Local Government Energy Audit:
Energy Audit Report

Fieldstone Middle School

47 Spring Valley Rd.

Montvale, New Jersey 07645

Montvale School District

September 28, 2018

Final Report by:

TRC Energy Services

Disclaimer

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

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

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

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

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 Fieldstone Middle School.

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

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

1.1 Facility Summary

Fieldstone Middle School is an 89,640 square-foot building comprised of various space types including classrooms, offices, a cafeteria, a library, a gymnasium and various mechanical and storage spaces.

Lighting at Fieldstone Middle School consists of aging and inefficient fluorescent and incandescent lighting. Heating is supplied by two large hot water boilers. Cooling is supplied by a mixture of window air conditioners, split-systems and packaged rooftop units. Domestic hot water is produced by a storage water heater. A thorough description of the building and our observations are in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated 12 measures but recommends eight measures which together represent an opportunity for Fieldstone Middle School to reduce annual energy costs by roughly $19,769 and annual greenhouse gas emissions by 139,695 lbs. CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 5.9 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 Fieldstone Middle School's annual energy use by 9%.

Figure 1 – Previous 12 Month Utility Costs

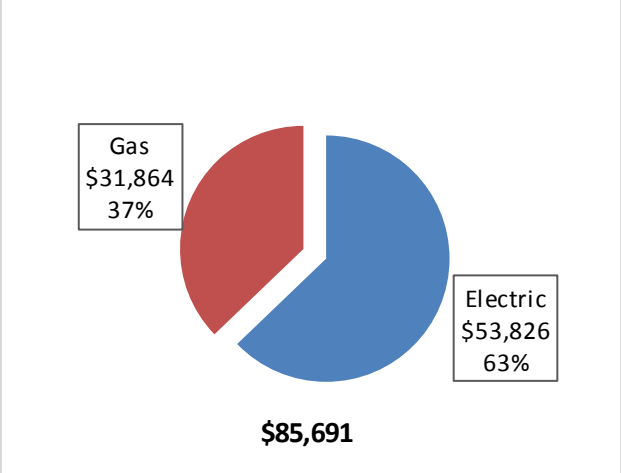
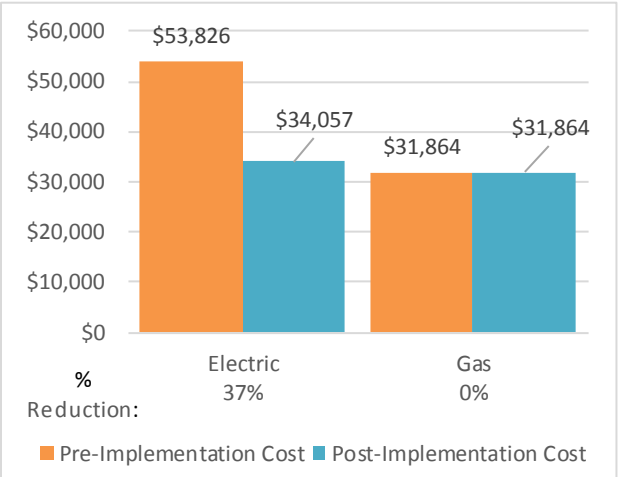


Figure 2 – Potential Post-Implementation Costs



A detailed description of Fieldstone 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. Brief descriptions of each category are below and a description of savings opportunities are 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			**94,626**	**23.7**	**0.0**	**$13,484.79**	**$76,270.14**	**$10,655.00**	**$65,615.14**	**4.9**	**95,288**
ECM 1	Install LED Fixtures	Yes	4,051	0.5	0.0	$577.30	$3,125.42	$800.00	$2,325.42	4.0	4,079
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	33,604	9.1	0.0	$4,788.73	$31,796.67	$2,680.00	$29,116.67	6.1	33,839
ECM 3	Retrofit Fixtures with LED Lamps	Yes	56,674	14.0	0.0	$8,076.32	$41,240.51	$7,175.00	$34,065.51	4.2	57,070
ECM 4	Install LED Exit Signs	Yes	298	0.0	0.0	$42.44	$107.56	$0.00	$107.56	2.5	300
Lighting Control Measures			**21,899**	**5.5**	**0.0**	**$3,120.79**	**$34,988.00**	**$3,860.00**	**$31,128.00**	**10.0**	**22,052**
ECM 5	Install Occupancy Sensor Lighting Controls	Yes	19,371	5.0	0.0	$2,760.45	$31,988.00	$3,860.00	$28,128.00	10.2	19,506
ECM 6	Install High/Low Lighitng Controls	Yes	2,529	0.5	0.0	$360.34	$3,000.00	$0.00	$3,000.00	8.3	2,546
Motor Upgrades			**458**	**0.1**	**0.0**	**$65.23**	**$3,134.10**	**$0.00**	**$3,134.10**	**48.0**	**461**
	Premium Efficiency Motors	No	458	0.1	0.0	$65.23	$3,134.10	$0.00	$3,134.10	48.0	461
Variable Frequency Drive (VFD) Measures			**12,000**	**1.2**	**0.0**	**$1,710.09**	**$7,615.90**	**$0.00**	**$7,615.90**	**4.5**	**12,084**
ECM 7	Install VFDs on Hot Water Pumps	Yes	12,000	1.2	0.0	$1,710.09	$7,615.90	$0.00	$7,615.90	4.5	12,084
Electric Unitary HVAC Measures			**14,568**	**9.4**	**0.0**	**$2,076.01**	**$33,779.36**	**$780.16**	**$32,999.20**	**15.9**	**14,670**
	Install High Efficiency Electric AC	No	4,369	2.6	0.0	$622.54	$20,700.36	$268.64	$20,431.72	32.8	4,399
ECM 8	Install High Efficiency Heat Pumps	Yes	10,199	6.8	0.0	$1,453.47	$13,079.00	$511.52	$12,567.48	8.6	10,271
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**177.8**	**$1,465.03**	**$148,106.45**	**$800.00**	**$147,306.45**	**100.5**	**20,821**
	Install High Efficiency Hot Water Boilers	No	0	0.0	165.1	$1,359.82	$142,668.69	$0.00	$142,668.69	104.9	19,325
	Install High Efficiency Furnaces	No	0	0.0	12.8	$105.21	$5,437.76	$800.00	$4,637.76	44.1	1,495
TOTALS FOR HIGH PRIORITY MEASURES			**138,725**	**37.2**	**0.0**	**$19,769.14**	**$131,953.05**	**$15,026.52**	**$116,926.53**	**5.9**	**139,695**
TOTALS FOR ALL EVALUATED MEASURES			**143,551**	**39.9**	**177.8**	**$21,921.94**	**$303,893.96**	**$16,095.16**	**$287,798.80**	**13.1**	**165,376**

* - 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 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 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 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.

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

Energy Efficient Practices

TRC also identified 19 low cost (or no cost) energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral or operational adjustments and by performing better routine maintenance on building systems. These practices can extend equipment lifetime, improve occupant comfort, provide better health and safety, as well as reduce annual energy and O&M costs. Potential opportunities identified at Fieldstone 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
- Turn Off Unneeded Motors
- Reduce Motor Short Cycling
- Perform Routine Motor Maintenance
- Use Fans to Reduce Cooling Load
- Install Destratification Fans
- Practice Use of Thermostat Schedules and Temperature Resets
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Check for and Seal Duct Leakage
- Perform Regular Boiler Maintenance
- Perform Regular 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 Fieldstone Middle School. Based on the configuration of the site and its loads there is medium potential for installing a photovoltaic (PV) array.

Figure 4 – Photovoltaic Potential

Potential	Medium	
System Potential	108	kW DC STC
Electric Generation	81,264	kWh/yr
Displaced Cost	$7,070	/yr
Installed Cost	$421,200	

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

1.3 Implementation Planning

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

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

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

- SmartStart
- Direct Install
- Combined Heat and Power Program
- 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.

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

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the Energy Savings Improvement Program (ESIP). Supported directly by the NJBPU, ESIP provides government agencies with project development, design, and implementation support services as well as attractive financing for implementing ECMs. An LGEA report (or other approved energy audit) is required for participation in ESIP. Please refer to Section 8.5 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 in Section 8 or: www.njcleanenergy.com/ci.

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 5 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Andrea Wasserman	Business Administrator	awasserman@montvalek8.org	201-391-6226
Designated Representative			
Brian Marshall	Maintenance Coordinator	bmarshall@montvalek8.org	201-391-9000 ext. 2511
TRC Energy Services			
Alexander Klieverik	Auditor	Aklieverik@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On April 24, 2018, TRC performed an energy audit at Fieldstone Middle School located in Montvale, New Jersey. TRC's team met with Andrea Wasserman & Brian Marshall to review the facility operations and help focus our investigation on specific energy-using systems.

Fieldstone Middle School is an 89,640 square-foot two-story building comprised of classrooms, offices, a cafeteria, a library, a gymnasium and various mechanical and storage spaces.

The building was constructed in 1966. In 2001, an addition was constructed on the northwest side of the building, adding offices for the school district administration.

2.3 Building Occupancy

The building is open Monday through Friday from 6:00 AM to 11:00 PM and sometimes on Saturday from 9:00 AM to 4:00 PM. The typical schedule is presented in the table below. The building is used throughout the school year with limited use throughout the summer. During a typical day, the building is occupied by approximately 75 faculty and 470 students.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Fieldstone Middle School	Weekday	6:00 AM to 11:00 PM
Fieldstone Middle School	Weekend	Saturday: 9:00 AM to 4:00 PM

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 a membrane with reflective surface that was applied in 2017. 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 are in good condition.



2.5 On-Site Generation

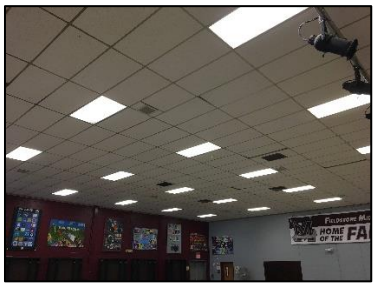
Fieldstone Middle School does not have any on-site electric generation capacity.

2.6 Energy-Using Systems

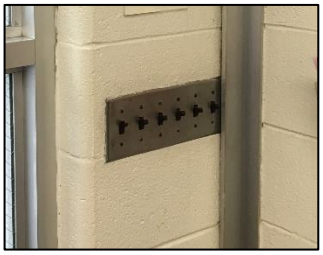
Please see Appendix A: Equipment Inventory and Recommendations for an inventory of the facility's equipment.

Lighting System

Lighting is provided by a mixture of 32-Watt linear fluorescent T8 lamps with electronic ballasts as well as 40-Watt fluorescent T12 lamps with magnetic ballasts. Most of the fixtures are 2-lamp 4-foot long troffers with diffusers. There are also some incandescent lamps throughout the building in various restrooms and storage spaces. Mr. Brian Marshall, the building's maintenance technician, indicated that the building is incrementally changing T12 fixtures to T8 fixtures as the old lamps burn out.

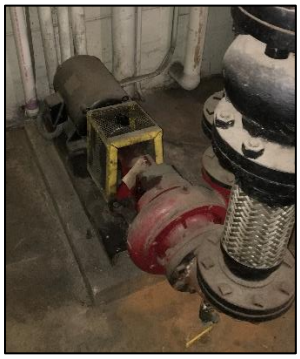

Lighting control in most spaces is provided by wall switches. There are occupancy sensors installed in the teachers' lounge, two administration office restrooms and four student restrooms. Stairwells, elevator lobbies and main lobby areas do not contain any occupancy sensors and operate continuously throughout the day until the evening maintenance staff leaves the building after their shift.




The building's exterior lighting consists primarily of efficient LED fixtures that are controlled by photocells, though there are a few fixtures with high pressure sodium lamps, compact fluorescent lamps, and incandescent lamps that are controlled by schedule timers.

Hot Water Heating System

The hot water system consists of two Pacific National 4,163 kBtu/hr. output, natural gas fire tube boilers. The boilers have a nominal combustion efficiency of 80%. The boilers are configured in a constant flow primary distribution with two 10 HP hot water pumps. Hot water is supplied at 180°F when the outside air temperature is below 50°F and the setpoint is reset to 155°F when the outside air is above 65°F. The boilers provide hot water to two air handlers and perimeter unit ventilators.


The boilers operate in a lead/lag configuration. Both boilers may be required during cold weather. The lead boiler is rotated weekly.

The boilers are in good condition and well maintained.

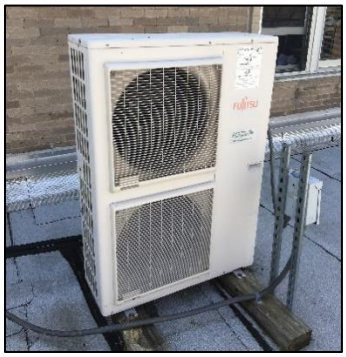
Direct Expansion Air Conditioning System (DX)

The building is conditioned by a variety of equipment types. There are 15 1-ton window air conditioners throughout the building used to condition the classrooms.



A 3-ton Sanyo cooling only split system is used to condition the wood shop. The evaporator is in the ceiling of the wood shop. The condensing unit is located on the roof above the space. The unit is manually controlled by a thermostat located in zone. The unit operates on demand to maintain a space temperature setpoint around 76°F (adjustable by staff).

The IT/server room contains a Fujitsu ductless mini-split air conditioning system which supplies heating and cooling to the space. The unit has a cooling capacity of 42,700 Btu, and a heating capacity of 45,200 Btu. The unit operates on demand to maintain a space temperature setpoint around 74°F.




The gymnasium is conditioned by two heating-only air handler units with hot water coils located near the ceiling of the gym. Each unit contains a 1 HP supply fan, and a ½ HP return fan.

HVAC Equipment - Gas Fired Rooftop Unit

Two newer Trane 7.5 ton, 11.5 EER packaged rooftop units with gas burners used to condition the administration office and the area from the main office to nurse's office. The gas fired components have an output capacity of 250 kBtuh and a rated efficiency of 80%.

Domestic Hot Water Heating System

The domestic hot water heating system for the building consists of one Bradford White gas fired storage water heater with an input rating of 76 kBtu/hr. with a nominal efficiency of 80%. The water heater has a separate storage tank with a capacity of 1,468 gallons. Two fractional horsepower recirculation pumps distribute 120°F water to the entire site. The recirculation pumps operate continuously.

Building Plug Load

There are roughly 85 computer work stations throughout the building. Roughly 80% of the computers are desktop units with LCD monitors. There is no centralized PC power management software installed.

Other major equipment contributing to the building's plug load includes 20 projectors, 20 smartboards, 32 desk printers, six photocopiers, 10 LCD televisions, and six refrigerators, and two vending machines.



2.7 Water-Using Systems

There are 14 restrooms at this facility. A sampling of restrooms found that faucets are rated for 2.2 gallons per minute (gpm) or lower, the toilets are rated at 2.5 gallons per flush (gpf) and the urinals are rated at 2 gpf.

The school has a girls' locker room and boys' locker room. The girl's locker room has eight showerheads and the boy's locker room has eight showerheads. All the showerheads are rated at 2.5 gpm. The showers in both the boy's locker room and girl's locker room are rarely used.

3 SITE ENERGY USE AND COSTS

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

3.1 Total Cost of Energy

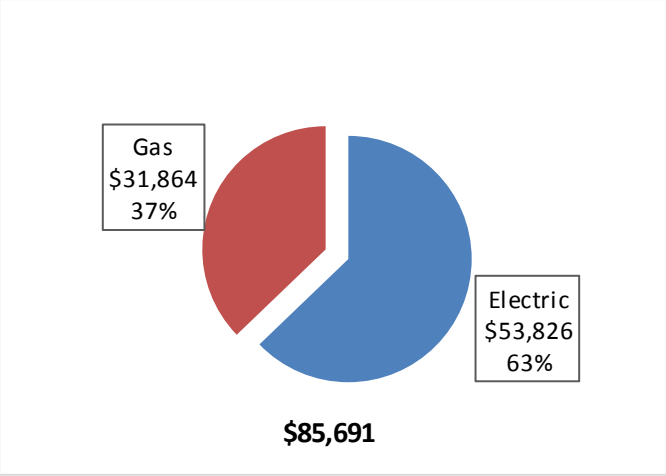
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 7 - Utility Summary

Utility Summary for Fieldstone Middle School		
Fuel	**Usage**	**Cost**
Electricity	377,713 kWh	$53,826
Natural Gas	38,676 Therms	$31,864
Total		**$85,691**

The current annual energy cost for this facility is $85,691 as shown in the chart below.

Figure 8 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by Rockland Electric. The average electric cost over the past 12 months was $0.143/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The electric energy profile (pattern of consumption) indicates spikes in consumption during the fall due to increased activity in the building. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 9 - Electric Usage & Demand

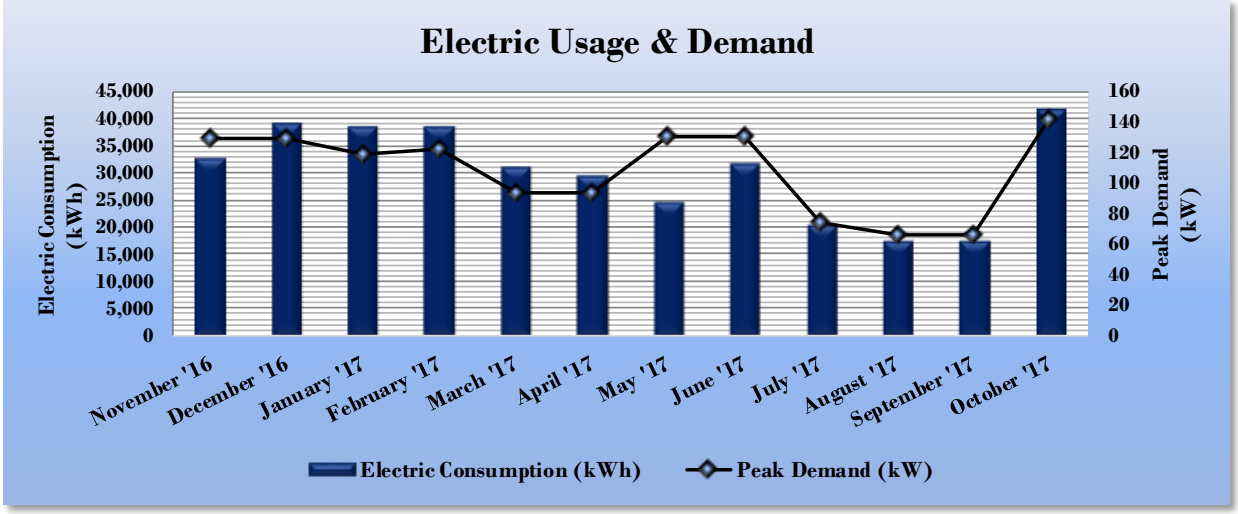


Figure 10 - Electric Usage & Demand

Electric Billing Data for Fieldstone Middle School					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
11/23/16	28	32,940	130	$0	$4,677
12/23/16	29	39,120	130	$0	$5,453
1/26/17	33	38,520	119	$0	$5,332
2/24/17	28	38,760	122	$0	$5,374
3/24/17	27	31,250	93	$0	$4,313
4/24/17	30	29,600	93	$0	$3,848
5/23/17	28	24,590	131	$0	$3,958
6/23/17	30	31,800	131	$0	$4,628
7/25/17	31	20,520	74	$0	$2,979
8/23/17	28	17,640	66	$0	$2,592
9/25/17	32	17,640	66	$0	$2,597
10/24/17	28	41,880	142	$0	$6,159
Totals	**352**	**364,260**	**141.6**	**$0**	**$51,909**
Annual	**365**	**377,713**	**141.6**	**$0**	**$53,826**

3.3 Natural Gas Usage

Natural gas is provided by PSE&G. The average gas cost for the past 12 months is $0.824/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below. The energy profile (pattern of consumption) is typical for a building with natural gas heating and limited domestic hot water use.

Figure 11 - Natural Gas Usage

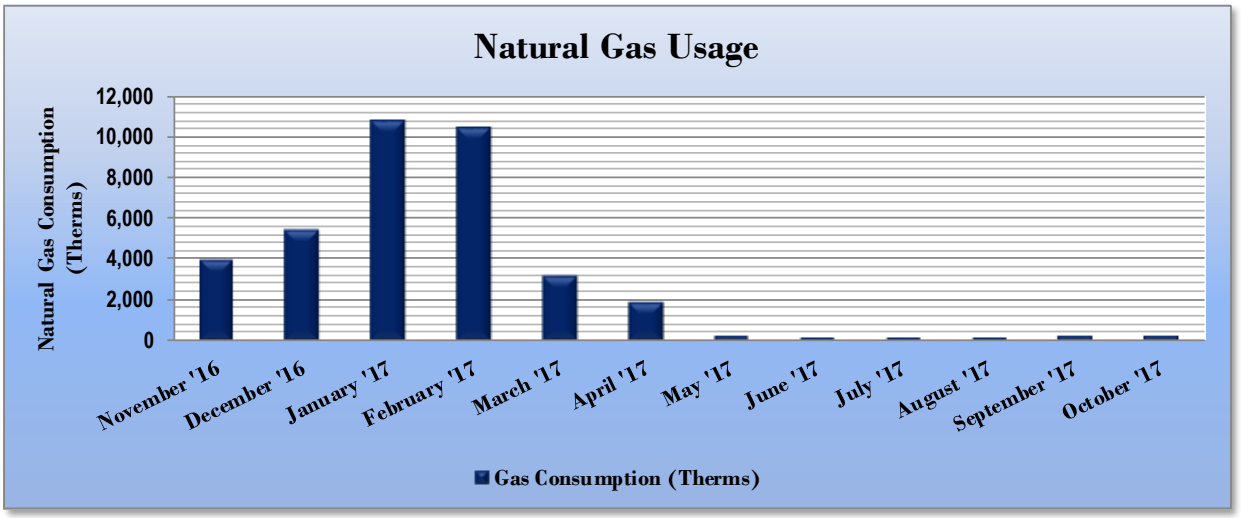


Figure 12 - Natural Gas Usage

Gas Billing Data for Fieldstone Middle School			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
11/30/16	33	4,038	$2,925
12/29/16	28	5,443	$3,946
1/30/17	31	10,837	$9,799
3/1/17	29	10,462	$9,131
3/30/17	28	3,220	$1,481
4/30/17	30	1,932	$1,041
6/1/17	31	284	$779
6/30/17	28	215	$742
7/31/17	30	212	$227
8/29/17	28	224	$232
9/28/17	29	257	$250
10/27/17	28	281	$263
Totals	**353**	**37,404**	**$30,817**
Annual	**365**	**38,676**	**$31,864**

3.4 Benchmarking

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

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

Figure 13 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Fieldstone Middle School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	90.4	141.4
Site Energy Use Intensity (kBtu/ft^2)	57.5	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 14 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Fieldstone Middle School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	73.9	141.4
Site Energy Use Intensity (kBtu/ft^2)	52.2	58.2

Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. This facility has a current score of 80.

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

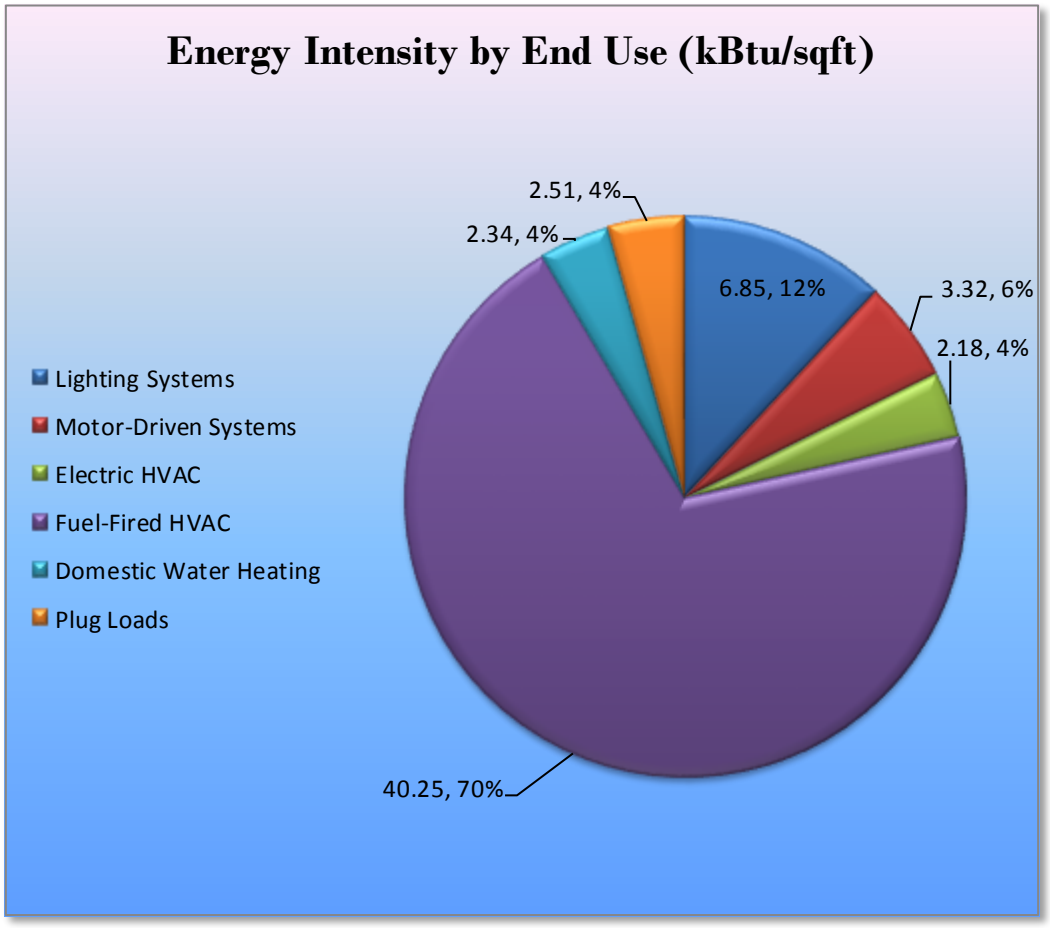
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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

3.5 Energy End-Use Breakdown

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

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



4 ENERGY CONSERVATION MEASURES

Level of Analysis

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information to the Fieldstone 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 facility.

Figure 16 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**94,626**	**23.7**	**0.0**	**$13,484.79**	**$76,270.15**	**$10,655.00**	**$65,615.15**	**4.9**	**95,288**
ECM 1	Install LED Fixtures	4,051	0.5	0.0	$577.30	$3,125.42	$800.00	$2,325.42	4.0	4,079
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	33,604	9.1	0.0	$4,788.73	$31,796.67	$2,680.00	$29,116.67	6.1	33,839
ECM 3	Retrofit Fixtures with LED Lamps	56,674	14.0	0.0	$8,076.32	$41,240.51	$7,175.00	$34,065.51	4.2	57,070
ECM 4	Install LED Exit Signs	298	0.0	0.0	$42.44	$107.56	$0.00	$107.56	2.5	300
Lighting Control Measures		**21,899**	**5.5**	**0.0**	**$3,120.79**	**$34,988.00**	**$3,860.00**	**$31,128.00**	**10.0**	**22,052**
ECM 5	Install Occupancy Sensor Lighting Controls	19,371	5.0	0.0	$2,760.45	$31,988.00	$3,860.00	$28,128.00	10.2	19,506
ECM 6	Install High/Low Lighitng Controls	2,529	0.5	0.0	$360.34	$3,000.00	$0.00	$3,000.00	8.3	2,546
Variable Frequency Drive (VFD) Measures		**12,000**	**1.2**	**0.0**	**$1,710.09**	**$7,615.90**	**$0.00**	**$7,615.90**	**4.5**	**12,084**
ECM 7	Install VFDs on Hot Water Pumps	12,000	1.2	0.0	$1,710.09	$7,615.90	$0.00	$7,615.90	4.5	12,084
Electric Unitary HVAC Measures		**10,199**	**6.8**	**0.0**	**$1,453.47**	**$13,079.00**	**$511.52**	**$12,567.48**	**8.6**	**10,271**
ECM 8	Install High Efficiency Heat Pumps	10,199	6.8	0.0	$1,453.47	$13,079.00	$511.52	$12,567.48	8.6	10,271
TOTALS		**138,725**	**37.2**	**0.0**	**$19,769.14**	**$131,953.05**	**$15,026.52**	**$116,926.53**	**5.9**	**139,695**

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

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

4.1.1 Lighting Upgrades

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

Figure 17 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**94,626**	**23.7**	**0.0**	**$13,484.79**	**$76,270.15**	**$10,655.00**	**$65,615.15**	**4.9**	**95,288**
ECM 1	Install LED Fixtures	4,051	0.5	0.0	$577.30	$3,125.42	$800.00	$2,325.42	4.0	4,079
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	33,604	9.1	0.0	$4,788.73	$31,796.67	$2,680.00	$29,116.67	6.1	33,839
ECM 3	Retrofit Fixtures with LED Lamps	56,674	14.0	0.0	$8,076.32	$41,240.51	$7,175.00	$34,065.51	4.2	57,070
ECM 4	Install LED Exit Signs	298	0.0	0.0	$42.44	$107.56	$0.00	$107.56	2.5	300

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	4,051	0.5	0.0	$577.30	$3,125.42	$800.00	$2,325.42	4.0	4,079

Measure Description

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

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of other lighting technologies.

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	33,604	9.1	0.0	$4,788.73	$31,796.67	$2,680.00	$29,116.67	6.1	33,839
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 tube 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	54,663	13.8	0.0	$7,789.82	$40,756.73	$7,130.00	$33,626.73	4.3	55,045
Exterior	2,010	0.3	0.0	$286.50	$483.78	$45.00	$438.78	1.5	2,024

Measure Description

We recommend retrofitting existing incandescent, halogen, and fluorescent fixtures with LED lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed while leaving the fluorescent fixture ballast in place. LED bulbs can be used in existing fixtures as a direct replacement for 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 tube 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	298	0.0	0.0	$42.44	$107.56	$0.00	$107.56	2.5	300
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 lighting control measures are summarized in Figure 18 below.

Figure 18 – Summary of Lighting Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**21,899**	**5.5**	**0.0**	**$3,120.79**	**$34,988.00**	**$3,860.00**	**$31,128.00**	**10.0**	**22,052**
ECM 5	Install Occupancy Sensor Lighting Controls	19,371	5.0	0.0	$2,760.45	$31,988.00	$3,860.00	$28,128.00	10.2	19,506
ECM 6	Install High/Low Lighitng Controls	2,529	0.5	0.0	$360.34	$3,000.00	$0.00	$3,000.00	8.3	2,546

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)
19,371	5.0	0.0	$2,760.45	$31,988.00	$3,860.00	$28,128.00	10.2	19,506

Measure Description

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

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

ECM 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)
2,529	0.5	0.0	$360.34	$3,000.00	$0.00	$3,000.00	8.3	2,546

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. Energy savings results from only providing full lighting levels when it is required.

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

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

4.1.3 Variable Frequency Drive Measures

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

Figure 19 – Summary of Variable Frequency Drive ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**12,000**	**1.2**	**0.0**	**$1,710.09**	**$7,615.90**	**$0.00**	**$7,615.90**	**4.5**	**12,084**
ECM 7	Install VFDs on Hot Water Pumps	12,000	1.2	0.0	$1,710.09	$7,615.90	$0.00	$7,615.90	4.5	12,084

ECM 7: Install VFDs on Hot Water Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
12,000	1.2	0.0	$1,710.09	$7,615.90	$0.00	$7,615.90	4.5	12,084

Measure Description

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

4.1.4 Electric Unitary HVAC Measures

Our recommendations for unitary HVAC measures are summarized in Figure 20 below.

Figure 20 - 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		**10,199**	**6.8**	**0.0**	**$1,453.47**	**$13,079.00**	**$511.52**	**$12,567.48**	**8.6**	**10,271**
ECM 8	Install High Efficiency Heat Pumps	10,199	6.8	0.0	$1,453.47	$13,079.00	$511.52	$12,567.48	8.6	10,271

ECM 8: Install High Efficiency Heat Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
10,199	6.8	0.0	$1,453.47	$13,079.00	$511.52	$12,567.48	8.6	10,271

Measure Description

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

4.2 ECMs Evaluated but Not Recommended

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

Figure 21 – Summary of Measures Evaluated, But Not Recommended

Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Motor Upgrades	**458**	**0.1**	**0.0**	**$65.23**	**$3,134.10**	**$0.00**	**$3,134.10**	**48.0**	**461**
Premium Efficiency Motors	458	0.1	0.0	$65.23	$3,134.10	$0.00	$3,134.10	48.0	461
Electric Unitary HVAC Measures	**4,369**	**2.6**	**0.0**	**$622.54**	**$20,700.36**	**$268.64**	**$20,431.72**	**32.8**	**4,399**
Install High Efficiency Electric AC	4,369	2.6	0.0	$622.54	$20,700.36	$268.64	$20,431.72	32.8	4,399
Gas Heating (HVAC/Process) Replacement	**0**	**0.0**	**177.8**	**$1,465.03**	**$148,106.45**	**$800.00**	**$147,306.45**	**100.5**	**20,821**
Install High Efficiency Hot Water Boilers	0	0.0	165.1	$1,359.82	$142,668.69	$0.00	$142,668.69	104.9	19,325
Install High Efficiency Furnaces	0	0.0	12.8	$105.21	$5,437.76	$800.00	$4,637.76	44.1	1,495
TOTALS	**4,826**	**2.7**	**177.8**	**$2,152.80**	**$171,940.91**	**$1,068.64**	**$170,872.27**	**79.4**	**25,681**

* - 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).

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)
458	0.1	0.0	$65.23	$3,134.10	$0.00	$3,134.10	48.0	461

Measure Description

We typically 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.

Reasons for not Recommending

Due to the long payback period, we do not recommend replacing motors at this time.

Install High Efficiency Air Conditioning Units

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
4,369	2.6	0.0	$622.54	$20,700.36	$268.64	$20,431.72	32.8	4,399

Measure Description

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

Reasons for not Recommending

Due to the long payback period, we do not recommend replacing air conditioning equipment at this time.

Install High Efficiency Hot Water Boilers

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	165.1	$1,359.82	$142,668.69	$0.00	$142,668.69	104.9	19,325

Measure Description

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

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

Reasons for not Recommending

Due to the long payback period, we do not recommend replacing the boilers at this time.

Install High Efficiency Gas-Fired Rooftop 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)
0	0.0	12.8	$105.21	$5,437.76	$800.00	$4,637.76	44.1	1,495

Measure Description

We recommend replacing existing standard efficiency gas-fired rooftop units with condensing equipment. Improved combustion technology and heat exchanger design optimize heat recovery from the combustion gases which can significantly improve furnace efficiency. Savings result from improved system efficiency.

Reasons for not Recommending

Due to the long payback period, we do not recommend replacing the packaged furnaces at this time.

5 ENERGY EFFICIENT PRACTICES

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

Reduce Air Leakage

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

Use Window Treatments/Coverings

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

Perform Proper Lighting Maintenance

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

Develop a Lighting Maintenance Schedule

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

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.

Turn Off Unneeded Motors

Electric motors often run unnecessarily, and this is an overlooked opportunity to save energy. These motors should be identified and turned off when appropriate. For example, exhaust fans often run unnecessarily when ventilation requirements are already met. Reducing run hours for these motors can result in significant energy savings. Whenever possible, use automatic devices such as twist timers or occupancy sensors to ensure that motors are turned off when not needed.

Reduce Motor Short Cycling

Stopping and starting of motors frequently subjects rotors and other parts to substantial stress. This can result in component wear, reducing efficiency, and increasing maintenance costs. Adjust the load on the motor to limit the amount of unnecessary stopping and starting to improve motor performance.

Perform Routine Motor Maintenance

Motors consist of many moving parts whose collective degradation can contribute to a significant loss of motor efficiency. To prevent damage to motor components, routine maintenance should be performed. This maintenance consists of cleaning surfaces and ventilation openings on motors to prevent overheating, lubricating moving parts to reduce friction, inspecting belts and pulleys for wear and to ensure they are at proper alignment and tension, and cleaning and lubricating bearings. Consult a licensed technician to assess these and other motor maintenance strategies.

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.

Install Destratification Fans

Allowing air to thermally stratify in spaces with high ceilings results in additional energy consumption by requiring the heating system to heat a volume of space much larger than the actual occupied space. Additional inefficiencies also occur because there are higher temperatures at the ceiling level than at the floor level. Higher temperatures at the ceiling accelerate heat loss through the roof, requiring additional energy consumption by the heating equipment to compensate for the accelerated heat transfer.

Destratification fans are specially designed to deliver a columnar, laminar flow of air balancing the air temperature from floor to ceiling. In addition to fuel savings, the use of destratification fans will reduce the recovery time necessary to warm the space after nightly temperature setbacks and will increase the comfort level of the occupants.

Practice Proper Use of Thermostat Schedules and Temperature Resets

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

Clean Evaporator/Condenser Coils on AC Systems

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

Clean and/or Replace HVAC Filters

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

Check for and Seal Duct Leakage

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

Perform Regular Boiler Maintenance

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

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

6 On-Site Generation Measures

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

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

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

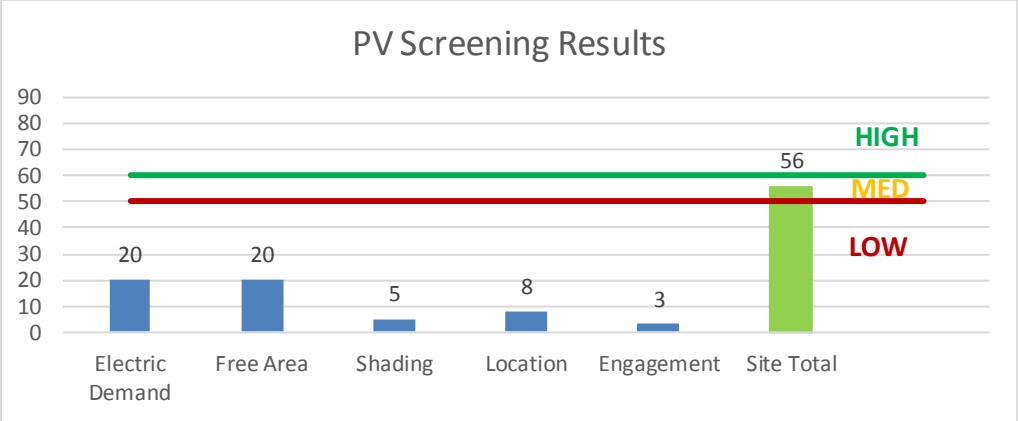
6.1 Photovoltaic

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

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

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

Figure 22 - Photovoltaic Screening



Potential	Medium	
System Potential	108	kW DC STC
Electric Generation	81,264	kWh/yr
Displaced Cost	$7,070	/yr
Installed Cost	$421,200	

Solar projects must register their projects in the SREC (Solar Renewable Energy Certificate) Registration Program (SRP) prior to the start of construction 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 8.4 for additional information.

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

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

6.2 Combined Heat and Power

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

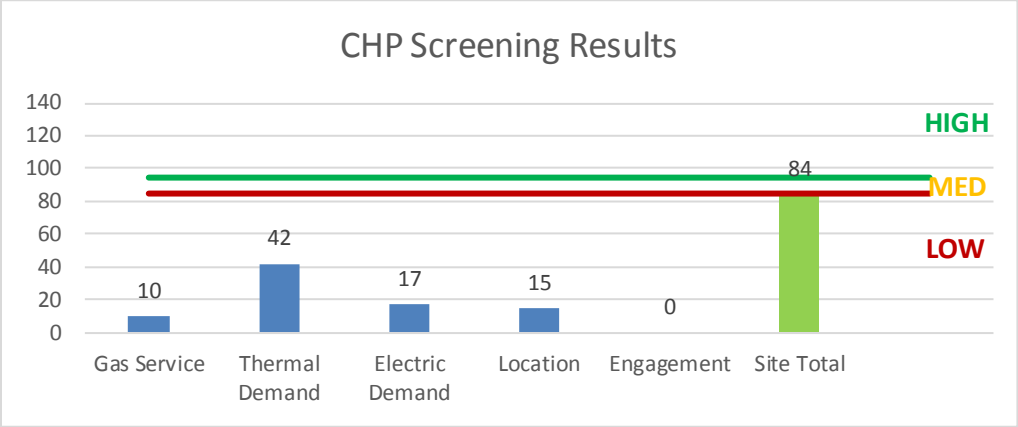
CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for space heating and/or domestic hot water heating. Waste heat can also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

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

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

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

Figure 23 - Combined Heat and Power Screening



Please see Section 8.3 for additional information in the Combined Heat & Power Program.

7 DEMAND RESPONSE

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

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

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

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

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

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

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

8 PROJECT FUNDING / INCENTIVES

The NJCEP provides 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 eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 24 for a list of the eligible programs identified for each recommended ECM.

Figure 24 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Install LED Fixtures	X		X			
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	X		X			
ECM 3	Retrofit Fixtures with LED Lamps	X		X			
ECM 4	Install LED Exit Signs			X			
ECM 5	Install Occupancy Sensor Lighting Controls	X		X			
ECM 6	Install High/Low Lighitng Controls						
ECM 7	Install VFDs on Hot Water Pumps						
ECM 8	Install High Efficiency Heat Pumps	X		X			

SmartStart is generally well-suited for implementation of individual measures or small group of measures. It provides flexibility to install measures at your own pace using in-house staff or a preferred contractor. Direct Install caters to small to mid-size facilities that can bundle multiple ECMs together. This can greatly simplify participation and may lead to higher incentive amounts but requires the use of pre-approved contractors. The Pay for Performance (P4P) program is a "whole-building" energy improvement program designed for larger facilities. It requires implementation of multiple measures meeting minimum savings thresholds, as well as use of pre-approved consultants. The Large Energy Users Program (LEUP) is available to New Jersey's largest energy users giving them flexibility to install as little or as many measures, in a single facility or several facilities, with incentives capped based on the entity's annual energy consumption. LEUP applicants can use in-house staff or a preferred contractor.

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

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

8.1 SmartStart

Overview

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

Equipment with Prescriptive Incentives Currently Available:

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

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

Incentives

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

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

How to Participate

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

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

8.2 Direct Install

Overview

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

Incentives

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

How to Participate

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

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

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

8.3 Combined Heat and Power Program

Overview

One of the goals of the State of New Jersey is to enhance energy efficiency through on-site power generation with recovery and productive use of waste heat, and to reduce existing and new demands to the electric power grid. The Combined Heat & Power (CHP) program provides incentives for eligible CHP or Waste Heat to Power (WHP) projects. Eligible CHP or Waste Heat to Power (WHP) projects must achieve an annual system efficiency of at least 65% (Lower Heating Value - LHV), based on total energy input and total utilized energy output. Mechanical energy may be included in the efficiency evaluation.

Incentives

Eligible Technologies	Size (Installed Rated Capacity)	Incentive ($/kW)	% of Total Cost Cap per Project[3]	$ Cap per Project[3]
Powered by non-renewable or renewable fuel source[4]	≤500 kW	$2,000	30-40%[2]	$2 million
Gas Internal Combustion Engine	>500 kW - 1 MW	$1,000		
Gas Combustion Turbine	> 1 MW - 3 MW	$550	30%	$3 million
Microturbine Fuel Cells with Heat Recovery	>3 MW	$350		
Waste Heat to Power*	<1 MW	$1,000	30%	$2 million
	> 1MW	$500		$3 million

*Waste Heat to Power: Powered by non-renewable fuel source, heat recovery or other mechanical recovery from existing equipment utilizing new electric generation equipment (e.g. steam turbine).

Check the NJCEP website for details on program availability, incentive levels, and requirements.

How to Participate

You work with a qualified developer or consulting firm to complete the CHP Application. Once the application is approved the project can be installed. Information about the CHP program can be found at: www.njcleanenergy.com/CHP.

8.4 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 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.

8.5 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 facility's interconnection to the grid and repair to local power distribution will still reside with the traditional utility company serving your region.

If your facility is not purchasing electricity from a third-party supplier, consider shopping for a reduced rate from third party electric suppliers. If your facility is purchasing electricity from a third-party supplier, review and compare prices at the end of the current contract or every couple of 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 monthly. The utility provides basic gas supply service (BGSS) to customers who choose not to buy from a third-party supplier for natural gas commodity.

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

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

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

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	3	LED Screw-In Lamps: Screw-In: LED (10W) - 1L	Wall Switch	10	2,288	None	No	3	LED Screw-In Lamps: Screw-In: LED (10W) - 1L	Wall Switch	10	2,288	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,288	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,288	0.04	147	0.0	$21.00	$95.13	$20.00	3.58
Boiler Room	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,288	0.08	310	0.0	$44.25	$234.00	$20.00	4.84
Boiler Room	1	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	2,288	Relamp & Reballast	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,288	0.08	310	0.0	$44.25	$161.83	$20.00	3.21
Boiler Room	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Custodial Room 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	520	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	364	0.05	50	0.0	$7.11	$233.00	$20.00	29.97
Elevator Machine Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	520	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	520	0.02	20	0.0	$2.81	$58.50	$10.00	17.25
Custodial Room 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	520	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	520	0.02	20	0.0	$2.81	$58.50	$10.00	17.25
Teacher's Lounge	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,602	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.11	304	0.0	$43.31	$292.50	$50.00	5.60
Teacher's Lounge	13	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Occupancy Sensor	88	1,602	Relamp & Reballast	No	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.50	1,413	0.0	$201.32	$1,521.00	$130.00	6.91
Teacher's Lounge	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Occupancy Sensor	88	1,602	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.04	109	0.0	$15.49	$117.00	$10.00	6.91
CR 200	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.05	219	0.0	$31.27	$117.00	$20.00	3.10
CR 200	10	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.44	1,781	0.0	$253.85	$1,440.00	$135.00	5.14
Men's RR	1	Incandescent: Screw-In: Inc. (60W) - 1L	Wall Switch	60	828	Relamp	No	1	LED Screw-In Lamps: Screw-In: LED (10W) - 1L	Wall Switch	9	828	0.03	49	0.0	$6.92	$53.75	$5.00	7.04
CR 202	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.22	878	0.0	$125.09	$738.00	$115.00	4.98
CR 202	10	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.44	1,781	0.0	$253.85	$1,440.00	$135.00	5.14
CR 203	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.30	1,207	0.0	$172.00	$913.50	$145.00	4.47
CR 203	7	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.31	1,247	0.0	$177.69	$1,089.00	$105.00	5.54
CR 203 Closet	2	Incandescent: Screw-In: Inc. (60W) - 1L	Wall Switch	60	2,288	Relamp	Yes	2	LED Screw-In Lamps: Screw-In: LED (10W) - 1L	Occupancy Sensor	9	1,602	0.07	283	0.0	$40.27	$223.51	$10.00	5.30
CR 204	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.25	987	0.0	$140.72	$796.50	$125.00	4.77
CR 204	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.40	1,603	0.0	$228.46	$1,323.00	$125.00	5.24
CR 205	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.16	658	0.0	$93.82	$621.00	$95.00	5.61
CR 205	12	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.53	2,138	0.0	$304.62	$1,674.00	$155.00	4.99
CR 205	11	Compact Fluorescent: Screw-In: CFL (18W) - 1L	Wall Switch	18	2,288	Relamp	Yes	11	LED Screw-In Lamps: Screw-In: LED (12W) - 1L	Occupancy Sensor	13	1,602	0.07	266	0.0	$37.86	$861.28	$35.00	21.82
Tech Office	4	LED - Fixtures: Ambient 1x4 Fixture	Wall Switch	40	2,288	None	Yes	4	LED - Fixtures: Ambient 1x4 Fixture	Occupancy Sensor	40	1,602	0.03	126	0.0	$18.00	$116.00	$20.00	5.33

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boys RR 1	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,602	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.06	182	0.0	$25.98	$175.50	$30.00	5.60
CR 209	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.30	1,207	0.0	$172.00	$913.50	$145.00	4.47
CR 209	10	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.44	1,781	0.0	$253.85	$1,440.00	$135.00	5.14
CR 210	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.27	1,097	0.0	$156.36	$855.00	$135.00	4.60
CR 210	8	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.36	1,425	0.0	$203.08	$1,206.00	$115.00	5.37
CR 211	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.27	1,097	0.0	$156.36	$855.00	$135.00	4.60
CR 211	8	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.36	1,425	0.0	$203.08	$1,206.00	$115.00	5.37
CR 212	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.25	987	0.0	$140.72	$796.50	$125.00	4.77
CR 212	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.40	1,603	0.0	$228.46	$1,323.00	$125.00	5.24
CR 213	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.25	987	0.0	$140.72	$796.50	$125.00	4.77
CR 213	12	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.53	2,138	0.0	$304.62	$1,674.00	$155.00	4.99
CR 214	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.11	439	0.0	$62.54	$504.00	$75.00	6.86
CR 214	14	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.62	2,494	0.0	$355.39	$1,908.00	$175.00	4.88
CR 215	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.16	658	0.0	$93.82	$621.00	$95.00	5.61
CR 215	12	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.53	2,138	0.0	$304.62	$1,674.00	$155.00	4.99
CR 216	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.08	329	0.0	$46.91	$175.50	$30.00	3.10
CR 216	18	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.80	3,206	0.0	$456.93	$2,646.00	$250.00	5.24
CR 130	18	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,288	Relamp	Yes	18	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,602	0.87	3,476	0.0	$495.40	$2,252.40	$430.00	3.68
CR 130	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
Science Prep Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,288	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,602	0.14	579	0.0	$82.57	$555.40	$95.00	5.58
CR 125	18	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,288	None	Yes	18	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,602	0.21	824	0.0	$117.44	$540.00	$70.00	4.00
CR 125	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR 129	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.30	1,207	0.0	$172.00	$913.50	$145.00	4.47
CR 129	7	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.31	1,247	0.0	$177.69	$1,089.00	$105.00	5.54
CR 128	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.25	987	0.0	$140.72	$796.50	$125.00	4.77

	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 128	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.40	1,603	0.0	$228.46	$1,323.00	$125.00	5.24
CR 126	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.16	658	0.0	$93.82	$621.00	$95.00	5.61
CR 126	12	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.53	2,138	0.0	$304.62	$1,674.00	$155.00	4.99
CR 124	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,288	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,602	0.43	1,738	0.0	$247.70	$1,126.20	$215.00	3.68
Old Computer Lab	7	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,288	Relamp	Yes	7	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,602	0.34	1,352	0.0	$192.66	$935.93	$175.00	3.95
Old Computer Lab	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,288	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.01	46	0.0	$6.52	$0.00	$0.00	0.00
CR 108	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.49	1,975	0.0	$281.45	$1,323.00	$215.00	3.94
CR 109	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,288	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,602	0.43	1,738	0.0	$247.70	$1,126.20	$215.00	3.68
CR 107	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,288	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,602	0.43	1,738	0.0	$247.70	$1,126.20	$215.00	3.68
CR 106	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.49	1,975	0.0	$281.45	$1,323.00	$215.00	3.94
Room 104	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.27	1,097	0.0	$156.36	$855.00	$135.00	4.60
Room 104 Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.03	110	0.0	$15.64	$174.50	$30.00	9.24
Room 104 Office	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.04	178	0.0	$25.38	$117.00	$10.00	4.22
CR 105	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,288	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,602	0.38	1,545	0.0	$220.18	$1,031.07	$195.00	3.80
Garage / Maintenance Office	3	LED Screw-In Lamps: Screw-In: LED (10W) - 1L	Wall Switch	10	2,288	None	Yes	3	LED Screw-In Lamps: Screw-In: LED (10W) - 1L	Occupancy Sensor	10	1,602	0.01	24	0.0	$3.37	$0.00	$0.00	0.00
Garage / Maintenance Office	4	Incandescent: Screw-In: Inc. (60W) - 1L	Wall Switch	60	2,288	Relamp	Yes	4	LED Screw-In Lamps: Screw-In: LED (10W) - 1L	Occupancy Sensor	9	1,602	0.14	565	0.0	$80.54	$485.01	$55.00	5.34
Garage / Maintenance Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,288	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,602	0.05	193	0.0	$27.52	$95.13	$20.00	2.73
Garage / Maintenance Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.03	110	0.0	$15.64	$58.50	$10.00	3.10
Garage / Maintenance Office	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 / Maintenance Office - Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	520	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	364	0.05	44	0.0	$6.26	$211.13	$20.00	30.56
Garage / Maintenance Office	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,288	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,602	0.01	56	0.0	$7.91	$48.20	$10.00	4.83
Garage / Maintenance Office	1	Compact Fluorescent: Screw-In: CFL (28W) - 1L	Wall Switch	28	2,288	Relamp	Yes	1	LED Screw-In Lamps: Scew-In: LED (20W) - 1L	Occupancy Sensor	20	1,602	0.01	38	0.0	$5.35	$53.75	$0.00	10.04
Gymnasium	30	Linear Fluorescent - T8: 4' T8 (32W) - 6L	Wall Switch	176	2,288	Relamp	Yes	30	LED - Linear Tubes: (6) 4' Lamps	Occupancy Sensor	87	1,602	2.26	9,086	0.0	$1,294.74	$10,626.70	$1,950.00	6.70
Gymnasium	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
Girls Locker Room Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.03	110	0.0	$15.64	$174.50	$30.00	9.24

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Girls Locker Room Office	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.04	178	0.0	$25.38	$117.00	$10.00	4.22
Girls Locker Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.16	658	0.0	$93.82	$621.00	$95.00	5.61
Girls Locker Room	6	Incandescent: Screw-In: Inc. (60W) - 1L	Wall Switch	60	2,288	Relamp	Yes	6	LED Screw-In Lamps: Screw-In: LED (10W) - 1L	Occupancy Sensor	9	1,602	0.21	848	0.0	$120.81	$592.52	$65.00	4.37
Girls Locker Room	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Girls Locker Room	5	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	5	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,602	0.13	512	0.0	$72.93	$316.00	$0.00	4.33
Womens RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.03	110	0.0	$15.64	$174.50	$10.00	10.52
Womens RR	1	Incandescent: Screw-In: Inc. (60W) - 2L	Wall Switch	120	2,288	Relamp	Yes	1	LED Screw-In Lamps: Screw-In: LED (10W) - 2L	Occupancy Sensor	18	1,602	0.07	283	0.0	$40.27	$107.51	$10.00	2.42
Gym Storage 1	2	Incandescent: Screw-In: Inc. (60W) - 1L	Wall Switch	60	520	Relamp	Yes	2	LED Screw-In Lamps: Screw-In: LED (10W) - 1L	Occupancy Sensor	9	364	0.07	64	0.0	$9.15	$223.51	$10.00	23.33
Gym Exterior Entry 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,288	0.02	87	0.0	$12.37	$58.50	$10.00	3.92
Gym Exterior Entry 1	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 Exterior Entry 2	1	Incandescent: Screw-In: Inc. (60W) - 1L	Wall Switch	60	2,288	Relamp	No	1	LED Screw-In Lamps: Screw-In: LED (10W) - 1L	Wall Switch	9	2,288	0.03	134	0.0	$19.12	$53.75	$5.00	2.55
Gym Exterior Entry 2	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Gym Storage 2	2	Incandescent: Screw-In: Inc. (60W) - 1L	Wall Switch	60	520	Relamp	Yes	2	LED Screw-In Lamps: Screw-In: LED (10W) - 1L	Occupancy Sensor	9	364	0.07	64	0.0	$9.15	$223.51	$10.00	23.33
Boys Locker Room	8	Incandescent: Screw-In: Inc. (60W) - 1L	Wall Switch	60	2,288	Relamp	Yes	8	LED Screw-In Lamps: Screw-In: LED (10W) - 1L	Occupancy Sensor	9	1,602	0.28	1,130	0.0	$161.08	$700.02	$75.00	3.88
Boys Locker Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.16	658	0.0	$93.82	$621.00	$95.00	5.61
Boys Locker Room	5	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	5	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,602	0.13	512	0.0	$72.93	$586.00	$35.00	7.56
Boys Locker Room Office	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.09	356	0.0	$50.77	$350.00	$40.00	6.11
Boys Locker Room Office Storage Room	1	Incandescent: Screw-In: Inc. (60W) - 1L	Wall Switch	60	520	Relamp	Yes	1	LED Screw-In Lamps: Screw-In: LED (10W) - 1L	Occupancy Sensor	9	364	0.04	32	0.0	$4.58	$169.75	$5.00	36.00
Mens Locker Room (Staff)	1	LED Screw-In Lamps: Screw-In: LED (10W) - 1L	Wall Switch	10	2,288	None	No	1	LED Screw-In Lamps: Screw-In: LED (10W) - 1L	Wall Switch	10	2,288	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mens Locker Room RR (Staff)	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	828	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	828	0.02	31	0.0	$4.48	$58.50	$10.00	10.83
Weight Room	6	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.27	1,069	0.0	$152.31	$972.00	$95.00	5.76
Boys RR 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,602	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.04	122	0.0	$17.32	$117.00	$20.00	5.60
Boys RR 2	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	1,602	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,602	0.02	53	0.0	$7.61	$63.20	$0.00	8.30
Girls RR	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,602	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.04	122	0.0	$17.32	$117.00	$20.00	5.60
Girls RR	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	1,602	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,602	0.02	53	0.0	$7.61	$63.20	$0.00	8.30

	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
2	30	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	30	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.82	3,292	0.0	$469.08	$2,295.00	$370.00	4.10
CR 110 (Music) Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.03	110	0.0	$15.64	$58.50	$10.00	3.10
CR 110 (Music) Storage	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.09	356	0.0	$50.77	$504.00	$20.00	9.53
CR 111 (Art)	22	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,288	Relamp	Yes	22	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,602	0.90	3,621	0.0	$515.99	$2,194.40	$400.00	3.48
Storage 112	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	520	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	364	0.16	150	0.0	$21.32	$467.00	$60.00	19.09
Stage Area	6	LED Screw-In Lamps: Screw-In: LED (10W) - 1L	Wall Switch	10	2,288	None	No	6	LED Screw-In Lamps: Screw-In: LED (10W) - 1L	Wall Switch	10	2,288	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Stage Storage 1	1	Incandescent: Screw-In: Inc. (60W) - 1L	Wall Switch	60	520	Relamp	No	1	LED Screw-In Lamps: Screw-In: LED (10W) - 1L	Wall Switch	9	520	0.03	30	0.0	$4.35	$53.75	$5.00	11.22
Stage Storage 2	1	Incandescent: Screw-In: Inc. (60W) - 1L	Wall Switch	60	520	Relamp	No	1	LED Screw-In Lamps: Screw-In: LED (10W) - 1L	Wall Switch	9	520	0.03	30	0.0	$4.35	$53.75	$5.00	11.22
Stage Area	8	Halogen Incandescent: Elipsoidal: (1000W) - 1L	Wall Switch	1,000	24	None	No	8	Halogen Incandescent: Elipsoidal: (1000W) - 1L	Wall Switch	1,000	24	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cafeteria	25	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	25	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.68	2,743	0.0	$390.90	$2,002.50	$320.00	4.30
Cafeteria	10	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.44	1,781	0.0	$253.85	$1,440.00	$135.00	5.14
Cafeteria	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
CR 134	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,288	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,602	0.45	1,810	0.0	$257.99	$1,097.20	$200.00	3.48
Wood Shop	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.49	1,975	0.0	$281.45	$1,593.00	$250.00	4.77
Wood Shop	11	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.49	1,959	0.0	$279.23	$1,557.00	$145.00	5.06
Wood Shop	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,288	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,602	0.10	386	0.0	$55.04	$190.27	$40.00	2.73
Wood Shop	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
Wood Shop Storage	4	Incandescent: Screw-In: Inc. (60W) - 1L	Wall Switch	60	520	Relamp	Yes	4	LED Screw-In Lamps: Screw-In: LED (10W) - 1L	Occupancy Sensor	9	364	0.14	128	0.0	$18.30	$331.01	$20.00	16.99
Wood Shop RR	2	Incandescent: Screw-In: Inc. (60W) - 1L	Wall Switch	60	828	Relamp	Yes	2	LED Screw-In Lamps: Screw-In: LED (10W) - 1L	Occupancy Sensor	9	580	0.07	102	0.0	$14.57	$223.51	$10.00	14.65
Faculty RR	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	828	None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	828	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Main Office	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Main Office	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,288	None	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.03	137	0.0	$19.57	$270.00	$0.00	13.79
Main Office	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,288	None	Yes	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,602	0.01	40	0.0	$5.74	$0.00	$0.00	0.00
Copy Room	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,288	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.01	46	0.0	$6.52	$116.00	$20.00	14.71
Lunch Room	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,288	None	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.02	69	0.0	$9.79	$116.00	$0.00	11.85

	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
VP Office	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,288	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.02	92	0.0	$13.05	$116.00	$20.00	7.36
Principal's Office	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,288	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.02	92	0.0	$13.05	$116.00	$20.00	7.36
Guidance Office	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,288	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.02	92	0.0	$13.05	$116.00	$20.00	7.36
Nurse's Office	6	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,288	None	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,602	0.07	275	0.0	$39.15	$270.00	$35.00	6.00
Nurse's Office RR	1	LED Screw-In Lamps: Screw-In: LED (10W) - 2L	Wall Switch	20	828	None	No	1	LED Screw-In Lamps: Screw-In: LED (10W) - 2L	Wall Switch	20	828	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Nurse's Office Entry Room	1	LED - Linear Tubes: (4) 2' Lamps	Wall Switch	34	2,288	None	No	1	LED - Linear Tubes: (4) 2' Lamps	Wall Switch	34	2,288	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR 102	8	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,288	None	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,602	0.09	366	0.0	$52.19	$270.00	$35.00	4.50
CR 103	6	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,288	None	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,602	0.07	275	0.0	$39.15	$270.00	$35.00	6.00
Mens RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	828	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	580	0.03	40	0.0	$5.66	$174.50	$10.00	29.07
Womens RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.03	110	0.0	$15.64	$174.50	$10.00	10.52
Media Center	39	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,288	None	No	39	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,288	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Media Center	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
Media Center Conference Room	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,288	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.02	92	0.0	$13.05	$270.00	$0.00	20.69
Media Center Conference Room	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,288	None	Yes	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,602	0.01	27	0.0	$3.82	$0.00	$0.00	0.00
Media Center Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.03	110	0.0	$15.64	$58.50	$10.00	3.10
Media Center Office	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.09	356	0.0	$50.77	$350.00	$40.00	6.11
CR 120	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.19	768	0.0	$109.45	$679.50	$105.00	5.25
CR 120	11	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.49	1,959	0.0	$279.23	$1,557.00	$145.00	5.06
CR 119	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.22	878	0.0	$125.09	$738.00	$115.00	4.98
CR 119	10	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.44	1,781	0.0	$253.85	$1,440.00	$135.00	5.14
Hallway: Gym to 121	21	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,080	Relamp	Yes	21	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,156	0.57	3,102	0.0	$442.02	$1,828.50	$210.00	3.66
Hallway: Gym to 121	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway: Gym to 121	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,080	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	2,156	0.10	520	0.0	$74.10	$190.27	$40.00	2.03
Hallway: 129 to Media Center	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,080	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,156	0.55	2,954	0.0	$420.97	$1,770.00	$200.00	3.73
Hallway: 129 to Media Center	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

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Hallway: Media Center Lobby	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,080	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,156	0.16	886	0.0	$126.29	$551.00	$60.00	3.89
Hallway: Media Center Lobby	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway: Media Center Exterior Enry Area	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,080	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	2,156	0.10	520	0.0	$74.10	$390.27	$40.00	4.73
Director of Curriculum Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,288	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,602	0.19	773	0.0	$110.09	$496.53	$100.00	3.60
Director of Curriculum Office RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	828	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	828	0.02	31	0.0	$4.48	$58.50	$10.00	10.83
Hallway: Front Section	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,080	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	2,156	0.05	276	0.0	$39.27	$126.40	$0.00	3.22
Hallway: Front Section	5	U-Bend Fluorescent - T12: U T12 (34W) - 2L	Wall Switch	72	3,080	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	2,156	0.16	866	0.0	$123.41	$785.00	$0.00	6.36
Hallway: Front Section	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,080	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	2,156	0.10	520	0.0	$74.10	$190.27	$40.00	2.03
Main Entry Lobby	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,602	0.16	658	0.0	$93.82	$551.00	$60.00	5.23
Main Entry Lobby	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Main Entry Foyer	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,288	0.04	174	0.0	$24.75	$117.00	$20.00	3.92
110 / 111 Hallway	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,288	0.11	434	0.0	$61.87	$292.50	$50.00	3.92
Stairwell (Elevator Area)	1	Exit Signs: Incandescent	None	40	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.02	343	0.0	$48.81	$107.56	$0.00	2.20
Stairwell (Elevator Area)	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,602	0.11	439	0.0	$62.54	$434.00	$40.00	6.30
Hallway: 2nd Floor	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
Hallway: 2nd Floor	17	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,080	Relamp	Yes	17	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,156	0.46	2,511	0.0	$357.82	$1,594.50	$170.00	3.98
Stairwell	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,602	0.11	439	0.0	$62.54	$434.00	$40.00	6.30
Music Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.08	329	0.0	$46.91	$291.50	$50.00	5.15
Band Room	17	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,288	None	Yes	17	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.10	389	0.0	$55.46	$540.00	$70.00	8.48
Band Room	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Practice Room 1	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,288	0.04	155	0.0	$22.12	$117.00	$10.00	4.84
Practice Room 2	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,288	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,288	0.04	155	0.0	$22.12	$117.00	$10.00	4.84
Instrument Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,288	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.05	219	0.0	$31.27	$233.00	$20.00	6.81
Admin Office Entry Area	1	LED - Linear Tubes: (2) 2' Lamps	None	17	2,288	None	No	1	LED - Linear Tubes: (2) 2' Lamps	None	17	2,288	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Office RR	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	828	None	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	828	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
Admin Offices	7	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,288	None	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.04	160	0.0	$22.84	$540.00	$70.00	20.58
Admin Office BA Office	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,288	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.02	92	0.0	$13.05	$116.00	$0.00	8.89
Admin Office Conference/Break Room	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,288	None	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.02	69	0.0	$9.79	$270.00	$0.00	27.59
Admin Office Conference/Break Room	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,288	None	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,602	0.00	13	0.0	$1.91	$0.00	$0.00	0.00
Admin Office Superintendant Office	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,288	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.02	92	0.0	$13.05	$116.00	$0.00	8.89
Admin Office Superintendant Office Storage	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	520	None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	520	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Office Superintendant Office RR	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,602	None	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,602	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Office - Currey	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,288	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,602	0.02	92	0.0	$13.05	$116.00	$0.00	8.89
Basement Storage	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	520	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	364	0.40	364	0.0	$51.92	$1,323.00	$90.00	23.75
Basement Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	520	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	364	0.05	44	0.0	$6.26	$95.13	$20.00	12.01
Basement Storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	520	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	364	0.08	75	0.0	$10.66	$445.50	$30.00	38.97
Basement Storage	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
Basement Storage	14	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	520	Relamp & Reballast	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	364	0.62	567	0.0	$80.77	$2,178.00	$140.00	25.23
Basement Storage	1	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	520	Relamp & Reballast	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	364	0.09	81	0.0	$11.54	$161.83	$20.00	12.29
Building Exterior	4	High-Pressure Sodium: (1) 250W Lamp	Wall Switch	295	4,380	Fixture Replacement	No	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	89	4,380	0.54	4,161	0.0	$592.91	$1,562.71	$400.00	1.96
Building Exterior	1	LED - Fixtures: Outdoor Post-Mount	Daylight Dimming	58	4,015	None	No	1	LED - Fixtures: Outdoor Post-Mount	Daylight Dimming	58	4,015	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Building Exterior	1	LED Screw-In Lamps: Screw-In: LED (10W) - 2L	Wall Switch	10	4,380	None	No	1	LED Screw-In Lamps: Screw-In: LED (10W) - 2L	Wall Switch	10	4,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Building Exterior	1	High-Pressure Sodium: (1) 70W Lamp	Wall Switch	95	4,380	Fixture Replacement	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	29	4,380	0.04	335	0.0	$47.73	$390.68	$100.00	6.09
Building Exterior	3	Compact Fluorescent: Wall Pack: CFL (36W) - 1L	Wall Switch	36	4,380	Fixture Replacement	No	3	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	25	4,380	0.02	163	0.0	$23.26	$1,172.03	$300.00	37.50
Building Exterior	3	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	58	4,015	None	No	3	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	58	4,015	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Building Exterior	3	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	30	4,015	None	No	3	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	30	4,015	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Building Exterior	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	41	4,015	None	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	41	4,015	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Building Exterior	9	Incandescent: Screw-In: Inc. (60W) - 1L	Wall Switch	60	4,380	Relamp	No	9	LED Screw-In Lamps: Screw-In: LED (10W) - 1L	Wall Switch	9	4,380	0.30	2,312	0.0	$329.47	$483.78	$45.00	1.33
Exterior Pole Lights	3	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Wall Switch	58	4,380	None	No	3	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Wall Switch	58	4,380	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
Boiler Room	Heating Distribution	1	Heating Hot Water Pump	10.0	89.5%	No	3,391	Yes	91.7%	Yes	1	1.33	12,458	0.0	$1,775.32	$10,750.00	$0.00	6.06
Boiler Room	Heating Distribution	1	Heating Hot Water Pump	10.0	89.5%	No	0	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	DHW recirc	1	Process Pump	0.1	70.0%	No	5,490	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	DHW recirc	1	Process Pump	0.3	70.0%	No	5,490	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classrooms/Offices	Unit Ventilators	30	Supply Fan	0.5	75.0%	No	3,120	No	75.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Offices	Offices	4	Supply Fan	0.5	75.0%	No	2,745	No	75.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Elevator Machine Room	Elevator Machine Room - Unit Heater	1	Supply 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
Basement Storage	Basement Storage - Unit Heaters	2	Supply 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	Whole Building	20	Exhaust Fan	0.5	75.0%	No	2,745	No	75.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Gym Ceiling	Gym	2	Supply Fan	1.0	84.0%	No	1,647	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Gym Ceiling	Gym	2	Return Fan	0.5	78.0%	No	1,647	No	78.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	Woodshop / Tech Room	1	Split-System AC	2.92		Yes	1	Split-System AC	2.92		14.00		No	0.58	976	0.0	$139.02	$4,368.96	$268.64	29.50
Roof	Admin Office	1	Packaged AC	7.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Main Office	1	Packaged AC	7.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Server Room / IT	1	Ductless Mini-Split HP	3.56	45.20	Yes	1	Ductless Mini-Split HP	3.56	45.20	18.00	3.80	No	0.79	1,902	0.0	$271.01	$8,541.08	$327.52	30.31
Offices	Offices (4)	4	Packaged Air-Source HP	2.00	12.00	Yes	1	Packaged Air-Source HP	2.00	12.00	14.00	3.80	No	6.00	8,298	0.0	$1,182.46	$4,537.92	$184.00	3.68
Whole Building	Various Rooms	15	Window AC	1.00		Yes	15	Window AC	1.00		12.00		No	2.01	3,393	0.0	$483.52	$16,331.40	$0.00	33.78

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Whole Building	1	Non-Condensing Hot Water Boiler	4,163.00	Yes	1	Non-Condensing Hot Water Boiler	4,163.00	85.00%	Ec	0.00	0	82.5	$679.91	$71,334.35	$0.00	104.92
Boiler Room	Whole Building	1	Non-Condensing Hot Water Boiler	4,163.00	Yes	1	Non-Condensing Hot Water Boiler	4,163.00	85.00%	Ec	0.00	0	82.5	$679.91	$71,334.35	$0.00	104.92
Roof	Admin Offices	1	Furnace	120.00	Yes	1	Furnace	120.00	95.00%	AFUE	0.00	0	6.4	$52.61	$2,718.88	$400.00	44.08
Roof	Main Office, Copy Room, Guidance Office, Principal's Office, Nurse's Office	1	Furnace	120.00	Yes	1	Furnace	120.00	95.00%	AFUE	0.00	0	6.4	$52.61	$2,718.88	$400.00	44.08

DHW Inventory & Recommendations

		Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Whole Building	1	Storage Tank Water Heater (> 50 Gal)	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	70	Desktop computers	150.0	Yes
Whole Building	20	Projectors	100.0	Yes
Whole Building	20	Smartboards	50.0	Yes
Whole Building	32	Desk Printers	40.0	Yes
Whole Building	6	Photocopiers	600.0	Yes
Whole Building	5	CRT TVs	120.0	Yes
Whole Building	10	LCD TVs	71.0	Yes
Whole Building	15	Laptop Computers	45.0	Yes
Whole Building	2	Paper Shredder	150.0	Yes
Whole Building	6	Refrigerators	172.0	Yes
Whole Building	1	Mini Fridge	153.0	Yes
Whole Building	6	Microwave	800.0	Yes
Whole Building	3	Toaster Ovens	1,100.0	Yes
Whole Building	2	Water Cooler/Heater	500.0	Yes
Whole Building	484	Chromebook Laptops	35.0	Yes

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Cafeteria	1	Refrigerated	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cafeteria	1	Non-Refrigerated	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

80

ENERGY STAR® Score[1]

Fieldstone Middle School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 89,640
Built: 1966

For Year Ending: September 30, 2017
Date Generated: May 17, 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
Fieldstone Middle School 47 Spring Valley Road Montvale, New Jersey 07645	Montvale School District 47 Spring Valley Road Montvale, NJ 07645 201-391-6226	Andrea Wasserman 47 Spring Valley Road Montvale, NJ 07645 201-391-6226 awasserman@montvalek8.org

Property ID: 6264191

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
55.6 kBtu/ft²

Source EUI
86.9 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	3,766,094 (76%)
Electric - Grid (kBtu)	1,221,487 (24%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	76.7
National Median Source EUI (kBtu/ft²)	119.8
% Diff from National Median Source EUI	-28%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	260

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)