Local Government Energy Audit:
Energy Audit Report

Thurgood Marshall

Elementary School

Asbury Park Board of Education

600 Monroe Ave.

Asbury Park, New Jersey 07712

October 11, 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 saving are included in this report to help make decisions about reducing energy use at the facility. This report, however, is not intended to serve as a detailed engineering design document. Further design and analysis may be necessary in order to implement some of the measures recommended in this report.

The energy conservation measures and estimates of energy savings have been reviewed for technical accuracy. However, estimates of final energy savings are not guaranteed, because final savings may depend on behavioral factors and other uncontrollable variables. TRC 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.

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1 EXECUTIVE SUMMARY

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

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

This study was conducted by TRC Energy Services (TRC), as part of a comprehensive effort to assist New Jersey schools in controlling energy costs and help protect our environment by reducing energy usage statewide.

1.1 Facility Summary

Thurgood Marshall Elementary School is a 94,025 square foot public school. The main building has three floors. It was constructed in 1996. A single story addition was added to the western end of the building in 2005. The building contains various space types including: classrooms, offices, gyms, a library, restrooms, and mechanical spaces. Interior lighting consists primarily of T8 linear fluorescent fixtures, which are considered inefficient by current lighting standards. The buildings also has fixtures containing compact fluorescent and incandescent bulbs. The exterior is lit primarily by high intensity discharge (HID) lamps.

The entire facility is heated and cooled. Water source heat pumps condition classrooms and rooftop air conditioning units with hot water reheat coils serve the rest of the building. Modular hot water boilers serve the hot water coils, provide domestic hot water, and ensure that the closed water source loop has sufficient heat throughout the winter. A cooling tower rejects heat from the closed water source loop during the summer.

A thorough description of the facility and our observations are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated 13 measures which together represent an opportunity for Thurgood Marshall Elementary School to reduce its annual energy costs by about $38,840 and its annual greenhouse gas emissions by 360,660 lbs CO_2e. We estimate that if all measures are implemented as recommended, the project would likely pay for itself in energy savings alone in about 5.4 years. The breakdown of current costs is shown in Figure 1. The estimated savings following project implementation is shown Figure 2 below. Together these measures represent an opportunity to reduce Thurgood Marshall Elementary School's total annual energy use by about 19.5% overall.

Figure 1 – Previous 12 Month Utility Costs

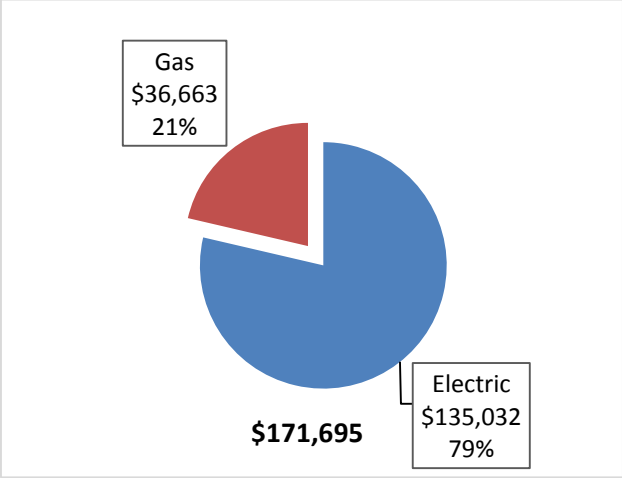
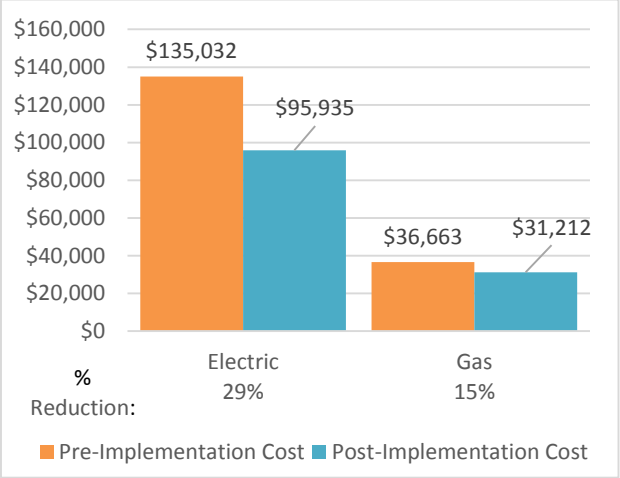


Figure 2 – Potential Post-Implementation Costs



A detailed description of Thurgood Marshall Elementary School's existing energy use can be found in Section 3.

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

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**176,761**	**37.9**	**0.0**	**$20,859.46**	**$101,610.74**	**$18,595.00**	**$83,015.74**	**4.0**	**177,997**
ECM 1	Install LED Fixtures	Yes	27,244	3.7	0.0	$3,215.07	$15,275.11	$3,200.00	$12,075.11	3.8	27,435
ECM 2	Retrofit Fixtures with LED Lamps	Yes	145,397	33.9	0.0	$17,158.16	$79,989.88	$15,395.00	$64,594.88	3.8	146,413
ECM 3	Install LED Exit Signs	Yes	4,120	0.3	0.0	$486.23	$6,345.75	$0.00	$6,345.75	13.1	4,149
Lighting Control Measures			**33,763**	**7.8**	**0.0**	**$3,984.29**	**$44,758.00**	**$5,070.00**	**$39,688.00**	**10.0**	**33,999**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	31,396	7.6	0.0	$3,705.03	$42,328.00	$5,070.00	$37,258.00	10.1	31,616
ECM 5	Install High/Low Lighitng Controls	Yes	2,366	0.2	0.0	$279.25	$2,430.00	$0.00	$2,430.00	8.7	2,383
Motor Upgrades			**458**	**0.1**	**0.0**	**$54.02**	**$1,343.55**	**$0.00**	**$1,343.55**	**24.9**	**461**
ECM 6	Premium Efficiency Motors	Yes	458	0.1	0.0	$54.02	$1,343.55	$0.00	$1,343.55	24.9	461
Variable Frequency Drive (VFD) Measures			**39,190**	**2.2**	**0.0**	**$4,624.72**	**$12,609.20**	**$900.00**	**$11,709.20**	**2.5**	**39,464**
ECM 7	Install VFDs on Hot Water Pumps	Yes	21,326	2.2	0.0	$2,516.63	$7,414.75	$0.00	$7,414.75	2.9	21,475
ECM 8	Install VFDs on Cooling Tower Fans	Yes	17,864	0.0	0.0	$2,108.10	$5,194.45	$900.00	$4,294.45	2.0	17,989
Electric Unitary HVAC Measures			**2,228**	**1.2**	**0.0**	**$262.87**	**$7,107.05**	**$437.00**	**$6,670.05**	**25.4**	**2,243**
ECM 9	Install High Efficiency Electric AC	Yes	2,228	1.2	0.0	$262.87	$7,107.05	$437.00	$6,670.05	25.4	2,243
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**376.0**	**$3,167.95**	**$57,608.21**	**$8,000.00**	**$49,608.21**	**15.7**	**44,023**
ECM 10	Install High Efficiency Hot Water Boilers	Yes	0	0.0	376.0	$3,167.95	$57,608.21	$8,000.00	$49,608.21	15.7	44,023
HVAC System Improvements			**28,578**	**0.0**	**161.4**	**$4,732.46**	**$16,493.50**	**$0.00**	**$16,493.50**	**3.5**	**47,677**
ECM 11	Install Programmable Thermostats	Yes	28,578	0.0	161.4	$4,732.46	$16,493.50	$0.00	$16,493.50	3.5	47,677
Domestic Water Heating Upgrade			**0**	**0.0**	**109.6**	**$923.18**	**$468.51**	**$0.00**	**$468.51**	**0.5**	**12,829**
ECM 12	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	109.6	$923.18	$468.51	$0.00	$468.51	0.5	12,829
Plug Load Equipment Control - Vending Machine			**1,954**	**0.0**	**0.0**	**$230.63**	**$460.00**	**$0.00**	**$460.00**	**2.0**	**1,968**
ECM 13	Vending Machine Control	Yes	1,954	0.0	0.0	$230.63	$460.00	$0.00	$460.00	2.0	1,968
TOTALS			**282,931**	**49.2**	**647.0**	**$38,839.56**	**$242,458.76**	**$33,002.00**	**$209,456.76**	**5.4**	**360,660**

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

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

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

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

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

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

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

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

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

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

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

Energy Efficient Practices

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

- Ensure Lighting Controls Are Operating Properly
- Turn Off Unneeded Motors
- Perform Routine Motor Maintenance
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Clean and/or Replace HVAC Filters
- Install Plug Load Controls
- 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 Thurgood Marshall Elementary School. Based on the configuration of the site and its electric load there appears to be a high potential for cost-effective installation of a rooftop solar photovoltaic (PV) array.

Figure 4 – Photovoltaic Potential

Potential	High	
System Potential	231	kW DC STC
Electric Generation	275,206	kWh/yr
Displaced Cost	$23,940	/yr
Installed Cost	$600,600	

For details on our evaluation of the building's on-site generation potential, please see Section 6.

1.3 Implementation Planning

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

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

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

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

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

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

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

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

Additional information on relevant incentive programs is located in Section 8 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			
Walter Sosa	Buildings and Grounds Supervisor	sosaw@asburypark.k12.nj.us	(732) 776 2663 x2851
Geoffrey Hastings	Business Administrator	hastingsg@asburypark.k12.nj.us	(732) 776 2606 x2426
TRC Energy Services			
Tom Page	Auditor	TPage@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On July 28, 2017, TRC performed an energy audit at Thurgood Marshall Elementary School located in Asbury Park, New Jersey. TRC's team met with Walter Sosa to review the facility operations and help focus our investigation on specific energy-using systems.

Thurgood Marshall Elementary School is a 94,025 square foot public school. The main building has three floors. It was constructed in 1996. A single story addition was added to the western end of the building in 2005. The building contains various space types including: classrooms, offices, gyms, a library, restrooms, and mechanical spaces. Interior lighting consists primarily of T8 linear fluorescent fixtures, which are considered inefficient by current lighting standards. The buildings also has fixtures containing compact fluorescent and incandescent bulbs. The exterior is lit primarily by high intensity discharge (HID) lamps.

The entire facility is heated and cooled. Water source heat pumps condition classrooms and rooftop air conditioning units with hot water reheat coils serve the rest of the building. Modular hot water boilers serve the hot water coils, provide domestic hot water, and ensure that the closed water source loop has sufficient heat throughout the winter. A cooling tower rejects heat from the closed water source loop during the summer.

2.3 Building Occupancy

The school building is typically open Monday through Friday, September through June. The typical occupancy schedule is presented in the table below. The school is used approximately 44 weeks per year and closed throughout the summer. During a typical school day, the building is occupied by approximately 575 staff and students.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Thurgood Marshall Elementary School	Weekday	7:30 AM - 4:00 PM
Thurgood Marshall Elementary School	Weekend	Closed

2.4 Building Envelope

The building is constructed of concrete block with a façade of brick and concrete. The building has a flat roof. The roof of older section of the building is covered with a black membrane. The newer section of the building has a white bitumen roof. The building has double paned, operable windows throughout. The exterior doors are constructed of double-paned glass with aluminum frames. All door and window seals appeared tight with no evidence of excessive air infiltration anywhere.

2.5 On-Site Generation

Thurgood Marshall Elementary School has a 125-kW GENERAC gas-fired backup generator on site. Energy usage for the generator is negligible, because it is only used in case of emergency power outages. It typically runs only a few hours per year for required testing.

2.6 Energy-Using Systems

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

Lighting System

Lighting is provided almost mostly by 32-Watt linear fluorescent T8 lamps with electronic ballasts. Most of the fixtures are 2-lamp or 3-lamp 4-foot long troffers with diffusers, though there are also 1-lamp and 4-lamp 4-foot fixtures and some 2-foot U-bend tubes as well. The lighting in gym room was converted to 6-lamp T5 fluorescent fixtures a few years ago. The buildings also has some fixtures with compact fluorescent lamps (CFLs) and a few incandescent bulbs remaining as well. Lighting control throughout the building is provided almost exclusively by manually operated wall switches.

Most of the building's exit signs are lit by LEDs, but there are a few older signs lit by CFLs.



Exterior lighting is provided by fixtures with high-pressure sodium lamps. These fixtures illuminate the building perimeter, playground area, and parking lot. The exterior security lighting is controlled by time clocks or photocells.


Hot Water Heating System

The hot water system consists of eight Hydrotherm 300 kBtu/hr output, natural draft hot water boilers. The boilers are roughly 20 years old. Their combustion efficiency is assumed as 80%. The boilers are configured in a constant flow primary distribution loop with three hot water pumps (10 hp, 7.5 hp and 1.5 hp) that serve different hot water loops. The boilers provide hot water to the hot water coils throughout the school, add heat to the water source heat pump loop, and provide domestic hot water through a heat exchanger.

The boilers stay on as needed to server the building load. Based on historic fuel usage, it appears that the boilers operate year round.


Direct Expansion Air Conditioning System (DX)

There are approximately 42 water-source heat pump units (WSHPs) supplying heating, cooling, and ventilation; primarily to classrooms. A majority of the units are located in mechanical closets distributed throughout the building. As needed, heat is added to the closed water loop by the boiler or removed with a cooling tower. The WSHPs are constant air volume units with a single ½ hp supply fan and no return fan. All of the WSHPs use direct-expansion (DX) coils. The WSHPs utilize either scroll or reciprocating compressors depending on the model and age of the unit.

Seven direct-expansion (DX) package units are used to condition areas not served by the heat pumps. The units vary in size between five and 20 tons of cooling, with a total cooling capacity of over 80 tons. Hot water coils in the zones reheat the air as needed to temper or provide heating during the winter. The units appear to have outside air economizers, but it is unknown if they are used or are functioning properly. All of the units are located on the roof of the building.


The school also has six energy recovery ventilation units that exhaust air form the building and provide outside air make-up. Heat wheels in the units condition the outside air by transferring heat between the exhaust air and the make-up air. During the winter this provides heat and during the summer this provides cooling.

All of the HVAC units are controlled by individual thermostats located in zones.

Domestic Hot Water Heating System

The domestic water heating for the facility is provided through a heat exchanger with the main Hydrotherm modular boilers described above.

Food Service

The school has a small kitchen that is primarily used to heat pre-prepared lunches for the students and staff. The kitchen has a four half size convection ovens, a three pan electric steamer, various refrigerators, and an ice maker. The kitchen is also equipped with a small gas griddle and two steam kettles.

Building Plug Load

There are roughly 506 computer work stations throughout the school. The computers are desktop units with LCD monitors. Two server racks were also observed. There is no centralized PC power management software installed.

In addition to the typical class room and office equipment, we observed multiple microwaves, refrigerators, and two vending machines.

2.7 Water-Using Systems

There are 31 restrooms at this facility. A sampling of restrooms found that most of the faucets are rated for 2.2 gallons per minute (gpm) or higher. Kitchen sinks were also found to have higher flow faucets. Adding faucet aerators to restrooms and pre-rinse spray valves to kitchen sinks is a very low cost measure to reduce hot water energy usage.

Toilets and urinals all appeared to meet low-flow water conservation standards.

3 SITE ENERGY USE AND COSTS

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

3.1 Total Cost of Energy

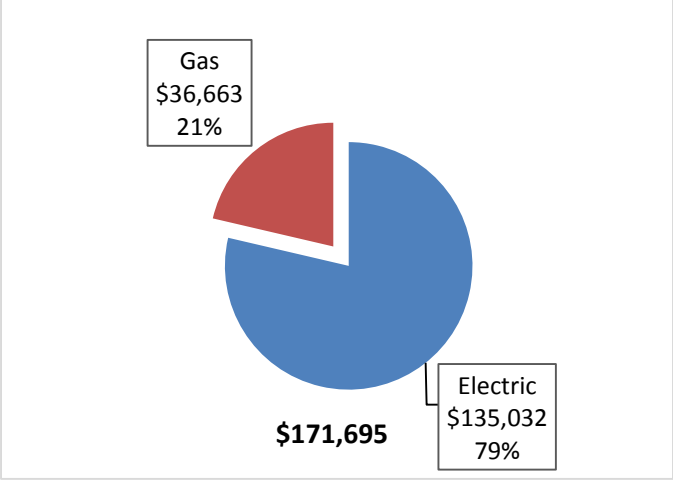
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 7 - Utility Summary

Utility Summary for Thurgood Marshall Elementary School		
Fuel	**Usage**	**Cost**
Electricity	1,144,250 kWh	$135,032
Natural Gas	43,513 Therms	$36,663
Total		**$171,695**

The current annual energy cost for this facility is $171,695 as shown in the chart below.

Figure 8 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by JCP&L. The average electric rate over a recent 12 month period was found to be $0.118/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The monthly electricity consumption and peak demand are shown in the chart below.

The electric use during the summer is much higher than is typical for a building that is closed during those months. The shape of the peak electric load graph is indicative of cooling during the summer. School buildings are often partially occupied in the summer months for routine construction and maintenance. However, care should be taken to limit energy usage during low occupancy months.

Figure 9 - Electric Usage & Demand

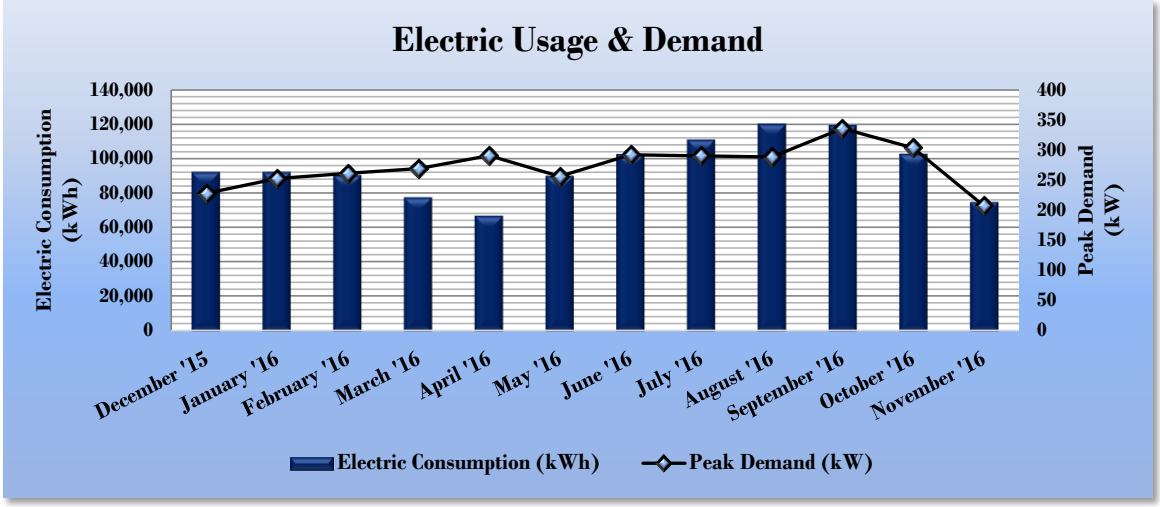


Figure 10 - Electric Usage & Demand

Electric Billing Data for Thurgood Marshall Elementary School				
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Total Electric Cost
12/28/15	33	92,000	228	$10,296
1/27/16	30	92,160	252	$10,448
2/25/16	29	90,240	261	$10,406
3/25/16	29	77,440	269	$9,099
4/22/16	28	66,720	291	$8,208
5/24/16	32	89,820	256	$10,396
6/23/16	30	102,400	292	$11,936
7/25/16	32	110,720	290	$13,322
8/24/16	30	120,000	288	$14,180
9/23/16	30	119,200	336	$14,630
10/25/16	32	102,560	303	$12,410
11/22/16	28	74,720	208	$8,962
Totals	**363**	**1,137,980**	**336**	**$134,292**
Annual	**365**	**1,144,250**	**336**	**$135,032**

3.3 Natural Gas Usage

Natural gas is provided by NJ Natural Gas. The average rate for natural gas service for a recent 12 month period was found to be $0.843/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below.

Figure 11 - Natural Gas Usage

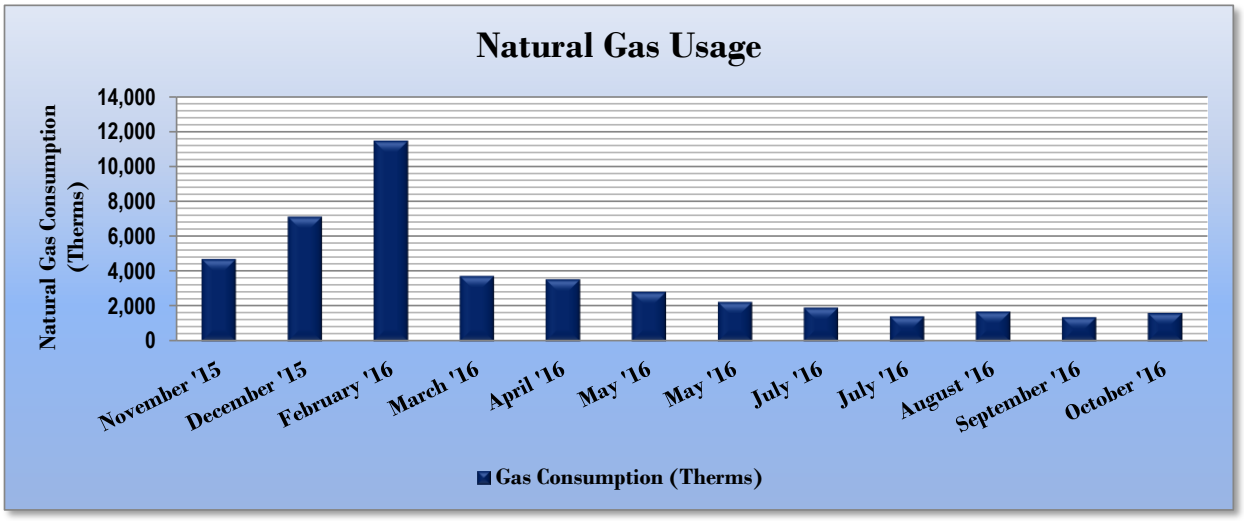


Figure 12 - Natural Gas Usage

Gas Billing Data for Thurgood Marshall Elementary School			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
12/14/15	33	4,695	$3,854
1/14/16	31	7,119	$5,677
2/17/16	34	11,452	$8,805
3/17/16	29	3,723	$3,019
4/18/16	32	3,534	$2,866
5/16/16	28	2,826	$2,404
6/15/16	30	2,250	$2,012
7/18/16	33	1,925	$1,857
8/15/16	28	1,423	$1,441
9/13/16	29	1,695	$1,575
10/13/16	30	1,377	$1,256
11/11/16	29	1,614	$1,998
Totals	**366**	**43,632**	**$36,763**
Annual	**365**	**43,513**	**$36,663**

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		
	Thurgood Marshall Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	179.0	141.4
Site Energy Use Intensity (kBtu/ft^2)	87.8	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		
	Thurgood Marshall Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	134.0	141.4
Site Energy Use Intensity (kBtu/ft^2)	68.9	58.2

Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. This school currently has an ENERGY STAR® score of 47 (out of 100). It is slightly below the national median. Following installation of the recommended energy efficiency measures, it would be above the national median value for energy performance.

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

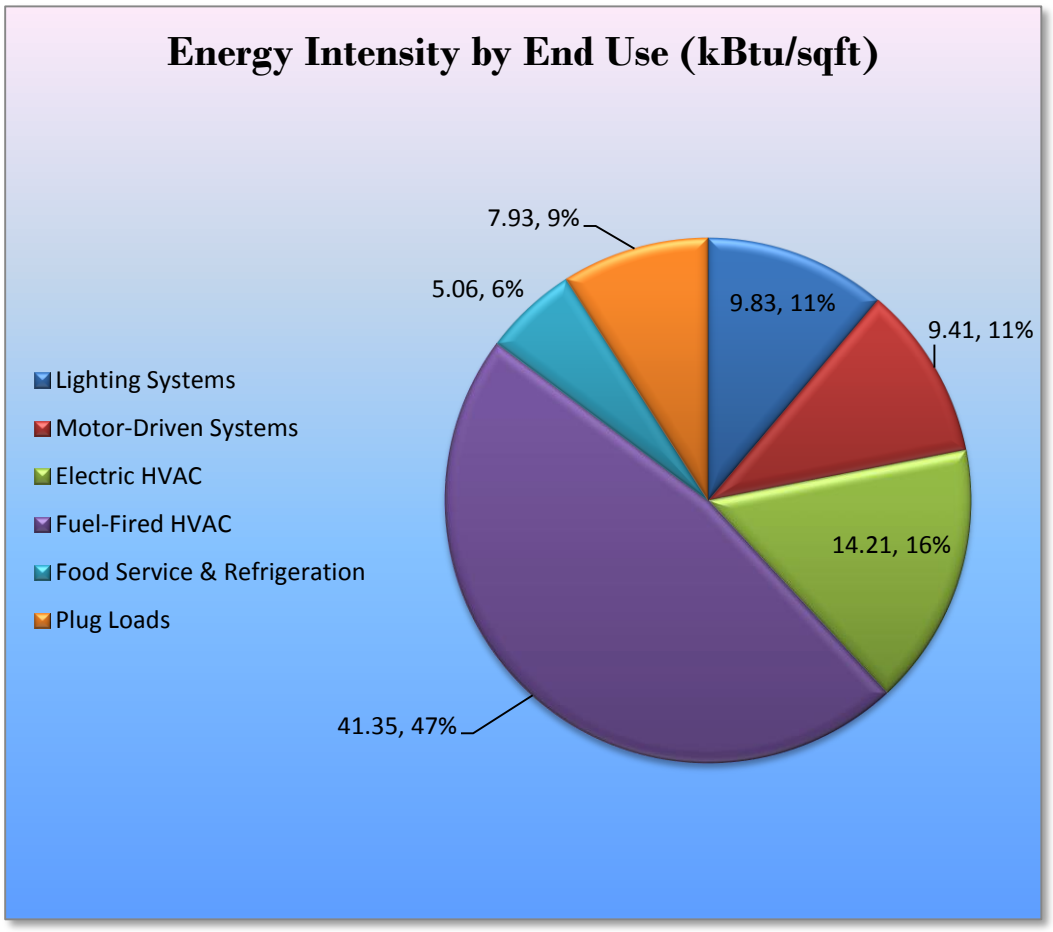
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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

4.1 Recommended ECMs

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

Figure 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		**176,761**	**37.9**	**0.0**	**$20,859.46**	**$101,610.74**	**$18,595.00**	**$83,015.74**	**4.0**	**177,997**
ECM 1	Install LED Fixtures	27,244	3.7	0.0	$3,215.07	$15,275.11	$3,200.00	$12,075.11	3.8	27,435
ECM 2	Retrofit Fixtures with LED Lamps	145,397	33.9	0.0	$17,158.16	$79,989.88	$15,395.00	$64,594.88	3.8	146,413
ECM 3	Install LED Exit Signs	4,120	0.3	0.0	$486.23	$6,345.75	$0.00	$6,345.75	13.1	4,149
Lighting Control Measures		**33,763**	**7.8**	**0.0**	**$3,984.29**	**$44,758.00**	**$5,070.00**	**$39,688.00**	**10.0**	**33,999**
ECM 4	Install Occupancy Sensor Lighting Controls	31,396	7.6	0.0	$3,705.03	$42,328.00	$5,070.00	$37,258.00	10.1	31,616
ECM 5	Install High/Low Lighitng Controls	2,366	0.2	0.0	$279.25	$2,430.00	$0.00	$2,430.00	8.7	2,383
Motor Upgrades		**458**	**0.1**	**0.0**	**$54.02**	**$1,343.55**	**$0.00**	**$1,343.55**	**24.9**	**461**
ECM 6	Premium Efficiency Motors	458	0.1	0.0	$54.02	$1,343.55	$0.00	$1,343.55	24.9	461
Variable Frequency Drive (VFD) Measures		**39,190**	**2.2**	**0.0**	**$4,624.72**	**$12,609.20**	**$900.00**	**$11,709.20**	**2.5**	**39,464**
ECM 7	Install VFDs on Hot Water Pumps	21,326	2.2	0.0	$2,516.63	$7,414.75	$0.00	$7,414.75	2.9	21,475
ECM 8	Install VFDs on Cooling Tower Fans	17,864	0.0	0.0	$2,108.10	$5,194.45	$900.00	$4,294.45	2.0	17,989
Electric Unitary HVAC Measures		**2,228**	**1.2**	**0.0**	**$262.87**	**$7,107.05**	**$437.00**	**$6,670.05**	**25.4**	**2,243**
ECM 9	Install High Efficiency Electric AC	2,228	1.2	0.0	$262.87	$7,107.05	$437.00	$6,670.05	25.4	2,243
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**376.0**	**$3,167.95**	**$57,608.21**	**$8,000.00**	**$49,608.21**	**15.7**	**44,023**
ECM 10	Install High Efficiency Hot Water Boilers	0	0.0	376.0	$3,167.95	$57,608.21	$8,000.00	$49,608.21	15.7	44,023
HVAC System Improvements		**28,578**	**0.0**	**161.4**	**$4,732.46**	**$16,493.50**	**$0.00**	**$16,493.50**	**3.5**	**47,677**
ECM 11	Install Programmable Thermostats	28,578	0.0	161.4	$4,732.46	$16,493.50	$0.00	$16,493.50	3.5	47,677
Domestic Water Heating Upgrade		**0**	**0.0**	**109.6**	**$923.18**	**$468.51**	**$0.00**	**$468.51**	**0.5**	**12,829**
ECM 12	Install Low-Flow Domestic Hot Water Devices	0	0.0	109.6	$923.18	$468.51	$0.00	$468.51	0.5	12,829
Plug Load Equipment Control - Vending Machine		**1,954**	**0.0**	**0.0**	**$230.63**	**$460.00**	**$0.00**	**$460.00**	**2.0**	**1,968**
ECM 13	Vending Machine Control	1,954	0.0	0.0	$230.63	$460.00	$0.00	$460.00	2.0	1,968
TOTALS		**282,931**	**49.2**	**647.0**	**$38,839.56**	**$242,458.76**	**$33,002.00**	**$209,456.76**	**5.4**	**360,660**

* - 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		**176,761**	**37.9**	**0.0**	**$20,859.46**	**$101,610.74**	**$18,595.00**	**$83,015.74**	**4.0**	**177,997**
ECM 1	Install LED Fixtures	27,244	3.7	0.0	$3,215.07	$15,275.11	$3,200.00	$12,075.11	3.8	27,435
ECM 2	Retrofit Fixtures with LED Lamps	145,397	33.9	0.0	$17,158.16	$79,989.88	$15,395.00	$64,594.88	3.8	146,413
ECM 3	Install LED Exit Signs	4,120	0.3	0.0	$486.23	$6,345.75	$0.00	$6,345.75	13.1	4,149

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	1,112	0.3	0.0	$131.26	$1,322.73	$0.00	$1,322.73	10.1	1,120
Exterior	26,132	3.4	0.0	$3,083.81	$13,952.38	$3,200.00	$10,752.38	3.5	26,315

Measure Description

We recommend replacing existing fixtures containing high pressure sodium or other types of HID lamps with new high performance LED light fixtures. An alternative option would be to retrofit the HID lamps with LED bulbs or retrofit kits designed for those fixtures. Either option is fine. For the purpose of this analysis, we have assumed that HID fixtures would be replaced. We have also assumed that recessed can interior lighting would be retrofitted with retrofit kits, rather than simply replacing the bulbs for those fixtures, as the kits often provide better lighting.

This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

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

ECM 2: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	143,085	33.6	0.0	$16,885.32	$79,506.11	$15,395.00	$64,111.11	3.8	144,085
Exterior	2,312	0.3	0.0	$272.84	$483.78	$0.00	$483.78	1.8	2,328

Measure Description

We recommend retrofitting existing incandescent and fluorescent lamps 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. We also recommend replacing all CFL and incandescent bulbs with LED lamps. Cost-effective LED replacement lamps are now readily available for virtually every type of existing fixture.

This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space.

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

ECM 3: Install LED Exit Signs

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	4,120	0.3	0.0	$486.23	$6,345.75	$0.00	$6,345.75	13.1	4,149
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend replacing all compact fluorescent exit signs with LED exit signs. The school's exit signs are a mix of LED and CFL fixtures. We recommend upgrading them all to LEDs. Although exit signs only use a few watts each, they are on 24 hours a day, seven days a week, so savings adds up over time. 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		**33,763**	**7.8**	**0.0**	**$3,984.29**	**$44,758.00**	**$5,070.00**	**$39,688.00**	**10.0**	**33,999**
ECM 4	Install Occupancy Sensor Lighting Controls	31,396	7.6	0.0	$3,705.03	$42,328.00	$5,070.00	$37,258.00	10.1	31,616
ECM 5	Install High/Low Lighitng Controls	2,366	0.2	0.0	$279.25	$2,430.00	$0.00	$2,430.00	8.7	2,383

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

ECM 4: Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
31,396	7.6	0.0	$3,705.03	$42,328.00	$5,070.00	$37,258.00	10.1	31,616

Measure Description

We recommend installing occupancy sensors to control lighting fixtures that are currently controlled by manual switches in all restrooms, storage rooms, hallways, classrooms, offices areas, and the gym. Lighting sensors detect occupancy using ultrasonic and/or infrared sensors.

For most spaces, we recommend installing 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 5: 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)
2,366	0.2	0.0	$279.25	$2,430.00	$0.00	$2,430.00	8.7	2,383

Measure Description

We recommend installing occupancy sensors to provide bi-level lighting control (a.k.a. high/low dimming) for lighting fixtures in spaces that are infrequently occupied but may require some level of continuous lighting for safety or security reasons. Stairwells are a typical area for such lighting control.

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 passive infrared sensors and there are dual technology sensors that use both. The lighting systems are switched to full lighting levels whenever an occupant is detected. Fixtures are automatically switched back to a lower lighting level after an area has been vacant for a preset period of time. Energy savings results from only providing full lighting levels when it is required.

Most stairwells are required to be continuously lit for fire safety reasons. Reducing lighting levels to the minimum level allowed by code when stairwells are unoccupied can significantly reduce energy usage in those spaces. 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. There needs to be at least one sensor per floor for full coverage and dual technology sensors are preferred for stairwells to ensure full coverage, so that lights come up to full brightness immediately whenever someone enters the space. Customers and contractors should check with building and fire code inspectors to ensure proper compliance with all local codes and ordinances.

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

4.1.3 Motor Upgrades

Our recommendations for motor upgrades are summarized in Figure 19 below.

Figure 19-Summary of Motor Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Motor Upgrades		**458**	**0.1**	**0.0**	**$54.02**	**$1,343.55**	**$0.00**	**$1,343.55**	**24.9**	**461**
ECM 6	Premium Efficiency Motors	458	0.1	0.0	$54.02	$1,343.55	$0.00	$1,343.55	24.9	461

ECM 6: 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	$54.02	$1,343.55	$0.00	$1,343.55	24.9	461

Measure Description

We recommend replacing standard efficiency motors with NEMA Premium® efficiency motors. This 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. Existing motor energy usage is estimated from nameplate information and our best estimates of motor efficiencies and run hours. Energy savings estimates and efficiencies of proposed motor upgrades are based on *New Jersey's Clean Energy Program Protocols to Measure Resource Savings (2016)*.

4.1.4 Variable Frequency Drive Measures

Our recommendations for variable frequency drive (VFD) measures are summarized in Figure 20 below.

Figure 20 – Summary of Variable Frequency Drive ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**39,190**	**2.2**	**0.0**	**$4,624.72**	**$12,609.20**	**$900.00**	**$11,709.20**	**2.5**	**39,464**
ECM 7	Install VFDs on Hot Water Pumps	21,326	2.2	0.0	$2,516.63	$7,414.75	$0.00	$7,414.75	2.9	21,475
ECM 8	Install VFDs on Cooling Tower Fans	17,864	0.0	0.0	$2,108.10	$5,194.45	$900.00	$4,294.45	2.0	17,989

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)
21,326	2.2	0.0	$2,516.63	$7,414.75	$0.00	$7,414.75	2.9	21,475

Measure Description

We recommend installing variable frequency drives (VFD) to control a hot water pumps. This measure requires that a majority of the hot water coils be served by 2-way valves and that a differential pressure sensor is installed in the hot water loop. As the hot water valves close, the differential pressure increases. The VFD modulates pump speed to maintain a differential pressure setpoint.

Energy savings results from reducing pump motor speed (and power) as hot water valves close. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

If the system contains 3-way valves, they will need to be replaced with 2-way valves to achieve the estimated savings. The cost associated with replacing 3-way valves was not currently included in our estimate measure cost and savings.

ECM 8: Install VFDs on Cooling Tower Fans

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
17,864	0.0	0.0	$2,108.10	$5,194.45	$900.00	$4,294.45	2.0	17,989

Measure Description

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

4.1.5 Electric Unitary HVAC Measures

Our recommendations for unitary HVAC measures are summarized in Figure 21 below.

Figure 21 - 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		**2,228**	**1.2**	**0.0**	**$262.87**	**$7,107.05**	**$437.00**	**$6,670.05**	**25.4**	**2,243**
ECM 9	Install High Efficiency Electric AC	2,228	1.2	0.0	$262.87	$7,107.05	$437.00	$6,670.05	25.4	2,243

ECM 9: 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)
2,228	1.2	0.0	$262.87	$7,107.05	$437.00	$6,670.05	25.4	2,243

Measure Description

We recommend replacing standard efficiency packaged air conditioning units with high efficiency packaged air conditioning units. This measure estimates the cost and savings that would result from replacing one 5-ton Trane AC unit, which is at the end of its rated useful life, with a new higher efficiency model (e.g. Goodman DSXC18R21, 18 SEER).

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

4.1.6 Gas-Fired Heating System Replacements

Our recommendations for gas-fired heating system replacements are summarized in Figure 22 below.

Figure 22 - Summary of Gas-Fired Heating Replacement 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)
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**376.0**	**$3,167.95**	**$57,608.21**	**$8,000.00**	**$49,608.21**	**15.7**	**44,023**
ECM 10	Install High Efficiency Hot Water Boilers	0	0.0	376.0	$3,167.95	$57,608.21	$8,000.00	$49,608.21	15.7	44,023

ECM 10: 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	376.0	$3,167.95	$57,608.21	$8,000.00	$49,608.21	15.7	44,023

Measure Description

We recommend replacing the school's 8 hot water boilers with high-efficiency condensing hot water boilers. Significant improvements have been made in combustion technology in recent years 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.

Our analysis assumed that current hot water boilers (which are 20 years old and estimated to be about 80% efficient) would be replaced with similarly sized condensing hot water boilers with an efficiency of 91% or higher.

4.1.7 HVAC System Upgrades

Our recommendation for HVAC system improvement are summarized in Figure 23 below.

Figure 23 - Summary of HVAC System Improvement ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
HVAC System Improvements		**28,578**	**0.0**	**161.4**	**$4,732.46**	**$16,493.50**	**$0.00**	**$16,493.50**	**3.5**	**47,677**
ECM 11	Install Programmable Thermostats	28,578	0.0	161.4	$4,732.46	$16,493.50	$0.00	$16,493.50	3.5	47,677

ECM 11: Install Programmable Thermostats

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)
28,578	0.0	161.4	$4,732.46	$16,493.50	$0.00	$16,493.50	3.5	47,677

Measure Description

We recommend replacing manual thermostats with programmable thermostats and ensuring the air conditioning systems are turn off when the school is unoccupied. The school already has programmable thermostats in most areas. However, when the school is unoccupied (or when specific areas are unoccupied) for prolonged periods of time the HVAC systems serving each zone should be turned off. This measure was included to estimate the cost and savings that would likely result from additional HVAC controls upgrades.

Manual thermostats are generally adjusted to a single heating and cooling setpoint and left at that setting regardless of occupancy in the area served by the HVAC equipment. As a result, the same level of heating and cooling is provided regardless of the occupancy in the space. Programmable thermostats can be set to maintain different temperature settings for different times of day and for different days of the week. By reducing heating temperature setpoints and raising cooling temperature setpoints when spaces are unoccupied, the operation of the HVAC equipment is reduced while still maintaining reasonable space temperatures for building usage at all times.

Programmable thermostats provide energy savings by reducing heating and cooling energy usage when a room is unoccupied.

4.1.8 Domestic Hot Water Heating System Upgrades

Our recommendations for domestic water heating system improvements are summarized in Figure 24 below.

Figure 24 - Summary of Domestic Water Heating ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**109.6**	**$923.18**	**$468.51**	**$0.00**	**$468.51**	**0.5**	**12,829**
ECM 12	Install Low-Flow Domestic Hot Water Devices	0	0.0	109.6	$923.18	$468.51	$0.00	$468.51	0.5	12,829

ECM 12: Install Low-Flow DHW Devices

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	109.6	$923.18	$468.51	$0.00	$468.51	0.5	12,829

Measure Description

We recommend installing low-flow domestic hot water devices to reduce overall hot water demand. Energy demand from domestic hot water heating systems can be reduced by reducing water usage in general. Faucet aerators can reduce hot water usage, relative to standard aerators, which saves energy. We observed that many restroom faucets had higher flow rates, which leads to excessive hot water usage. Water conserving low-flow devices are easily installed and provide significant savings over time.

Pre-rinse spray valves (PRSVs)—often used in commercial and institutional kitchens—are designed to remove food waste from dishes prior to dishwashing. Adding pre-rinse spray valves to kitchen sinks used for dishwashing will reduce hot water usage and save energy.

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

4.1.9 Plug Load Equipment Control - Vending Machines

Our recommendations for plug load equipment controls are summarized in Figure 25 below.

Figure 25-Summary of Plug Load Equipment Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Plug Load Equipment Control - Vending Machine		**1,954**	**0.0**	**0.0**	**$230.63**	**$460.00**	**$0.00**	**$460.00**	**2.0**	**1,968**
ECM 13	Vending Machine Control	1,954	0.0	0.0	$230.63	$460.00	$0.00	$460.00	2.0	1,968

ECM 13: Vending Machine Control

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,954	0.0	0.0	$230.63	$460.00	$0.00	$460.00	2.0	1,968

Measure Description

Vending machines operate continuously, even during non-business hours. It is recommended to install occupancy sensor controls to reduce the energy use. These controls power down vending machines when the vending machine area has been vacant for some time, then power up at regular intervals, as needed, to turn machine lights on or keep the product cool. Energy savings are a dependent on vending machine and activity level in the area surrounding the machines.

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.

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.

Perform Routine Motor Maintenance

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

Practice Proper Use of Thermostat Schedules and Temperature Resets

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

Clean 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.

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.

Water Conservation

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

Installing dual flush or low-flow toilets and low-flow or waterless urinals are additional ways to reduce the sites water use, however, these devices do not provide energy savings at the site level. Any reduction in water use does however ultimately reduce grid level electricity use since a significant amount of electricity is used to deliver water from reservoirs to end users. The EPA WaterSense™ ratings for urinals is 0.5 gallons per flush (gpf) and toilets that use as little as 1.28 gpf (this is lower than the current 1.6 gpf federal standard).

Refer to Section 4.1.8 for low-flow ECM recommendations.

6 On-Site Generation Measures

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

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

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

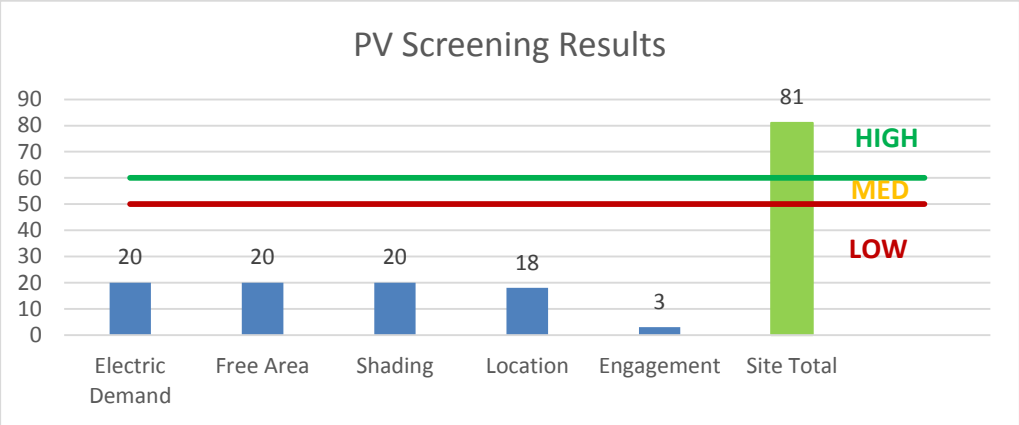
6.1 Photovoltaic

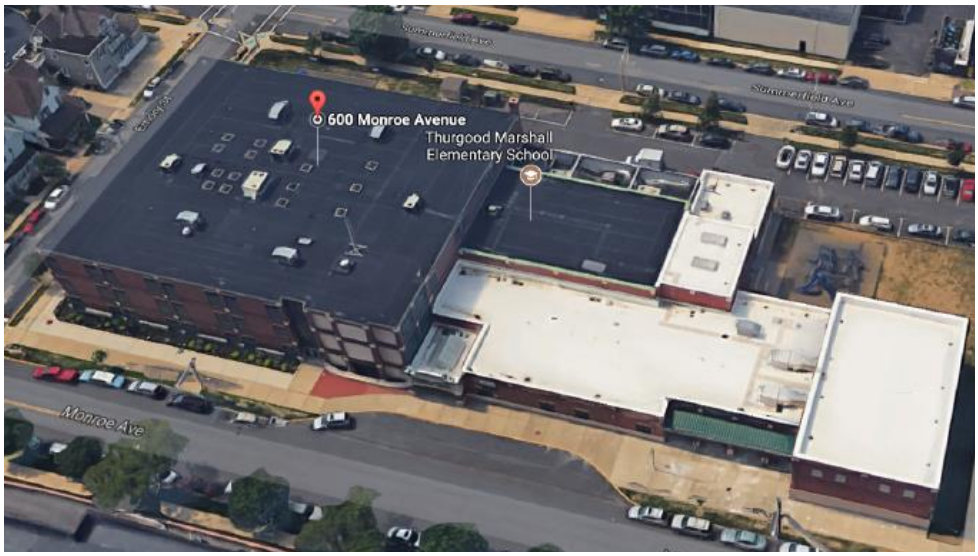
Sunlight can be converted into electricity using photovoltaics (PV) modules. Modules are racked together into an array that produces direct current (DC) electricity. The DC current is converted to alternating current (AC) through an inverter. The inverter is interconnected to the facility's electrical 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 **High Potential** for cost-effective installation of a solar PV array.

A solar PV array located on the roof may be feasible and cost effective. If Thurgood Marshall Elementary School is interested in pursuing the installation of PV, we recommended a full feasibility study be conducted by a qualified solar installer.

Figure 26 - Photovoltaic Screening





Potential	High	
System Potential	231	kW DC STC
Electric Generation	275,206	kWh/yr
Displaced Cost	$32,480	/yr
Installed Cost	$600,600	

An aerial image of the building (shown above) reveals that the school's roof appears to have ample unshaded space available that could be cost-effectively developed for solar PV electric generation. We estimate that there is up to 21,500 square feet of potentially useable roof space. Such a space could likely support a solar array with a generating capacity of up to 231 kW_{DC}. Such an array could reduce the school's annual electric purchases by up to 24%. It would also likely provide additional revenue to the school in the form of SREC income for the first 15 years of the projects life. Similar projects that benefit from SREC subsidies often show a simple payback of 8 years or less.

Solar panels typically have a lifetime of over 20 years, so in the later years of the project the power generated is essentially free. Other options, such as a power purchase agreements with a solar supplier, can also provide reduced electric rates with little or no upfront costs to the customer.

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

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

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

6.2 Combined Heat and Power

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

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

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

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

7 DEMAND RESPONSE

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

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

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

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

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

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

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

Participants in DR programs need to be able to quickly reduce their electric loads when called upon to do so. This facility's monthly peak electric demand only varies by a relatively small amount – by about 100 kW. So, it may not be a good candidate for participation in a Demand Response program.

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 27 for a list of the eligible programs identified for each recommended ECM.

Figure 27 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings
ECM 1	Install LED Fixtures	x			x
ECM 2	Retrofit Fixtures with LED Lamps	x			x
ECM 3	Install LED Exit Signs	x			x
ECM 4	Install Occupancy Sensor Lighting Controls	x			x
ECM 5	Install High/Low Lighitng Controls	x			x
ECM 6	Premium Efficiency Motors				x
ECM 7	Install VFDs on Chilled Water Pumps	x			x
ECM 8	Install VFDs on Hot Water Pumps				x
ECM 9	Install VFDs on Cooling Tower Fans	x			x
ECM 10	Install High Efficiency Electric AC	x			x
ECM 11	Install High Efficiency Hot Water Boilers	x			x
ECM 12	Install Programmable Thermostats				x
ECM 13	Install Low-Flow Domestic Hot Water Devices				x
ECM 14	Vending Machine Control				x

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

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

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

8.1 SmartStart

Overview

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

Equipment with Prescriptive Incentives Currently Available:

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

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

Incentives

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

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

How to Participate

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

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

8.2 Pay for Performance - Existing Buildings

Overview

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

Incentives

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

How to Participate

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

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

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

8.3 SREC Registration Program

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

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

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

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

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

8.4 Energy Savings Improvement Program

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

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

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

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

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

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

8.5 Demand Response Energy Aggregator

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

Curtailment Service Providers typically offer free assessments to determine a facility's eligibility to participate in a DR program. They will provide details regarding the program rules and requirements for metering and controls, a facility's ability to temporarily reduce electric load, as well as the payments involved in participating in the program. Also, these providers usually offer multiple options for DR to larger facilities and may also install controls or remote monitoring equipment to help ensure compliance of all terms and conditions of a DR contract.

See Section 7 for additional information.

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

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

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

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

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

9.2 Retail Natural Gas Supply Options

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

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

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

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

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Front Foyer	6	Incandescent: 100 W Incandescent Spot	Wall Switch	100	2,375	Relamp	No	6	LED Screw-In Lamps: 15W LED Spot lamp	Wall Switch	15	2,375	0.33	1,393	0.0	$164.38	$582.71	$30.00	3.36
Front Foyer	3	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	2	8,760	0.01	212	0.0	$24.97	$322.67	$0.00	12.92
Security Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.08	342	0.0	$40.32	$266.40	$50.00	5.37
Front Corridor	8	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	8	LED Exit Signs: 2 W Lamp	None	2	8,760	0.04	564	0.0	$66.57	$860.44	$0.00	12.92
Front Corridor	51	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	51	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	1.39	5,809	0.0	$685.46	$5,413.50	$825.00	6.69
Boiler Room	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	No	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,188	0.22	451	0.0	$53.20	$585.00	$100.00	9.12
Mechanical Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	500	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	500	0.13	114	0.0	$13.44	$351.00	$60.00	21.66
Electrical Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	500	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	500	0.01	10	0.0	$1.19	$35.90	$5.00	26.02
Gym	15	Linear Fluorescent - T5HO: 4' T5HO (54W) - 6L	Wall Switch	358	2,375	Relamp	Yes	15	LED - Linear Tubes: (6) 4' Lamps	Occupancy Sensor	87	1,663	2.92	12,172	0.0	$1,436.39	$3,093.35	$590.00	1.74
Gym	4	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	4	LED Exit Signs: 2 W Lamp	None	2	8,760	0.02	282	0.0	$33.29	$430.22	$0.00	12.92
Main Office	10	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	No	10	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,375	0.37	1,530	0.0	$180.50	$951.33	$200.00	4.16
Main Office	2	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	2	8,760	0.01	141	0.0	$16.64	$215.11	$0.00	12.92
Back Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,375	0.07	306	0.0	$36.10	$190.27	$40.00	4.16
Nurse Waiting Area	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,375	0.07	306	0.0	$36.10	$190.27	$40.00	4.16
Men's Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.03	114	0.0	$13.44	$174.50	$30.00	10.75
Women's Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.03	114	0.0	$13.44	$174.50	$30.00	10.75
Break Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.19	802	0.0	$94.63	$496.53	$100.00	4.19
Principal's Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.19	802	0.0	$94.63	$496.53	$100.00	4.19
Principal's Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,188	0.02	45	0.0	$5.32	$58.50	$10.00	9.12
Conference Room	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.38	1,604	0.0	$189.26	$1,031.07	$195.00	4.42
Vice Principal's Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.10	401	0.0	$47.32	$306.27	$60.00	5.20
Nurse's Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.03	114	0.0	$13.44	$174.50	$10.00	12.24
Nurse's Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.10	401	0.0	$47.32	$306.27	$60.00	5.20
Exam Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	No	3	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,375	0.11	459	0.0	$54.15	$285.40	$60.00	4.16
Office 113P	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.05	200	0.0	$23.66	$211.13	$40.00	7.23

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Office 113C	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.10	401	0.0	$47.32	$306.27	$60.00	5.20
Office 113B	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.10	401	0.0	$47.32	$306.27	$60.00	5.20
Office 113	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.05	200	0.0	$23.66	$211.13	$40.00	7.23
Classroom 104	17	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	17	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.82	3,408	0.0	$402.18	$2,157.27	$410.00	4.34
Classroom 104	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.05	228	0.0	$26.88	$387.00	$55.00	12.35
Classroom 104	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	2	8,760	0.00	71	0.0	$8.32	$107.56	$0.00	12.92
Classroom 104 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.03	114	0.0	$13.44	$174.50	$10.00	12.24
Classroom 103	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.29	1,203	0.0	$141.95	$686.80	$140.00	3.85
Classroom 117	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.29	1,203	0.0	$141.95	$686.80	$140.00	3.85
Classroom 100	18	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	18	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.87	3,609	0.0	$425.84	$2,252.40	$430.00	4.28
Classroom 100	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.08	342	0.0	$40.32	$445.50	$65.00	9.44
Classroom 100 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.03	114	0.0	$13.44	$174.50	$10.00	12.24
Classroom 100 Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,188	0.02	45	0.0	$5.32	$58.50	$10.00	9.12
Classroom 101	18	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	18	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.87	3,609	0.0	$425.84	$2,252.40	$430.00	4.28
Classroom 101 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.03	114	0.0	$13.44	$174.50	$10.00	12.24
Stairway 1,2,3	27	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	8,760	Relamp	Yes	27	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,132	0.74	11,342	0.0	$1,338.50	$4,009.50	$270.00	2.79
Classroom 121	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.14	601	0.0	$70.97	$555.40	$95.00	6.49
Classroom 121	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.03	114	0.0	$13.44	$328.50	$45.00	21.09
Classroom 119	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.29	1,203	0.0	$141.95	$840.80	$155.00	4.83
Classroom 116	16	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	16	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.77	3,208	0.0	$378.52	$2,062.13	$390.00	4.42
Classroom 116	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	2	8,760	0.00	71	0.0	$8.32	$107.56	$0.00	12.92
Classroom 114	17	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	17	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.82	3,408	0.0	$402.18	$2,157.27	$410.00	4.34
Classroom 114 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.03	114	0.0	$13.44	$174.50	$10.00	12.24
Classroom 114	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
Server Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	500	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	500	0.02	19	0.0	$2.24	$58.50	$10.00	21.66

	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
Classroom 112	13	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	13	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.63	2,606	0.0	$307.55	$1,776.73	$330.00	4.70
Classroom 110	13	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	13	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.63	2,606	0.0	$307.55	$1,776.73	$330.00	4.70
Classroom 110	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	2	8,760	0.00	71	0.0	$8.32	$107.56	$0.00	12.92
Classroom 110	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.03	114	0.0	$13.44	$328.50	$45.00	21.09
Classroom 110 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.03	114	0.0	$13.44	$174.50	$10.00	12.24
Faculty Dining	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.16	683	0.0	$80.64	$621.00	$95.00	6.52
Faculty Dining Men's Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.03	114	0.0	$13.44	$174.50	$30.00	10.75
Faculty Dining Women's Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.03	114	0.0	$13.44	$174.50	$30.00	10.75
Faculty Dining	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	2	8,760	0.00	71	0.0	$8.32	$107.56	$0.00	12.92
Kitchen Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,375	0.06	270	0.0	$31.91	$150.40	$30.00	3.77
Kitchen Office	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,375	0.02	90	0.0	$10.64	$58.50	$10.00	4.56
Kitchen	16	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	No	16	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,375	0.59	2,447	0.0	$288.79	$1,522.13	$320.00	4.16
Kitchen	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	2	8,760	0.00	71	0.0	$8.32	$107.56	$0.00	12.92
Food Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,375	0.04	180	0.0	$21.27	$117.00	$20.00	4.56
Kitchen Entrance	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,375	0.02	90	0.0	$10.64	$58.50	$10.00	4.56
Gym Entrance	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.08	342	0.0	$40.32	$291.50	$50.00	5.99
Stage	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,375	0.39	1,622	0.0	$191.45	$1,053.00	$180.00	4.56
Gym Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,375	0.06	270	0.0	$31.91	$150.40	$30.00	3.77
Gym Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.11	456	0.0	$53.76	$350.00	$60.00	5.39
Boys' / Girls Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.05	228	0.0	$26.88	$387.00	$55.00	12.35
Boys' / Girls Room	2	Incandescent: 100W Incandescent	Wall Switch	100	2,375	Relamp	Yes	2	LED Screw-In Lamps: 15W LED lamp	Occupancy Sensor	15	1,663	0.12	489	0.0	$57.69	$377.51	$35.00	5.94
Classroom 126	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.62	2,563	0.0	$302.41	$1,668.00	$295.00	4.54
Classroom 126	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
Janior Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	500	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	500	0.02	19	0.0	$2.24	$58.50	$10.00	21.66

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Electrical Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,375	0.04	180	0.0	$21.27	$117.00	$20.00	4.56
Server Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,375	0.04	180	0.0	$21.27	$117.00	$20.00	4.56
Music Room 128	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.41	1,708	0.0	$201.61	$1,417.50	$220.00	5.94
Music Room 128	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
Resource Room A	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.25	1,025	0.0	$120.96	$721.20	$125.00	4.93
Storage Room 137	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,188	0.17	361	0.0	$42.55	$468.00	$80.00	9.12
Stage Entrance	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,375	0.04	180	0.0	$21.27	$117.00	$20.00	4.56
Rec Room B	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.08	342	0.0	$40.32	$266.40	$50.00	5.37
Rec Room B Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,188	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,188	0.03	68	0.0	$7.98	$75.20	$15.00	7.55
Classroom 132	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,375	0.06	270	0.0	$31.91	$150.40	$30.00	3.77
Gym Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,663	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.09	252	0.0	$29.78	$234.00	$40.00	6.51
Gym Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,663	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.06	189	0.0	$22.34	$150.40	$30.00	5.39
Gym Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,663	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.04	126	0.0	$14.89	$117.00	$20.00	6.51
Gym Restroom	1	Incandescent: 100 W Incandescent	Wall Switch	100	2,375	Relamp	No	1	LED Screw-In Lamps: 15W LED lamp	Wall Switch	15	2,375	0.06	232	0.0	$27.40	$53.75	$0.00	1.96
Gym	24	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Wall Switch	63	2,375	Relamp	Yes	24	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	1,663	0.62	2,570	0.0	$303.23	$3,186.80	$655.00	8.35
Gym	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Gym Foyer	4	Incandescent: 100 W Incandescent	Wall Switch	100	2,375	Relamp	No	4	LED Screw-In Lamps: 15W LED lamp	Wall Switch	15	2,375	0.22	929	0.0	$109.59	$215.01	$0.00	1.96
Rt. Corridor	4	Incandescent: 100 W Incandescent	Wall Switch	100	2,375	Relamp	Yes	4	LED Screw-In Lamps: 15W LED lamp	Occupancy Sensor	15	1,663	0.23	978	0.0	$115.39	$215.01	$35.00	1.56
Rt. Corridor	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
Rt. Corridor	19	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,375	Relamp	Yes	19	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,663	0.26	1,095	0.0	$129.22	$1,725.80	$295.00	11.07
Elevator	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,375	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,375	0.01	48	0.0	$5.64	$35.90	$5.00	5.48
Classroom 208	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.37	1,538	0.0	$181.45	$946.80	$170.00	4.28
Classroom 208 Restroom	1	Compact Fluorescent: 2 x 17W CFL	Wall Switch	34	1,188	Fixture Replacement	Yes	1	LED - Fixtures: Downlight Recessed	Occupancy Sensor	12	831	0.02	35	0.0	$4.13	$173.51	$0.00	42.06
Computer Room 210	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.38	1,604	0.0	$189.26	$1,031.07	$195.00	4.42
Computer Room 210	2	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	2	8,760	0.01	141	0.0	$16.64	$215.11	$0.00	12.92

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 209	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.25	1,025	0.0	$120.96	$721.20	$125.00	4.93
2nd Floor Corridor	8	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	8	LED Exit Signs: 2 W Lamp	None	2	8,760	0.04	564	0.0	$66.57	$860.44	$0.00	12.92
2nd Floor Corridor	36	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	36	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.98	4,100	0.0	$483.86	$3,726.00	$570.00	6.52
Classroom 211	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.25	1,025	0.0	$120.96	$721.20	$125.00	4.93
Classroom 214	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.19	802	0.0	$94.63	$650.53	$115.00	5.66
Girls' Room	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,375	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,663	0.01	58	0.0	$6.80	$48.20	$45.00	0.47
Girls' Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.05	200	0.0	$23.66	$365.13	$55.00	13.11
Girls' Room	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.03	114	0.0	$13.44	$58.50	$45.00	1.00
Boys' Room	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,375	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,663	0.01	58	0.0	$6.80	$48.20	$45.00	0.47
Boys' Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.05	200	0.0	$23.66	$365.13	$55.00	13.11
Boys' Room	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.03	114	0.0	$13.44	$58.50	$45.00	1.00
Art Room 216	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.45	1,879	0.0	$221.77	$1,097.20	$200.00	4.05
Art Room 216	2	Compact Fluorescent: 2 x 17W CFL	Wall Switch	34	2,375	Fixture Replacement	Yes	2	LED - Fixtures: Downlight Recessed	Occupancy Sensor	12	1,663	0.03	140	0.0	$16.50	$115.02	$35.00	4.85
Classroom 218	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.49	2,050	0.0	$241.93	$1,442.40	$250.00	4.93
Classroom 218 Stroage	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	600	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	600	0.03	34	0.0	$4.03	$75.20	$15.00	14.94
Copy Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.04	171	0.0	$20.16	$345.20	$50.00	14.64
Book Room 213	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.25	1,025	0.0	$120.96	$721.20	$125.00	4.93
Storage Closet	1	Compact Fluorescent: 2 x 17 W CFLs	Wall Switch	34	1,188	Fixture Replacement	No	1	LED - Fixtures: Downlight Recessed	Wall Switch	12	1,188	0.01	30	0.0	$3.55	$57.51	$0.00	16.21
Library Office 215	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.16	683	0.0	$80.64	$621.00	$95.00	6.52
Classroom 220	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.49	2,050	0.0	$241.93	$1,442.40	$250.00	4.93
Classroom 220 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
Classroom 220	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
Classroom 220	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	2	8,760	0.00	71	0.0	$8.32	$107.56	$0.00	12.92
2nd Floor Server	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	600	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	600	0.02	23	0.0	$2.69	$58.50	$10.00	18.05
Classroom 226	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.49	2,050	0.0	$241.93	$1,172.40	$215.00	3.96

	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
Classroom 219	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.33	1,367	0.0	$161.29	$871.60	$155.00	4.44
Classroom 219	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.08	342	0.0	$40.32	$175.50	$65.00	2.74
Classroom 219	1	Compact Fluorescent: 2 x 17W CFL	Wall Switch	34	2,375	Fixture Replacement	Yes	1	LED - Fixtures: Downlight Recessed	Occupancy Sensor	12	1,663	0.02	70	0.0	$8.25	$57.51	$35.00	2.73
Classroom 226 Restrrom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
Classroom 201	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.49	2,050	0.0	$241.93	$1,442.40	$250.00	4.93
Classroom 201	1	Compact Fluorescent: 2 x 17W CFL	Wall Switch	34	2,375	Fixture Replacement	No	1	LED - Fixtures: Downlight Recessed	Wall Switch	12	2,375	0.01	60	0.0	$7.09	$57.51	$0.00	8.11
Classroom 201	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	2	8,760	0.00	71	0.0	$8.32	$107.56	$0.00	12.92
Classroom 201 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$30.00	21.49
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
AV Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,375	0.10	406	0.0	$47.86	$225.60	$45.00	3.77
Media Center	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.19	797	0.0	$94.08	$679.50	$105.00	6.11
Media Center	27	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	27	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.74	3,075	0.0	$362.89	$2,389.50	$375.00	5.55
Media Center	6	Compact Fluorescent: 2 x 17W CFL	Wall Switch	34	2,375	Fixture Replacement	No	6	LED - Fixtures: Downlight Recessed	Wall Switch	12	2,375	0.09	361	0.0	$42.55	$345.06	$0.00	8.11
Media Center	2	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	2	8,760	0.01	141	0.0	$16.64	$215.11	$0.00	12.92
Media Center 205E	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.08	342	0.0	$40.32	$445.50	$65.00	9.44
Media Center 205D	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.08	342	0.0	$40.32	$420.40	$65.00	8.81
Classroom 207	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.16	683	0.0	$80.64	$621.00	$95.00	6.52
Classroom 308	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.37	1,538	0.0	$181.45	$946.80	$170.00	4.28
Classroom 308	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.08	342	0.0	$40.32	$445.50	$65.00	9.44
Classroom 308 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
Classroom 308 Storage	1	Compact Fluorescent: 2 x 17W CFL	Wall Switch	34	600	Fixture Replacement	No	1	LED - Fixtures: Downlight Recessed	Wall Switch	12	600	0.01	15	0.0	$1.79	$57.51	$0.00	32.10
3rd Floor Corridor	42	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	42	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	1.15	4,784	0.0	$564.50	$4,347.00	$665.00	6.52
3rd Floor Corridor	9	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	9	LED Exit Signs: 2 W Lamp	None	2	8,760	0.04	635	0.0	$74.90	$968.00	$0.00	12.92
Girls Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.03	114	0.0	$13.44	$328.50	$45.00	21.09
Girls Room	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.05	228	0.0	$26.88	$387.00	$55.00	12.35

	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 Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.03	114	0.0	$13.44	$328.50	$45.00	21.09
Boys Room	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.05	228	0.0	$26.88	$387.00	$55.00	12.35
Classroom 310	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.53	2,221	0.0	$262.09	$1,517.60	$265.00	4.78
Classroom 310	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	30	0.0	$3.57	$107.56	$0.00	30.16
Classroom 310 restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
Classroom 309	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.16	683	0.0	$80.64	$621.00	$95.00	6.52
Classroom 309	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	2	8,760	0.00	71	0.0	$8.32	$107.56	$0.00	12.92
Classroom 312	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.30	1,253	0.0	$147.84	$1,183.50	$180.00	6.79
Classroom 312	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	2	8,760	0.00	71	0.0	$8.32	$107.56	$0.00	12.92
Classroom 312 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
Classroom 316	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.37	1,538	0.0	$181.45	$946.80	$170.00	4.28
Classroom 315	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.29	1,203	0.0	$141.95	$840.80	$155.00	4.83
Classroom 315 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
Classroom 315 Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	600	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	600	0.04	39	0.0	$4.56	$95.13	$20.00	16.48
Classroom 322	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.03	114	0.0	$13.44	$328.50	$45.00	21.09
Classroom 322	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.41	1,708	0.0	$201.61	$1,022.00	$185.00	4.15
Classroom 322	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	2	8,760	0.00	71	0.0	$8.32	$107.56	$0.00	12.92
Classroom 322 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
Classroom 322 Storage	1	Compact Fluorescent: 2 x 17W CFL	Wall Switch	34	600	Fixture Replacement	No	1	LED - Fixtures: Downlight Recessed	Wall Switch	12	600	0.01	15	0.0	$1.79	$57.51	$0.00	32.10
Classroom 320	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.49	2,050	0.0	$241.93	$1,442.40	$250.00	4.93
Classroom 320	1	Compact Fluorescent: 2 x 17W CFL	Wall Switch	34	2,375	Fixture Replacement	No	1	LED - Fixtures: Downlight Recessed	Wall Switch	12	2,375	0.01	60	0.0	$7.09	$57.51	$0.00	8.11
Classroom 320	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	2	8,760	0.00	71	0.0	$8.32	$107.56	$0.00	12.92
Classroom 200	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.49	2,050	0.0	$241.93	$1,442.40	$250.00	4.93
Classroom 200	1	Compact Fluorescent: 2 x 17W CFL	Wall Switch	34	2,375	Fixture Replacement	No	1	LED - Fixtures: Downlight Recessed	Wall Switch	12	2,375	0.01	60	0.0	$7.09	$57.51	$0.00	8.11
Classroom 200	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	2	8,760	0.00	71	0.0	$8.32	$107.56	$0.00	12.92

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 204	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.49	2,050	0.0	$241.93	$1,442.40	$250.00	4.93
Classroom 204	1	Compact Fluorescent: 2 x 17W CFL	Wall Switch	34	2,375	Fixture Replacement	No	1	LED - Fixtures: Downlight Recessed	Wall Switch	12	2,375	0.01	60	0.0	$7.09	$57.51	$0.00	8.11
Classroom 204	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	2	8,760	0.00	71	0.0	$8.32	$107.56	$0.00	12.92
Classroom 206	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.49	2,050	0.0	$241.93	$1,442.40	$250.00	4.93
Classroom 206	1	Compact Fluorescent: 2 x 17W CFL	Wall Switch	34	2,375	Fixture Replacement	No	1	LED - Fixtures: Downlight Recessed	Wall Switch	12	2,375	0.01	60	0.0	$7.09	$57.51	$0.00	8.11
Classroom 206	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	2	8,760	0.00	71	0.0	$8.32	$107.56	$0.00	12.92
Classroom 318	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.49	2,050	0.0	$241.93	$1,442.40	$250.00	4.93
Classroom 318	1	Compact Fluorescent: 2 x 17W CFL	Wall Switch	34	2,375	Fixture Replacement	No	1	LED - Fixtures: Downlight Recessed	Wall Switch	12	2,375	0.01	60	0.0	$7.09	$57.51	$0.00	8.11
Classroom 318	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	2	8,760	0.00	71	0.0	$8.32	$107.56	$0.00	12.92
Classroom 314	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.53	2,221	0.0	$262.09	$1,517.60	$265.00	4.78
Classroom 314	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	2	8,760	0.00	71	0.0	$8.32	$107.56	$0.00	12.92
Classroom 311	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.16	683	0.0	$80.64	$621.00	$95.00	6.52
Classroom 311	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	2	8,760	0.00	71	0.0	$8.32	$107.56	$0.00	12.92
Classroom 317	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.45	1,879	0.0	$221.77	$1,367.20	$235.00	5.11
Classroom 317 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,663	0.03	114	0.0	$13.44	$174.50	$10.00	12.24
Classroom 317 Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	600	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	600	0.03	34	0.0	$4.03	$75.20	$15.00	14.94
Classroom 324	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.49	2,050	0.0	$241.93	$1,442.40	$250.00	4.93
Classroom 324 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
Computer Room 303	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.57	2,392	0.0	$282.25	$1,592.80	$280.00	4.65
Classroom 310	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.41	1,708	0.0	$201.61	$1,022.00	$185.00	4.15
Classroom 310 Storage	1	Compact Fluorescent: 2 x 17W CFL	Wall Switch	34	600	Fixture Replacement	No	1	LED - Fixtures: Downlight Recessed	Wall Switch	12	600	0.01	15	0.0	$1.79	$57.51	$0.00	32.10
Classroom 310 restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
Classroom 307	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.25	1,025	0.0	$120.96	$721.20	$125.00	4.93
Exterior Front Door	9	Incandescent: 60W	Wall Switch	60	4,380	Relamp	No	9	LED Screw-In Lamps: 15W LED lamp	Wall Switch	9	4,380	0.30	2,312	0.0	$272.84	$483.78	$0.00	1.77
Perimeter	21	High-Pressure Sodium: (1) 100W Lamp	Wall Switch	138	4,380	Fixture Replacement	No	21	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	30	4,380	1.49	11,424	0.0	$1,348.13	$8,204.22	$2,100.00	4.53

	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
Perimeter	1	High-Pressure Sodium: (1) 400W Lamp	Wall Switch	465	4,380	Fixture Replacement	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	120	4,380	0.23	1,738	0.0	$205.07	$390.68	$100.00	1.42
Playground Parking Poles	7	High-Pressure Sodium: (1) 250W Lamp	Wall Switch	295	4,380	Fixture Replacement	No	7	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Wall Switch	75	4,380	1.01	7,757	0.0	$915.39	$3,682.98	$700.00	3.26
Playground Parking Poles	3	High-Pressure Sodium: (1) 400W Lamp	Wall Switch	465	4,380	Fixture Replacement	No	3	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Wall Switch	120	4,380	0.68	5,213	0.0	$615.22	$1,674.51	$300.00	2.23
Classroom 301	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.49	2,050	0.0	$241.93	$1,172.40	$215.00	3.96
Classroom 301 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
Classroom 300	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.49	2,050	0.0	$241.93	$1,172.40	$215.00	3.96
Classroom 300 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
Classroom 302	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.49	2,050	0.0	$241.93	$1,172.40	$215.00	3.96
Classroom 302 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
Classroom 304	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.49	2,050	0.0	$241.93	$1,172.40	$215.00	3.96
Classroom 304 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
Classroom 102	17	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,375	Relamp	Yes	17	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,663	0.82	3,408	0.0	$402.18	$1,887.27	$375.00	3.76
Classroom 102	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,375	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,663	0.05	212	0.0	$25.08	$396.40	$35.00	14.41
Classroom 102	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	2	8,760	0.00	71	0.0	$8.32	$107.56	$0.00	12.92
Classroom 102 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
Classroom 114	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	2	8,760	0.00	71	0.0	$8.32	$107.56	$0.00	12.92
Classroom 114 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
Gym Entrance	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
Classroom 222	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.49	2,050	0.0	$241.93	$1,172.40	$215.00	3.96
Classroom 222 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
Classroom 222	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
Storage Closet	1	Compact Fluorescent: 2 x 17W CFLs	Wall Switch	34	1,188	Fixture Replacement	No	1	LED - Fixtures: Downlight Recessed	Wall Switch	12	1,188	0.01	30	0.0	$3.55	$57.51	$0.00	16.21
Classroom 224	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.49	2,050	0.0	$241.93	$1,172.40	$215.00	3.96
Classroom 224 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
Classroom 224	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Storage Closet	1	Compact Fluorescent: 2 x 17W CFLs	Wall Switch	34	600	Fixture Replacement	No	1	LED - Fixtures: Downlight Recessed	Wall Switch	12	600	0.01	15	0.0	$1.79	$57.51	$0.00	32.10
Classroom 219 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
Classroom 320 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
Classroom 318 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
Classroom 200 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
Classroom 204 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
Classroom 206 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
Classroom 202	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,375	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,663	0.49	2,050	0.0	$241.93	$1,172.40	$215.00	3.96
Classroom 202	1	Compact Fluorescent: 2 x 17W CFL	Wall Switch	34	2,375	Fixture Replacement	No	1	LED - Fixtures: Downlight Recessed	Wall Switch	12	2,375	0.01	60	0.0	$7.09	$57.51	$0.00	8.11
Classroom 202	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	2	8,760	0.00	71	0.0	$8.32	$107.56	$0.00	12.92
Classroom 202 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47
Classroom 303 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,188	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	832	0.03	57	0.0	$6.72	$174.50	$10.00	24.47

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 Rm	HHW Pump 1	1	Heating Hot Water Pump	7.5	88.5%	No	3,391	No	88.5%	Yes	1	0.95	9,326	0.0	$1,100.50	$3,606.80	$0.00	3.28
Boiler Rm	HHW Pump 1S	1	Heating Hot Water Pump	10.0	89.5%	No	3,391	Yes	91.7%	Yes	1	1.33	12,458	0.0	$1,470.14	$5,151.50	$0.00	3.50
Boiler Rm	HHW Pump 2	1	Heating Hot Water Pump	1.5	84.0%	No	2,745	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Cooling Tower	1	Cooling Tower Fan	15.0	92.4%	No	3,391	No	92.4%	Yes	1	0.00	17,864	0.0	$2,108.10	$5,194.45	$900.00	2.04
Boiler Rm	Cooling Tower Water	1	Condenser Water Pump	20.0	91.0%	No	3,391	No	91.0%	Yes	1	2.47	24,185	0.0	$2,854.04	$6,334.30	$1,200.00	1.80
Boiler Rm	Cooling Tower Water	1	Condenser Water Pump	20.0	91.0%	No	3,391	No	91.0%	Yes	1	2.47	24,185	0.0	$2,854.04	$6,334.30	$1,200.00	1.80
Boiler Rm	Closed Loop Pump (HP)	1	Water-Source Heat Pump Circulation Pump	20.0	93.0%	Yes	3,391	No	93.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Rm	Closed Loop Pump (HP)	1	Water-Source Heat Pump Circulation Pump	20.0	93.0%	Yes	3,391	No	93.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ERU FV5000	2	Supply Fan	1.0	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ERU FV5000	2	Exhaust Fan	1.0	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ERU FV4000	3	Supply Fan	1.0	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ERU FV4000	3	Exhaust Fan	1.0	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ERU FV2000	1	Supply Fan	1.0	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	ERU FV2000	1	Exhaust Fan	1.0	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Various	Class Room HP - G030VHN	8	Supply Fan	0.5	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Various	Class Room HP - G036VHN	7	Supply Fan	0.5	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Various	Class Room HP - G043VHN	7	Supply Fan	0.5	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Various	Class Room HP - G052VHN	13	Supply Fan	0.5	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Various	Class Room HP - G062VHN	6	Supply Fan	0.5	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Various	Class Room HP - G072VHN	1	Supply Fan	1.0	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	RTU 1A & 5	2	Supply Fan	2.0	84.0%	No	2,745	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 1B	1	Supply Fan	2.0	84.0%	No	2,745	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 2	1	Supply Fan	3.0	87.5%	No	2,745	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	TRU 3	1	Supply Fan	3.0	87.5%	No	2,745	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 4A & B	2	Supply Fan	5.0	87.5%	No	2,745	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	EF	4	Exhaust Fan	0.8	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	EF	2	Exhaust Fan	0.3	82.0%	No	2,745	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	EF	5	Exhaust Fan	0.2	82.0%	No	2,745	No	82.0%	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
Various	Class Room HP - G030VHN	6	Water Source HP	2.50	33.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Various	Class Room HP - G036VHN	7	Water Source HP	3.00	38.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Various	Class Room HP - G043VHN	7	Water Source HP	3.50	48.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Various	Class Room HP - G052VHN	13	Water Source HP	4.33	52.90	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Various	Class Room HP - G062VHN	6	Water Source HP	5.00	66.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Various	Class Room HP - G072VHN	1	Water Source HP	6.00	76.90	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 1A & 5	2	Packaged AC	7.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 1B	1	Packaged AC	8.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 2	1	Packaged AC	12.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 3	1	Packaged AC	15.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 4A & B	2	Packaged AC	20.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU-1 (Trane Split)	1	Split-System AC	5.00		Yes	1	Split-System AC	4.75		18.00		No	1.23	2,228	0.0	$262.87	$7,107.05	$437.00	25.37
Various	Class Room HP - G024VHN	2	Water Source HP	2.00	24.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Rm	School	8	Non-Condensing Hot Water Boiler	300.00	Yes	8	Condensing Hot Water Boiler	300.00	91.00%	Et	0.00	0	376.0	$3,167.95	$57,608.21	$8,000.00	15.66

Programmable Thermostat Recommendations

		Recommendation Inputs				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	Thermostat Quantity	Cooling Capacity of Controlled System (Tons)	Electric Heating Capacity of Controlled System (kBtu/hr)	Output Heating Capacity of Controlled System (MBh)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Various	School	50	230.00	0.00	2,400.00	0.00	28,578	161.4	$4,732.46	$16,493.50	$0.00	3.49

Low-Flow Device Recommendations

	Recommedation Inputs				Energy Impact & Financial Analysis						
Location	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Restrooms	14	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	19.7	$165.82	$100.38	$0.00	0.61
Classroom Restrooms	34	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	47.8	$402.70	$243.78	$0.00	0.61
Kitchen	1	Pre-Rinse Spray Valve	5.00	1.15	0.00	0	42.1	$354.66	$124.35	$0.00	0.35

Cooking Equipment Inventory & Recommendations

	Existing Conditions			Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	High Efficiency Equipement?	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	4	Gas Convection Oven (Half Size)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Gas Griddle (4 Feet Width)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	2	Gas Large Vat Fryer	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Electric Steamer	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Dishwasher Inventory & Recommendations

	Existing Conditions					Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Dishwasher Type	Water Heater Fuel Type	Booster Heater Fuel Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Payback w/ Incentives in Years
Kitchen	1	Door Type (High Temp)	Electric	N/A	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Various	506	Desktop Computers	120.0	Yes
Various	506	Computer Monitors	28.0	Yes
Various	2	Sm. Printers	13.0	Yes
Various	6	Lg. Copiers	380.0	Yes
Various	1	TV (27")	150.0	No
Various	9	Sm. Microwaves	800.0	No
Various	7	Refrigerator	750.0	Yes
Kitchen	3	Refrigerator	750.0	No
Kitchen	1	Ice Maker	750.0	No
Kitchen	1	Reach-in Cooler	750.0	No
Kitchen	2	Walk-in Coolers	5,000.0	No

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
TMES	1	Refrigerated	Yes	0.00	1,612	0.0	$190.21	$230.00	$0.00	1.21
TMES	1	Non-Refrigerated	Yes	0.00	343	0.0	$40.42	$230.00	$0.00	5.69

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Thurgood Marshall Elementary School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 94,025
Built: 1996

For Year Ending: October 31, 2016
Date Generated: October 13, 2017

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
Thurgood Marshall Elementary School 600 Monroe Avenue Asbury Park, New Jersey 07712	Asbury Park Board of Education 910 4th Avenue Asbury Park, NJ 07712 (732) 776-2606 x 2426	Geoffrey Hastings 910 4th Avenue Asbury Park, NJ 07712 (732) 776-2606 x 2426 hastingsg@asburypark.k12.nj.us

Property ID: 6050036

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
88.4 kBtu/ft²

Source EUI
180.3 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	3,934,256 (47%)
Natural Gas (kBtu)	4,378,750 (53%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	86.2
National Median Source EUI (kBtu/ft²)	175.9
% Diff from National Median Source EUI	2%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	669

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)