamps: Screw-In: LED (11W) - 1L	Occupancy Sensor	11	1,932	0.09	427	0.0	$50.82	$107.51	$10.00	1.92
CR 111A	3	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,760	Relamp	Yes	3	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,932	0.07	335	0.0	$39.82	$185.10	$45.00	3.52
CR 111A	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,760	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.12	596	0.0	$70.86	$495.60	$80.00	5.87
CR 111A	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,760	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.07	347	0.0	$41.25	$179.50	$25.00	3.75
CR 111B	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,760	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.12	596	0.0	$70.86	$495.60	$80.00	5.87
CR 111B	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,760	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.07	347	0.0	$41.25	$179.50	$25.00	3.75
CR 111B	3	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,760	Relamp	Yes	3	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,932	0.07	335	0.0	$39.82	$185.10	$45.00	3.52
CR 112	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,760	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.37	1,787	0.0	$212.57	$946.80	$170.00	3.65
CR 112	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.14	662	0.0	$78.73	$562.50	$85.00	6.07
CR 112	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,760	Relamp	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.01	69	0.0	$8.25	$35.90	$5.00	3.75
CR 113	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,760	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.37	1,787	0.0	$212.57	$946.80	$170.00	3.65
CR 113	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,760	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.07	347	0.0	$41.25	$449.50	$25.00	10.29
CR 113	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.03	132	0.0	$15.75	$58.50	$10.00	3.08
CR 114	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,760	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.37	1,787	0.0	$212.57	$946.80	$170.00	3.65
CR 114	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,760	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.07	347	0.0	$41.25	$449.50	$25.00	10.29
CR 114	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.03	132	0.0	$15.75	$58.50	$10.00	3.08
CR 115	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,760	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.37	1,787	0.0	$212.57	$946.80	$170.00	3.65
CR 115	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,760	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.07	347	0.0	$41.25	$449.50	$25.00	10.29

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
CR 115	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.03	132	0.0	$15.75	$58.50	$10.00	3.08
CR 116	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,760	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.37	1,787	0.0	$212.57	$946.80	$170.00	3.65
CR 116	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,760	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.07	347	0.0	$41.25	$449.50	$25.00	10.29
CR 116	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.03	132	0.0	$15.75	$58.50	$10.00	3.08
CR 117	1	Compact Fluorescent: Pin Style: (9W) - 2L	Wall Switch	18	2,760	Relamp	Yes	1	LED Screw-In Lamps: Pin Style: LED (5.5W) - 2L	Occupancy Sensor	6	1,932	0.01	45	0.0	$5.34	$88.10	$0.00	16.49
CR 117	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,760	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.16	794	0.0	$94.48	$570.80	$95.00	5.04
CR 117	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,760	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.06	277	0.0	$33.00	$143.60	$20.00	3.75
CR 122	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,760	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.37	1,787	0.0	$212.57	$946.80	$170.00	3.65
CR 122	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,760	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.07	347	0.0	$41.25	$449.50	$25.00	10.29
CR 122	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.05	265	0.0	$31.49	$117.00	$20.00	3.08
CR 121	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,760	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.37	1,787	0.0	$212.57	$946.80	$170.00	3.65
CR 121	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,760	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.07	347	0.0	$41.25	$449.50	$25.00	10.29
CR 121	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.03	132	0.0	$15.75	$58.50	$10.00	3.08
CR 118	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,760	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.37	1,787	0.0	$212.57	$946.80	$170.00	3.65
CR 118	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,760	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.07	347	0.0	$41.25	$449.50	$25.00	10.29
CR 118	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.03	132	0.0	$15.75	$58.50	$10.00	3.08
CR 118 Storage	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	690	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	483	0.01	17	0.0	$1.99	$318.20	$10.00	154.73
CR 119	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,760	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.37	1,787	0.0	$212.57	$946.80	$170.00	3.65
CR 119	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,760	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.07	347	0.0	$41.25	$449.50	$25.00	10.29
CR 119	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.03	132	0.0	$15.75	$58.50	$10.00	3.08
CR 119 Storage	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	690	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	483	0.01	17	0.0	$1.99	$318.20	$10.00	154.73
CR 120	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,760	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,932	0.37	1,787	0.0	$212.57	$946.80	$170.00	3.65
CR 120	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,760	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,932	0.07	347	0.0	$41.25	$449.50	$25.00	10.29
CR 120	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.03	132	0.0	$15.75	$58.50	$10.00	3.08
Custodial Closet 2	1	Compact Fluorescent: Pin Style: (9W) - 2L	Wall Switch	18	690	Relamp	Yes	1	LED Screw-In Lamps: Pin Style: LED (5.5W) - 2L	Occupancy Sensor	6	483	0.01	11	0.0	$1.34	$358.10	$0.00	268.09

	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
Electrical Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	690	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	483	0.03	33	0.0	$3.94	$328.50	$10.00	80.91
Faculty Womens RR	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	690	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	483	0.01	17	0.0	$1.99	$318.20	$10.00	154.73
Faculty Womens RR	1	Compact Fluorescent: Pin Style: (9W) - 2L	Wall Switch	18	690	Relamp	Yes	1	LED Screw-In Lamps: Pin Style: LED (5.5W) - 2L	Occupancy Sensor	6	483	0.01	11	0.0	$1.34	$88.10	$0.00	65.96
Faculty Mens RR	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	690	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	483	0.01	17	0.0	$1.99	$318.20	$10.00	154.73
Faculty Mens RR	1	Compact Fluorescent: Pin Style: (9W) - 2L	Wall Switch	18	690	Relamp	Yes	1	LED Screw-In Lamps: Pin Style: LED (5.5W) - 2L	Occupancy Sensor	6	483	0.01	11	0.0	$1.34	$88.10	$0.00	65.96
Nurse's Suite Wait Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,588	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,512	0.08	516	0.0	$61.41	$420.40	$65.00	5.79
Nurse's Suite	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,588	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,512	0.21	1,290	0.0	$153.52	$646.00	$110.00	3.49
Nurse's Suite	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,588	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,512	0.05	321	0.0	$38.19	$126.40	$0.00	3.31
Nurse's Suite	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,588	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,512	0.14	860	0.0	$102.35	$562.50	$85.00	4.67
Nurse's Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,588	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,512	0.08	516	0.0	$61.41	$150.40	$30.00	1.96
Nurse's Office RR	1	Compact Fluorescent: Pin Style: (9W) - 2L	Wall Switch	18	690	Relamp	Yes	1	LED Screw-In Lamps: Pin Style: LED (5.5W) - 2L	Occupancy Sensor	6	483	0.01	11	0.0	$1.34	$88.10	$0.00	65.96
Nurse's Office RR	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	690	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	483	0.01	17	0.0	$1.99	$318.20	$10.00	154.73
Nurse's Office Storage Room	2	Compact Fluorescent: Pin Style: (9W) - 2L	Wall Switch	18	690	Relamp	Yes	2	LED Screw-In Lamps: Pin Style: LED (5.5W) - 2L	Occupancy Sensor	6	483	0.02	22	0.0	$2.67	$176.20	$0.00	65.96
Nurse's Office Storage Room	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	690	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	483	0.03	31	0.0	$3.67	$333.20	$0.00	90.74
Gym	32	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,588	Relamp	Yes	32	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,512	1.54	9,692	0.0	$1,152.98	$10,084.27	$1,760.00	7.22
Gym	4	Exit Signs: Fluorescent	None	7	8,760	Fixture Replacement	No	4	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	40	0.0	$4.79	$430.22	$0.00	89.74
Gym	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Gym	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,588	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,512	0.03	161	0.0	$19.10	$333.20	$0.00	17.45
Gym	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,588	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,512	0.08	516	0.0	$61.41	$445.50	$65.00	6.20
Gym Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,588	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,512	0.14	909	0.0	$108.09	$555.40	$95.00	4.26
Gym Office Closet	1	Compact Fluorescent: Pin Style: (9W) - 2L	Wall Switch	18	690	Relamp	Yes	1	LED Screw-In Lamps: Pin Style: LED (5.5W) - 2L	Occupancy Sensor	6	483	0.01	11	0.0	$1.34	$358.10	$0.00	268.09
Gym Storage	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	690	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	483	0.16	199	0.0	$23.62	$621.00	$60.00	23.75
Gym Hallway Display Cabinet	3	Linear Fluorescent - T12: 2' T12 (20W) - 2L	Wall Switch	50	3,588	Relamp & Reballast	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,588	0.06	408	0.0	$48.60	$321.00	$30.00	5.99
Stage Area	13	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,784	Relamp	No	13	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,784	0.48	2,331	0.0	$277.28	$1,236.73	$260.00	3.52
Stage Area	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Band/Music Room	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.22	1,059	0.0	$125.97	$738.00	$115.00	4.95
Band/Music Room	1	Exit Signs: Fluorescent	None	7	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	10	0.0	$1.20	$107.56	$0.00	89.74
Room 100 (Music Office)	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,760	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,932	0.38	1,864	0.0	$221.73	$1,031.07	$195.00	3.77
Music Office Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	690	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	483	0.03	33	0.0	$3.94	$328.50	$10.00	80.91
Storage Closet 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	690	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	483	0.05	66	0.0	$7.87	$233.00	$20.00	27.05
Maintenance Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,588	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,512	0.10	606	0.0	$72.06	$460.27	$75.00	5.35
Storage Closet 3	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	690	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	483	0.05	66	0.0	$7.87	$233.00	$20.00	27.05
CR 101	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.41	1,985	0.0	$236.19	$1,147.50	$185.00	4.08
CR 101 Storage 1	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	690	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	483	0.01	17	0.0	$1.99	$318.20	$10.00	154.73
CR 101 Storage 2	1	Compact Fluorescent: Pin Style: (9W) - 2L	Wall Switch	18	690	Relamp	Yes	1	LED Screw-In Lamps: Pin Style: LED (5.5W) - 2L	Occupancy Sensor	6	483	0.01	11	0.0	$1.34	$358.10	$0.00	268.09
CR 102	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.33	1,588	0.0	$188.95	$972.00	$155.00	4.32
CR 102 Storage 1	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	690	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	483	0.01	17	0.0	$1.99	$318.20	$10.00	154.73
CR 102 Storage 2	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	690	Relamp & Reballast	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	483	0.04	54	0.0	$6.39	$387.00	$10.00	58.99
Room 125 Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	690	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	483	0.05	66	0.0	$7.87	$233.00	$20.00	27.05
Common Hallway (CR109 to CR108)	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
Common Hallway (CR109 to CR108)	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,588	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,512	0.55	3,441	0.0	$409.39	$1,570.00	$200.00	3.35
Common Hallway (CR109 to CR108)	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,588	Relamp	Yes	2	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	2,512	0.03	180	0.0	$21.45	$71.80	$10.00	2.88
Common Hallway (CR109 to CR108) Bathroom Entry	2	Compact Fluorescent: Pin Style: (9W) - 2L	Wall Switch	18	3,588	Relamp	Yes	2	LED Screw-In Lamps: Pin Style: LED (5.5W) - 2L	High/Low Control	6	2,512	0.02	117	0.0	$13.89	$176.20	$0.00	12.68
Common Hallway (Media Center to CR114)	2	Exit Signs: Incandescent	None	20	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.02	282	0.0	$33.56	$215.11	$0.00	6.41
Common Hallway (Media Center to CR114)	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,588	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	2,512	0.03	161	0.0	$19.10	$63.20	$0.00	3.31
Common Hallway (Media Center to CR114)	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,588	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	2,512	0.14	909	0.0	$108.09	$485.40	$60.00	3.94
Common Hallway (Media Center to CR114)	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,588	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,512	0.38	2,409	0.0	$286.57	$1,019.00	$140.00	3.07
Common Hallway (CR115 to Nurse's Suite)	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,588	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,512	0.41	2,581	0.0	$307.04	$1,077.50	$150.00	3.02
Common Hallway (CR115 to Nurse's Suite)	1	Exit Signs: Incandescent	None	20	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	141	0.0	$16.78	$107.56	$0.00	6.41
Common Hallway (CR115 to Nurse's Suite)	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Common Hallway (Gym to Cafeteria)	11	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	11	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Common Hallway (Gym to Cafeteria)	23	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,588	Relamp	Yes	23	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,512	0.63	3,957	0.0	$470.80	$1,745.50	$230.00	3.22
Common Hallway (Gym to Cafeteria) Display Cabinets (2)	6	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,588	Relamp	No	6	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,588	0.06	396	0.0	$47.12	$289.20	$60.00	4.86
Common Hallway (Stage Area)	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
Common Hallway (Stage Area)	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,588	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,512	0.33	2,065	0.0	$245.64	$902.00	$120.00	3.18
Common Hallway (Stage Area)	10	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,588	Relamp	Yes	10	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	2,512	0.25	1,605	0.0	$190.95	$832.00	$0.00	4.36
Common Hallway (Mechanicals)	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,588	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	2,512	0.05	303	0.0	$36.03	$95.13	$20.00	2.09
Common Hallway (Mechanicals)	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,588	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,512	0.08	516	0.0	$61.41	$375.50	$30.00	5.63
Common Hallway (Mechanicals)	1	Exit Signs: Fluorescent	None	7	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	10	0.0	$1.20	$107.56	$0.00	89.74
Common Hallway (Mechanicals)	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
Garage	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.08	397	0.0	$47.24	$445.50	$65.00	8.06
Garage Storage Area	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,760	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,932	0.05	265	0.0	$31.49	$233.00	$20.00	6.76
Exterior Entry	3	Incandescent: Screw-in: (60W) - 2L	Wall Switch	120	2,190	Relamp	No	3	LED Screw-In Lamps: Screw-In: LED (9W) - 2L	Wall Switch	18	2,190	0.20	771	0.0	$91.68	$161.26	$15.00	1.60
Exterior Lamp Posts	6	LED - Fixtures: Outdoor Pole/Arm-Mounted Decorative Fixture	Wall Switch	40	2,190	None	No	6	LED - Fixtures: Outdoor Pole/Arm-Mounted Decorative Fixture	Wall Switch	40	2,190	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Building Lights	10	High-Pressure Sodium: (1) 150W Lamp	Wall Switch	188	2,190	Fixture Replacement	No	10	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	45	2,190	0.94	3,601	0.0	$428.45	$3,906.77	$1,000.00	6.78
Building Lights	1	High-Pressure Sodium: (1) 400W Lamp	Wall Switch	465	2,190	Fixture Replacement	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	120	2,190	0.23	869	0.0	$103.37	$390.68	$100.00	2.81
Building Lights	6	Compact Fluorescent: Pin Style: (13W) - 3L	Wall Switch	39	2,190	Relamp	No	6	LED Screw-In Lamps: Pin Style: LED (9W) - 3L	Wall Switch	9	2,190	0.12	453	0.0	$53.93	$792.92	$0.00	14.70
Building Lights	2	Metal Halide: (1) 320W Lamp	Wall Switch	365	2,190	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	96	2,190	0.35	1,355	0.0	$161.19	$781.35	$200.00	3.61
Building Lights	1	LED Screw-In Lamps: Screw-in: (18W) - 1L	Wall Switch	18	2,190	None	No	1	LED Screw-In Lamps: Screw-in: (18W) - 1L	Wall Switch	18	2,190	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Motor Inventory & Recommendations

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical Room	Geothermal Loop	1	Water-Source Heat Pump Circulation Pump	40.0	90.2%	Yes	4,380	Yes	94.1%	No		0.76	4,504	0.0	$535.83	$4,206.90	$0.00	7.85
Mechanical Room	Geothermal Loop	1	Water-Source Heat Pump Circulation Pump	40.0	90.2%	Yes	4,380	Yes	94.1%	No		0.76	4,504	0.0	$535.83	$4,206.90	$0.00	7.85
Mechanical Room	DHW	1	Process Pump	0.1	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	DHW	1	Process Pump	0.1	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Whole Building Rooms	Heat Pumps	22	Supply Fan	1.5	84.0%	No	3,059	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Exhaust fans	14	Exhaust Fan	0.3	70.0%	No	2,745	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Penthouse	Gym AHU1 & AHU2	2	Supply Fan	5.0	87.5%	No	2,898	Yes	89.5%	Yes	2	1.45	4,721	0.0	$561.60	$8,393.82	$800.00	13.52
Roof Penthouse	Stage AHU3	1	Supply Fan	5.0	87.5%	No	2,898	Yes	89.5%	Yes	1	0.72	2,360	0.0	$280.80	$4,196.91	$400.00	13.52
Roof	Main Office	1	Supply Fan	1.0	84.0%	No	2,898	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Penthouse 2	Main Office	2	Supply Fan	1.0	84.0%	No	2,898	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cafeteria / MPR	Cafeteria / MPR	4	Ventilation Fan	0.8	80.0%	No	2,745	No	80.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Media Center	2	Supply Fan	1.0	84.0%	No	2,898	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Each Classroom	Whole Buildng Heat/Cool	22	Ground Source HP	4.00	36.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Space Heater	1	Electric Resistance Heat		17.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Mechanical Room	1	Electric Resistance Heat		17.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Penthouse	Roof Pentouse	1	Electric Resistance Heat		17.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Gym Storage Room	Gym Storage Room	1	Electric Resistance Heat		17.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Main Office	1	Split-System AC	10.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Media Center	2	Packaged AC	4.00		Yes	1	Packaged AC	4.00		14.00		No	4.85	10,423	0.0	$1,239.97	$9,075.84	$368.00	7.02
Roof	Main Office	1	Electric Resistance Heat		34.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Whole Building	Rooms not served by Heat Pumps	7	Electric Resistance Heat		17.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway Ceilings	Hallways	4	Electric Resistance Heat		34.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

DHW Inventory & Recommendations

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

Walk-In Cooler/Freezer Inventory & Recommendations

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

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	4	Electric Convection Oven (Full Size)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Insulated Food Holding Cabinet (3/4 Size)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Electric Steamer	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Dishwasher Inventory & Recommendations

	Existing Conditions					Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Dishwasher Type	Water Heater Fuel Type	Booster Heater Fuel Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Payback w/ Incentives in Years
Kitchen	1	Door Type (High Temp)	Electric	Electric	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?
Whole Building	40	Desktops	150.0	Yes
Whole Building	30	Laptops	45.0	Yes
Whole Building Classrooms	80	Chromebooks	40.0	Yes
Whole Building	5	Desk printers	20.0	Yes
Whole Building	16	Projectors	373.0	Yes
Whole Building	16	Smartboards	50.0	Yes
Whole Building	2	Photocopiers	600.0	Yes
Whole Building	2	LCD TVs	50.0	Yes
Whole Building	17	CRT TVs	120.0	No
Whole Building	7	Microwaves	1,000.0	No
Whole Building	3	Toaster Ovens	1,200.0	No
Teacher's Lounge	1	Coffee Maker	900.0	No
Whole Building	1	Refrigerator	172.0	Yes
Main Office	1	Paper Shredder	150.0	No
Whole Building	2	Mini Fridge	153.0	Yes
Kitchen	2	Chest Freezer	127.0	Yes
Server Closet	1	Server Rack	750.0	Yes
Nurse's Office	1	Washing Machine	900.0	No

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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42

ENERGY STAR® Score[1]

Stewartsville Middle School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 52,415
Built: 1968

For Year Ending: May 31, 2017
Date Generated: April 20, 2018

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
Stewartsville Middle School 642 South Main Street Stewartsville, New Jersey 08886	Greenwich Township School District (Warren) 101 Wyndham Farm Boulevard Stewartsville, NJ 08886 (908) 859-9022	Tim Mantz 101 Wyndham Farm Boulevard Stewartsville, NJ 08886 (908) 859-9022 Ext. 1605 mantzt@gtsd.net

Property ID: 6305557

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
74.9 kBtu/ft²

Source EUI
197.2 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	2,996,174 (76%)
Electric - Solar (kBtu)	929,674 (24%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	70.2
National Median Source EUI (kBtu/ft²)	184.7
% Diff from National Median Source EUI	7%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	332

Signature & Stamp of Verifying Professional

I _____ (Name) verify that the above information is true and correct to the best of my knowledge.

Signature: _____ Date: _____

Licensed Professional

____ _____
,
(____)____-_____
_____

Professional Engineer Stamp (if applicable)