Local Government Energy Audit:
Energy Audit Report

Brick Township

Memorial High School

Brick Township Board of Education

2001 Lanes Mill Road

Brick, NJ 08723

April 16, 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 Veterans Memorial Middle School.

The goal of an LGEA report is to provide local governments with valuable information on their facilities' energy usage, to identify energy conservation measures (ECMs) and energy management options that may benefit their facilities, and to provide information on financial incentives from New Jersey's Clean Energy Programs (NJCEP) and other sources which may be available to assist with ECM implementation.

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

1.1 Facility Summary

Brick Township Memorial High School is a 275,846 square foot public school in Brick Township, New Jersey. It is a two-story building originally constructed in 1980, with an addition constructed in 2002. A 565-kW solar PV array was installed on the building's rooftop in 2010. The building is comprised of classrooms, administrative offices, a cafeteria, three gymnasiums, an auditorium, storage areas, locker rooms, and restrooms. The building is occupied ten months per year by approximately 1,659 students and 215 staff.

Interior lighting at Brick Township Memorial High School consists of mostly of 4-foot T8 and older T12 linear fluorescent fixtures. The auditorium is lit mostly by 75-Watt halogen spotlights. Lighting is controlled throughout the building by manual switches. Most exterior lighting, around the building perimeter and in parking lot areas, has recently been retrofitted with LEDs. Exterior lighting is controlled by timers.

Heating is provided to the original section of the building by two gas-fired 6,500 MBH input Weil McLain hot water boilers. The boilers provide perimeter heating to classroom unit ventilators and hot water to building's 17 air handling units (AHUs). The boilers were installed in 1980. Heating is supplied to the 2002 section by one H.B Smith gas-fired cast iron boiler with an input capacity of 1827 MBh.

Cooling is provided by three central chillers. 90% of the building is air conditioned. The main chiller is a 325-ton ultra-high efficiency Smardt water-cooled centrifugal chiller with magnetic bearings (installed in 2016). It supplies cooling to the 1980 section. A 170-ton Trane RTAC air-cooled scroll chiller supplies cooling for the 2002 section. There are also sixteen rooftop DX air conditioning units and five small ductless mini-split systems.

A thorough description of our observations regarding building equipment and operations is provided in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated 13 energy conservation measures. Eleven ECMs were determined to be "high priority" measures, which means that they would likely pay for themselves in energy savings alone over the rated useful lifetime of the new equipment. These eleven measures together represent an opportunity for Brick Township Memorial High School to reduce its annual energy costs by roughly $64,692 and annual greenhouse gas emissions by 686,900 lbs CO_2e. We estimate that if all measures are implemented as recommended, the project would pay for itself in 8.3 years. A breakdown of the facility's current utility costs and an estimate of potential annual utility savings are shown in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce Brick Township Memorial High School's annual energy usage by about 20% overall.

Figure 1 – Previous 12 Month Utility Costs

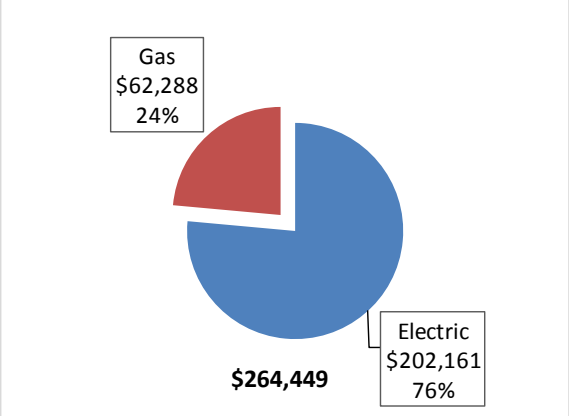
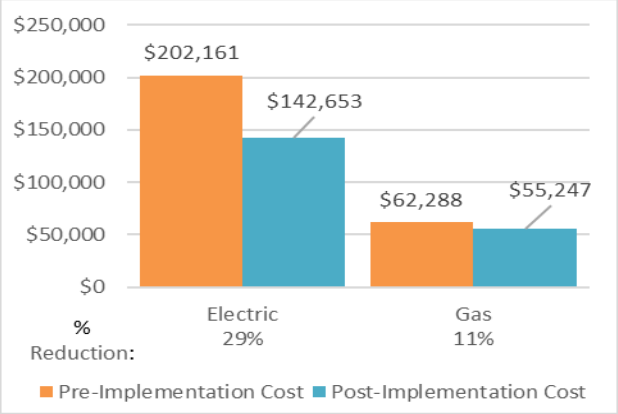


Figure 2 – Potential Post-Implementation Costs



A detailed description of Brick Township Memorial High School's existing energy use can be found in Section 3. Estimates of the total cost, energy savings, and financial incentives for the proposed energy efficient upgrades are summarized below in Figure 3. The measures that were evaluated but not considered to be a "high priority" measures were all upgrades to rooftop AC units. We chose not to include installation of new rooftop AC units and adding economizer controls to those units because of the higher cost associated with those upgrades relative to their resultant energy savings. On the other hand, ECM-10 "Install High Efficiency Hot Water Boilers" was deemed to be a "high priority" measure despite its longer payback period. A brief description of each ECM category can be found below and a detailed description of each ECM can be found in Section 4.

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	*Annual Natural Gas Savings (MMBtu)*	Annual 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			**374,736**	**95.8**	**0.0**	**0.0**	**$37,079.38**	**$269,589.16**	**$26,980.00**	**$242,609.16**	**6.5**	**377,356**
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	127,906	38.1	0.0	0.0	$12,655.99	$124,692.33	$0.00	$124,692.33	9.9	128,800
ECM 2	Retrofit Fixtures with LED Lamps	Yes	246,831	57.6	0.0	0.0	$24,423.39	$144,896.83	$26,980.00	$117,916.83	4.8	248,557
Lighting Control Measures			**68,312**	**17.8**	**0.0**	**0.0**	**$6,759.29**	**$66,564.00**	**$9,120.00**	**$57,444.00**	**8.5**	**68,789**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	68,312	17.8	0.0	0.0	$6,759.29	$66,564.00	$9,120.00	$57,444.00	8.5	68,789
Motor Upgrades			**5,242**	**1.2**	**0.0**	**0.0**	**$518.71**	**$15,835.36**	**$0.00**	**$15,835.36**	**30.5**	**5,279**
ECM 4	Premium Efficiency Motors	Yes	5,242	1.2	0.0	0.0	$518.71	$15,835.36	$0.00	$15,835.36	30.5	5,279
Variable Frequency Drive (VFD) Measures			**130,775**	**15.4**	**0.0**	**0.0**	**$12,939.88**	**$50,387.00**	**$3,300.00**	**$47,087.00**	**3.6**	**131,689**
ECM 5	Install VFDs on Constant Volume (CV) HVAC	Yes	14,784	3.9	0.0	0.0	$1,462.83	$10,388.90	$2,400.00	$7,988.90	5.5	14,887
ECM 6	Install VFDs on Chilled Water Pumps	Yes	35,497	3.6	0.0	0.0	$3,512.38	$10,388.90	$0.00	$10,388.90	3.0	35,745
ECM 7	Install VFDs on Hot Water Pumps	Yes	57,282	6.1	0.0	0.0	$5,667.98	$19,220.30	$0.00	$19,220.30	3.4	57,683
ECM 8	Install VFDs on Cooling Tower Fans	Yes	18,139	0.0	0.0	0.0	$1,794.79	$5,194.45	$900.00	$4,294.45	2.4	18,266
ECM 9	Install Air Compressors with VFDs	Yes	5,072	1.8	0.0	0.0	$501.90	$5,194.45	$0.00	$5,194.45	10.3	5,108
Electric Unitary HVAC Measures			**11,443**	**6.0**	**0.0**	**0.0**	**$1,132.26**	**$31,421.21**	**$1,951.50**	**$29,469.71**	**26.0**	**11,523**
	Install High Efficiency Electric AC	No	11,443	6.0	0.0	0.0	$1,132.26	$31,421.21	$1,951.50	$29,469.71	26.0	11,523
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**855.7**	**855.7**	**$7,041.39**	**$173,247.39**	**$0.00**	**$173,247.39**	**24.6**	**100,195**
ECM 10	Install High Efficiency Hot Water Boilers	Yes	0	0.0	855.7	855.7	$7,041.39	$173,247.39	$0.00	$173,247.39	24.6	100,195
HVAC System Improvements			**7,327**	**1.7**	**0.0**	**0.0**	**$725.00**	**$3,000.00**	**$1,250.00**	**$1,750.00**	**2.4**	**7,378**
	Install Dual Enthalpy Outside Economizer Control	No	7,327	1.7	0.0	0.0	$725.00	$3,000.00	$1,250.00	$1,750.00	2.4	7,378
Plug Load Equipment Control - Vending Machine			**3,566**	**0.0**	**0.0**	**0.0**	**$352.87**	**$690.00**	**$0.00**	**$690.00**	**2.0**	**3,591**
ECM 11	Vending Machine Control	Yes	3,566	0.0	0.0	0.0	$352.87	$690.00	$0.00	$690.00	2.0	3,591
TOTALS FOR ALL RECOMMENDED MEASURES			**582,631**	**130.1**	**855.7**	**855.7**	**$64,691.52**	**$576,312.91**	**$39,400.00**	**$536,912.91**	**8.3**	**686,899.6**
TOTALS FOR ALL EVALUATED MEASURES			**601,401**	**137.7**	**855.7**	**855.7**	**$66,548.78**	**$610,734.11**	**$42,601.50**	**$568,132.61**	**8.5**	**705,801**

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

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

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

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

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

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

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

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.

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 Best Practices

TRC also identified 16 low cost (or no cost energy) efficient best 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 best practices can extend equipment lifetime, improve occupant comfort, provide better health and safety, as well as reduce annual energy and O&M costs. It is our understanding Brick Township Board of Education is already implementing many of the best practices described in the audit reports, however they are listed for representative purposes only.

- Reduce Air Leakage
- Close Doors and Windows
- Turn Off Unneeded Motors
- Reduce Motor Short Cycling
- Perform Routine Motor Maintenance
- Use Fans to Reduce Cooling Load
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Assess Chillers & Request Tune-Ups
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Perform Proper Boiler Maintenance
- Perform Proper Water Heater Maintenance
- Perform Maintenance on Compressed Air Systems
- Install Plug Load Controls
- Replace Computer Monitors
- Water Conservation

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

On-Site Generation Measures

TRC evaluated the potential for installing on-site generation for Brick Township Memorial High School. Based on the configuration of the site and its loads there is a low potential for installing any PV and combined heat and power self-generation measures.

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

1.3 Implementation Planning

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

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

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

- SmartStart
- Pay for Performance - Existing Building (P4P)
- Energy Savings Improvement Program (ESIP)
- Demand Response Energy Aggregator

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

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

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the Energy Savings Improvement Program (ESIP). Supported directly by the NJBPU, ESIP provides government agencies with project development, design, and implementation support services, as well as, attractive financing for implementing ECMs. An LGEA report (or other approved energy audit) is required for participation in ESIP. Please refer to Section 8.3 for additional information on the ESIP Program.

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

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

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 4 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Will Kolibas	Exec Director of Facilities	wkolibas@brickschools.org	(732) 785-3000
James W. Edwards	Business Administrator	jedwards@brickschools.org	(732) 785-3000
TRC Energy Services			
Tom Page	Auditor	tpage@TRCsolutions.com	(732) 855-0033

2.2 General Site Information

On February 13, 2017, TRC performed an energy audit at Brick Township Memorial High School located in Brick, New Jersey. TRC's team met with Will Kolibas to review the facility operations and help focus our investigation on specific energy-using systems.

Brick Township Memorial High School is a 275,846 square foot public school in Brick Township, New Jersey. It is a two-story building originally constructed in 1980, with an addition constructed in 2002. A 565-kW solar PV array was installed on the building's rooftop in 2010.

The building is comprised of classrooms, administrative offices, a cafeteria, three gymnasiums, a large auditorium, corridors, storage areas, locker rooms, and restrooms.

2.3 Building Occupancy

The building is typically occupied from September through June by approximately 1,659 students and 215 staff. The class schedule runs Monday to Friday 8:00 AM to 4:00 PM, although there is some facility usage on the weekends.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Brick Township Memorial High School	Weekday	8am-4pm
Brick Township Memorial High School	Weekend	Closed

2.4 Building Envelope

The building is constructed of concrete masonry block with a brick façade. The building has a flat rubber roof with a light stone covering. Windows are all operable, double-paned, ¼-inch clear glass with aluminum frames. The window and door seals throughout the building were observed to be in good condition. No excessive air infiltration was noted around any windows or doors. However, some vents in the boiler room area were observed to be stuck open with cold air blowing in from outside.

Image 1: BMHS front exterior walls and windows

2.5 On-Site Generation

Brick Township Memorial High School installed a 565-kW solar PV system on the building's rooftop in 2010. The array completely covers the roof. There is no room for expansion of the current system. See Section 6 for more details.

2.6 Energy-Using Systems

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

Lighting System

Interior lighting at Brick Township Memorial High School consists of mostly of 4-foot T8 (32-Watt) and older T12 (40-Watt) linear fluorescent fixtures. The auditorium is lit mostly by 75-Watt halogen incandescent spotlights. Every other area is lit by linear fluorescents, plus a small number of compact fluorescents and incandescent. Lighting is controlled throughout the building by manual switches.

Most exterior lighting around the building perimeter and in parking lot areas has recently been retrofitted with LEDs. A few compact fluorescents and linear fluorescent fixtures remain near building entrances. Exterior lighting is controlled by timers.

Image 2: Building Interior and Exterior Lighting

Chilled Water or Condenser Water System

Cooling is provided by two central chillers, a new 325-ton Smardt water-cooled centrifugal chiller (installed in 2016) which supplies the 1980 section of the building, and a 170-ton Trane RTAC air-cooled scroll chiller that supplies the 2002 section. The Smardt chiller is a new ultra-high efficiency model with magnetic bearings. The Trane chiller is also a high efficiency model. It is 15 years old and in good condition.

Chilled water is distributed to chilled water coils in twelve AHUs throughout the building by six chilled water pumps (two 20-HP pumps, two 25-HP pumps, and two 15-HP pumps). The 20-HP pump motors are just two years old. They run at constant speed. The 25-HP pumps are also two years old. They distribute chilled water to the 2002 section of the building and are controlled by variable frequency drives (VFDs). The 15-HP pumps are 15 years old and run at constant speed.

A BAC cooling tower located outside the boiler room, provides cooling for the Smardt chiller. It has a 15-HP fan which is run at constant speed.

Image 3: Chillers and Cooling Towers

Heating, Ventilation, and Air Conditioning (HVAC) Systems

Heating is provided to the original section of the building by two gas-fired 6,500 MBH (input) Weil McLain hot water boilers. Boilers 1 & 2 provide perimeter heating to classroom unit ventilators and hot water to building's 17 air handling units (AHUs) via (2) 20 HP heating hot water pumps. The boilers were installed in 1980 and are in fair condition.

Perimeter classrooms and offices are supplied by unit ventilators with pneumatic controls. Two 7.5-HP compressors in the main boiler room supply compressed air for unit controls.

The compressors are old and in poor condition. One was not operating due to a broken belt and had been in that condition for some time. The one that was working was observed to cycle on and off frequently (about 4 times during the 15 min that we were there). When compressors cycle on and off frequently they waste a lot of energy. This is a sign that there is compressed air leakage at the pump or elsewhere in the system.

Heating is supplied to the 2002 section by one H.B Smith Series 28A gas-fired cast iron boiler (Boiler #3) with an input capacity of 1827 MBh. It is 15 years old and in good condition. Hot water is provided to the zones via two 5 HP heating hot water pumps.

Twelve of the Trane AHUs have heating and cooling coils, five are heating and ventilation only. In addition to the AHUs, there are nine Trane split system AC units. They range in size from 2 to 7.5 tons of cooling each. The condenser units for the split systems are on the roof. Three new Aaon/ Daikin AHUs supply the gym and the fans are controlled by VFDs. Most of the other AHUs are older units, run at constant volume, and are believed to be original to the building. (The date of last motor replacement for the older AHUs could not be determined.)

There are also five Aaon packaged AC units that supply the 2002 addition. These units range in size from 5 to 7 tons of cooling each.

There are also a few classrooms and a server room that are cooled by small ductless mini-split systems. There are five of these units which range in size from 1 to 4 tons of cooling each.

Image 4: Hot Water Boilers 1, 2 and 3

Image 5: Newer chilled water pumps and older hot water pumps and compressors

Image 6: Air handling units, packaged RTUs, and split systems

Image 7: Ductless mini-split systems

Domestic Hot Water Heating System

A heating hot water to domestic hot water heat exchanger in the main boiler room supplies most of the building's demand for domestic hot water. The heat exchanger is supplied by the main boilers. Hot water is stored in a 1,903-gallon Dura Adamson insulated storage tank.

The building also a new 100-gallon Bradford White water heater which supplies hot water to the original section of the building. It was installed in 2015. It is a standard efficiency model (~80% efficient) and in very good condition.

The 2002 section is supplied by an 85-gallon Lochinvar hot water heater. It is fourteen years old and in good condition. It is believed to be about 85% efficient.

Image 8: Domestic hot water heater

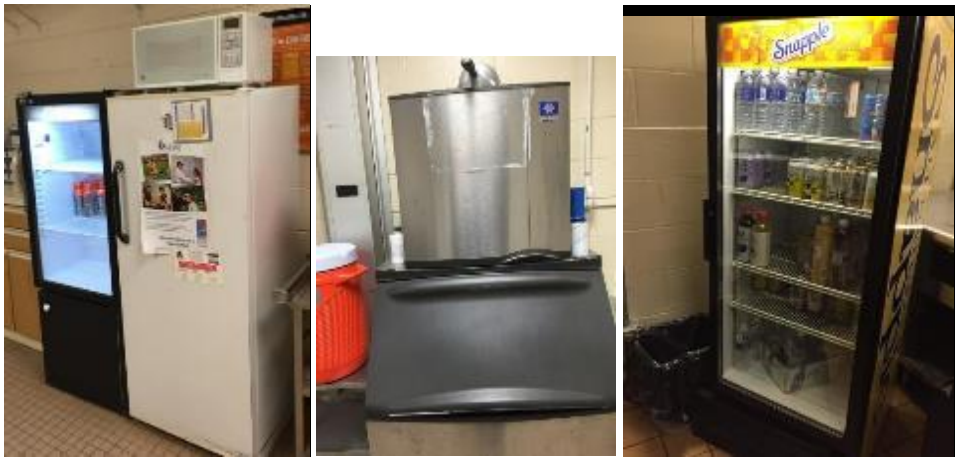
Refrigeration

The kitchen area has two walk-in coolers and one walk-in freezer. All three are manufactured by Southeast. Cooling capacity of each could not be determined, but they are estimated to provide about 2 tons of cooling each.

The kitchen area has nine other cabinet refrigeration units. There are four large double door commercial refrigerators and multiple smaller glass door display cabinet refrigerators and freezer chests. All appeared to be in good condition. There are also two Manitowoc ice makers.

We counted 11 standard refrigerators and six mini-refrigerators elsewhere in the school, used by school staff or in cooking classes.

Image 9: Refrigeration Units



Building Plug Load

There are approximately 331 computer work stations throughout the facility. Roughly 90% of the computers are desktop units with LCD monitors.

We also counted approximately 111 CRT televisions, 42 small to medium sized printers, seven large copy machines, four vending machines, and three server racks.

Most classrooms have a TV monitor which is left on throughout the day and used for school wide announcements. Replacing these with new flat screen TV monitors could significantly reduce classroom daily plug load. Vending machines can be retrofitted with controls to power the units down when the area is unoccupied. (See ECM-11 below.)

Image 10: Building Plug Load Equipment

2.7 Water-Using Systems

We counted 26 restrooms in the facility. We checked the fixtures for a representative sample of them. The restroom fixtures were found to meet current federal guidelines for water conserving low-flow devices (lavatory faucets were found to be 2.2 gallon per minute (gpm) or less, toilets were found to be 1.6 gallons per flush (gpf) or less, and urinals were found to be 1.0 gpf or less).

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

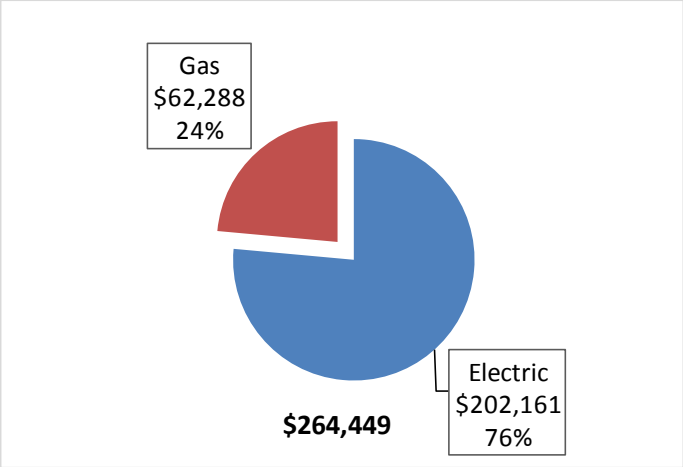
The following energy consumption and cost data is based on a recent 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 6 - Utility Summary

Utility Summary for Brick Township Memorial High School		
Fuel	**Usage**	**Cost**
Electricity	2,043,101 kWh	$202,161
Natural Gas	75,698 Therms	$62,288
Total		**$264,449**

The current annual energy cost for this facility is $264,449 as shown in the chart below.

Figure 7 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by JCP&L. The average electric cost over a recent 12-month period was found to be $0.099/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 slightly higher summer monthly usage is consist with a building that has a substantial cooling profile. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 8 - Electric Usage & Demand

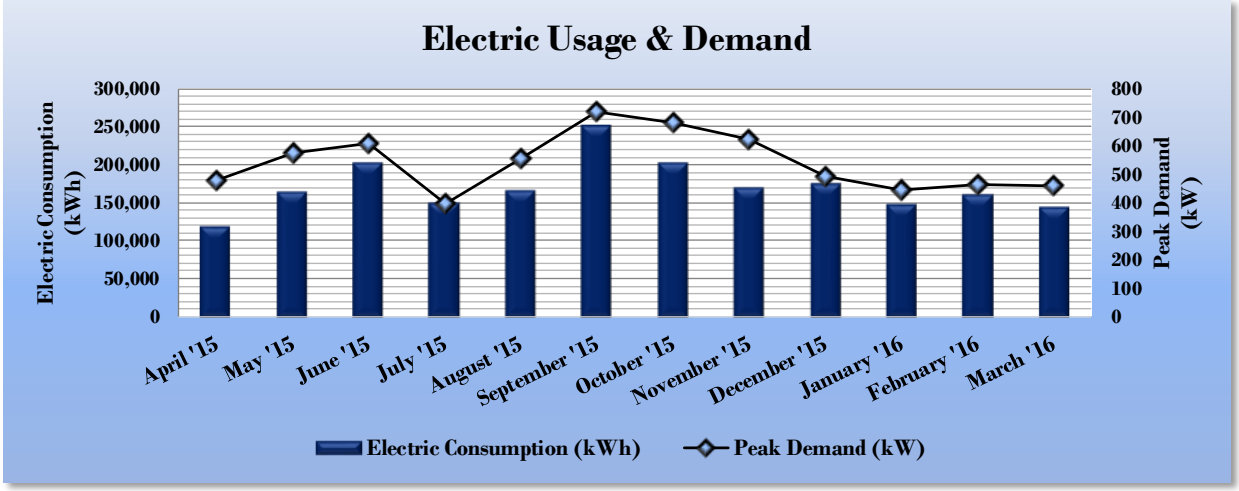


Figure 9 - Electric Usage & Demand

Electric Billing Data for Brick Township Memorial High School					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Total Electric Cost	TRC Estimated Usage?
4/27/15	32	119,013	479	$13,406	No
5/27/15	30	164,898	576	$16,790	No
6/26/15	30	203,736	608	$19,702	No
7/28/15	32	149,901	396	$14,349	No
8/27/15	30	166,770	554	$16,519	No
9/28/15	32	252,090	720	$24,315	No
10/28/15	30	202,966	680	$20,086	No
11/27/15	30	169,710	623	$17,061	No
12/29/15	32	175,374	493	$17,005	No
1/27/16	29	147,795	446	$14,490	No
2/25/16	29	161,868	464	$15,733	No
3/28/16	32	145,773	457	$14,366	No
Totals	**368**	**2,059,894**	**720**	**$203,822**	0
Annual	**365**	**2,043,101**	**720**	**$202,161**	

3.3 Natural Gas Usage

Natural gas is provided by NJ Natural Gas. The average gas cost over a recent 12-month period was found to be $0.823/therm, which is the blended rate used throughout the analyses in this report. The annual gas usage profile is consistent with a building which primarily relies on natural gas for heating. The monthly gas consumption is shown in the chart below.

Figure 10 - Natural Gas Usage

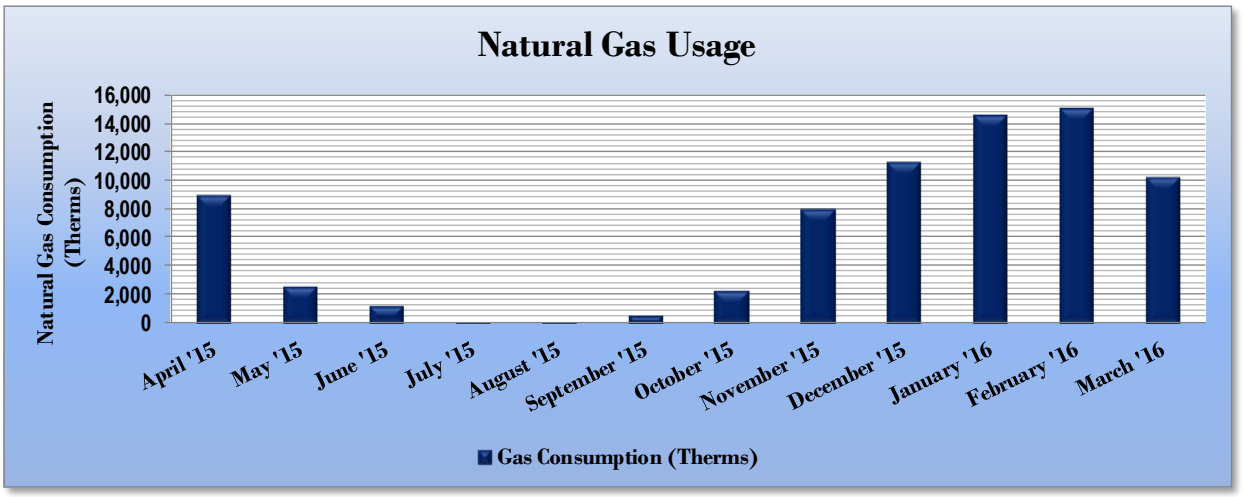


Figure 11 - Natural Gas Usage

Gas Billing Data for Brick Township Memorial High School			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
4/17/15	28	8,996	$9,455
5/19/15	32	2,638	$5,212
6/19/15	31	1,255	$1,668
7/23/15	34	107	$1,091
8/18/15	26	132	$1,113
9/17/15	30	548	$2,214
10/16/15	29	2,337	$1,964
11/17/15	32	8,044	$3,457
12/21/15	34	11,319	$7,383
1/21/16	31	14,538	$9,150
2/18/16	28	15,110	$11,338
3/17/16	28	10,260	$7,903
Totals	**363**	**75,283**	**$61,947**
Annual	**365**	**75,698**	**$62,288**

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 12 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Brick Township Memorial High School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	108.2	141.4
Site Energy Use Intensity (kBtu/ft^2)	52.7	58.2

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

Figure 13 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Brick Township Memorial High School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	82.3	141.4
Site Energy Use Intensity (kBtu/ft^2)	42.4	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. The school has a current score of 60, which means that it is slightly more efficient in its use of energy per square foot than the average school building of similar size and age.

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

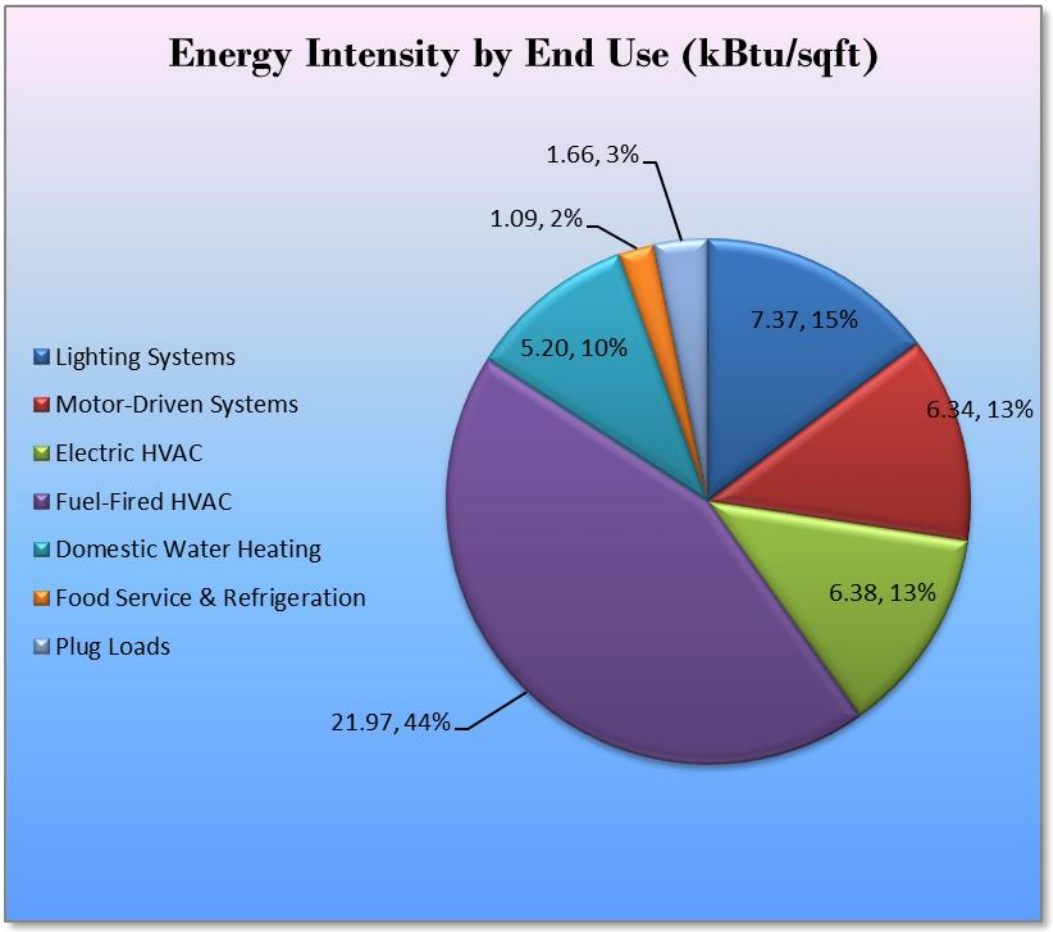
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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 14 - Energy Balance (kBtu/ft² and %)



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 Brick Township Memorial High 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 15 – 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		**374,736**	**95.8**	**0.0**	**$37,079.38**	**$269,589.16**	**$26,980.00**	**$242,609.16**	**6.5**	**377,356**
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	127,906	38.1	0.0	$12,655.99	$124,692.33	$0.00	$124,692.33	9.9	128,800
ECM 2	Retrofit Fixtures with LED Lamps	246,831	57.6	0.0	$24,423.39	$144,896.83	$26,980.00	$117,916.83	4.8	248,557
Lighting Control Measures		**68,312**	**17.8**	**0.0**	**$6,759.29**	**$66,564.00**	**$9,120.00**	**$57,444.00**	**8.5**	**68,789**
ECM 3	Install Occupancy Sensor Lighting Controls	68,312	17.8	0.0	$6,759.29	$66,564.00	$9,120.00	$57,444.00	8.5	68,789
Motor Upgrades		**5,242**	**1.2**	**0.0**	**$518.71**	**$15,835.36**	**$0.00**	**$15,835.36**	**30.5**	**5,279**
ECM 4	Premium Efficiency Motors	5,242	1.2	0.0	$518.71	$15,835.36	$0.00	$15,835.36	30.5	5,279
Variable Frequency Drive (VFD) Measures		**130,775**	**15.4**	**0.0**	**$12,939.88**	**$50,387.00**	**$3,300.00**	**$47,087.00**	**3.6**	**131,689**
ECM 5	Install VFDs on Constant Volume (CV) HVAC	14,784	3.9	0.0	$1,462.83	$10,388.90	$2,400.00	$7,988.90	5.5	14,887
ECM 6	Install VFDs on Chilled Water Pumps	35,497	3.6	0.0	$3,512.38	$10,388.90	$0.00	$10,388.90	3.0	35,745
ECM 7	Install VFDs on Hot Water Pumps	57,282	6.1	0.0	$5,667.98	$19,220.30	$0.00	$19,220.30	3.4	57,683
ECM 8	Install VFDs on Cooling Tower Fans	18,139	0.0	0.0	$1,794.79	$5,194.45	$900.00	$4,294.45	2.4	18,266
ECM 9	Install Air Compressors with VFDs	5,072	1.8	0.0	$501.90	$5,194.45	$0.00	$5,194.45	10.3	5,108
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**855.7**	**$7,041.39**	**$173,247.39**	**$0.00**	**$173,247.39**	**24.6**	**100,195**
ECM 10	Install High Efficiency Hot Water Boilers	0	0.0	855.7	$7,041.39	$173,247.39	$0.00	$173,247.39	24.6	100,195
Plug Load Equipment Control - Vending Machine		**3,566**	**0.0**	**0.0**	**$352.87**	**$690.00**	**$0.00**	**$690.00**	**2.0**	**3,591**
ECM 11	Vending Machine Control	3,566	0.0	0.0	$352.87	$690.00	$0.00	$690.00	2.0	3,591
TOTALS		**582,631**	**130.1**	**855.7**	**$64,691.52**	**$576,312.91**	**$39,400.00**	**$536,912.91**	**8.3**	**686,900**

* - 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

Recommended upgrades to existing lighting fixtures are summarized in Figure 16 below.

Figure 16 – 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		**374,736**	**95.8**	**0.0**	**$37,079.38**	**$269,589.16**	**$26,980.00**	**$242,609.16**	**6.5**	**377,356**
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	127,906	38.1	0.0	$12,655.99	$124,692.33	$0.00	$124,692.33	9.9	128,800
ECM 2	Retrofit Fixtures with LED Lamps	246,831	57.6	0.0	$24,423.39	$144,896.83	$26,980.00	$117,916.83	4.8	248,557

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: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	127,906	38.1	0.0	$12,655.99	$124,692.33	$0.00	$124,692.33	9.9	128,800
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend retrofitting existing T12 fluorescent fixtures by removing fluorescent tubes and ballasts and replacing them with LEDs and LED drivers, which are designed to be used retrofitted fluorescent fixtures. Many T8 fluorescent fixtures can retain existing ballasts when retrofitted with new LED lamps. However, with older T12 fixtures, we recommend replacing the ballasts in these fixtures along with the lamps.

The measure uses the existing fixture housing but replaces the rest of the components with more efficient lighting technology. This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of 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	244,635	57.3	0.0	$24,206.08	$143,926.06	$26,860.00	$117,066.06	4.8	246,345
Exterior	2,196	0.3	0.0	$217.30	$970.77	$120.00	$850.77	3.9	2,211

Measure Description

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

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

4.1.2 Lighting Control Measures

Figure 17 – 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		**68,312**	**17.8**	**0.0**	**$6,759.29**	**$66,564.00**	**$9,120.00**	**$57,444.00**	**8.5**	**68,789**
ECM 3	Install Occupancy Sensor Lighting Controls	68,312	17.8	0.0	$6,759.29	$66,564.00	$9,120.00	$57,444.00	8.5	68,789

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

ECM 3: Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
68,312	17.8	0.0	$6,759.29	$66,564.00	$9,120.00	$57,444.00	8.5	68,789

Measure Description

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

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

4.1.3 Motor Upgrades

Our recommended motor upgrades are summarized in Figure 18 below.

Figure 18- 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		**5,242**	**1.2**	**0.0**	**$518.71**	**$15,835.36**	**$0.00**	**$15,835.36**	**30.5**	**5,279**
ECM 4	Premium Efficiency Motors	5,242	1.2	0.0	$518.71	$15,835.36	$0.00	$15,835.36	30.5	5,279

ECM 4: 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)
5,242	1.2	0.0	$518.71	$15,835.36	$0.00	$15,835.36	30.5	5,279

Measure Description

We recommend replacing standard efficiency motors with *NEMA Premium™* high efficiency motors which meet EISA 2007 standards. Our evaluation assumes that existing motors will be replaced with motors of equivalent size and type. Although occasionally additional savings can be achieved by downsizing motors to better meet the motor's current load requirements. The base case motor efficiencies are estimated from nameplate information and our best estimates of motor run hours. Efficiencies of proposed motor upgrades are obtained from the *New Jersey's Clean Energy Program Protocols to Measure Resource Savings (2016)*. Savings are based on the difference between baseline and proposed efficiencies and the assumed annual operating hours.

4.1.4 Variable Frequency Drive Measures

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

Figure 19 – Summary of Variable Frequency Drive ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**130,775**	**15.4**	**0.0**	**$12,939.88**	**$50,387.00**	**$3,300.00**	**$47,087.00**	**3.6**	**131,689**
ECM 5	Install VFDs on Constant Volume (CV) HVAC	14,784	3.9	0.0	$1,462.83	$10,388.90	$2,400.00	$7,988.90	5.5	14,887
ECM 6	Install VFDs on Chilled Water Pumps	35,497	3.6	0.0	$3,512.38	$10,388.90	$0.00	$10,388.90	3.0	35,745
ECM 7	Install VFDs on Hot Water Pumps	57,282	6.1	0.0	$5,667.98	$19,220.30	$0.00	$19,220.30	3.4	57,683
ECM 8	Install VFDs on Cooling Tower Fans	18,139	0.0	0.0	$1,794.79	$5,194.45	$900.00	$4,294.45	2.4	18,266
ECM 9	Install Air Compressors with VFDs	5,072	1.8	0.0	$501.90	$5,194.45	$0.00	$5,194.45	10.3	5,108

ECM 5: Install VFDs on Constant Volume (CV) HVAC

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
14,784	3.9	0.0	$1,462.83	$10,388.90	$2,400.00	$7,988.90	5.5	14,887

Measure Description

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

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

ECM 6: Install VFDs on Chilled Water Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
35,497	3.6	0.0	$3,512.38	$10,388.90	$0.00	$10,388.90	3.0	35,745

Measure Description

We recommend installing a variable frequency drives (VFD) to control the two chilled water pumps (located in the 2nd floor mechanical room). The cost of upgrading existing pump motors with high efficiency motors was included in ECM-4. Adding VFD for better control of the CW pumps will provide additional energy savings.

This measure requires that chilled water coils be served by 2-way valves and that a differential pressure sensor be installed in the chilled water loop. As the chilled water valves close, the differential pressure increases. The VFD modulates pump speed to maintain a differential pressure setpoint. Energy savings results from reducing pump motor speed (and power) as chilled water valves close. The magnitude of energy savings is based on the estimated amount of time that the system operates at reduced loads.

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

ECM 7: Install VFDs on Hot Water Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
57,282	6.1	0.0	$5,667.98	$19,220.30	$0.00	$19,220.30	3.4	57,683

Measure Description

We recommend installing a variable frequency drives (VFD) to control a hot water pumps. The hot water pumps are very old and in need of replacement. The cost of upgrading existing pump motors with high efficiency motors was included in ECM-4. Adding VFDs for better control of the pumps will provide additional energy savings.

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

ECM 8: Install VFDs on Cooling Tower Fans

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
18,139	0.0	0.0	$1,794.79	$5,194.45	$900.00	$4,294.45	2.4	18,266

Measure Description

We recommend installing a variable frequency drives (VFD) to control the cooling tower fan motors. The VFD will allow the cooling tower fan to operate at the minimum speed necessary to maintain the temperature of the condenser water returning to the chiller. The fan motor is about 9 years old. It is still within its rated useful lifetime and need not be replaced. Though better control of the existing 15-HP fan motor should result in significant energy savings.

Energy savings results from reducing fan speed (and power) when there is a reduced load on the chiller and outside air wet bulb temperatures are depressed. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

ECM 9: Install VFDs on Air Compressors

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
5,072	1.8	0.0	$501.90	$5,194.45	$0.00	$5,194.45	10.3	5,108

Measure Description

We recommend installing variable frequency drives (VFD) on air compressors. BMHS has two 7.5-HP compressors, which are located in the main boiler room. They are both very old and in poor condition. We recommend that both be replaced. The cost of upgrading existing compressor motors with high efficiency motors was included in ECM-4. Adding a VFD for better control of the compressors will provide additional energy savings. Only one compressor is run at a time, so only one VFD is needed for control. Compressed air is used for pneumatic controls on unit ventilators throughout the school.

As an alternative measure (since the compressors are in need of replacement and the compressed air system might have leaks elsewhere too), the school might want to consider replacing all pneumatic controls throughout the building with modern direct digital controls (DDC) instead. If all current pneumatic controls could be replaced with DDC, then the need to operate the compressors might be eliminated altogether. This option should be investigated. A DDC upgrade measures that would replace all pneumatic controls throughout the school might be a more labor intensive (and therefore a more costly), but it would save the most energy over the long run. If only some pneumatic controls could be

eliminated from the system, then the compressors will need to be replaced, but they might be downsized. Care should be taken that replacement compressors are properly to best meet the system's current and future needs. Assessment of options to eliminate (or at least reduce) current compressed air demand will require a more in depth study of the building's HVAC system. If the building's compressed air usage cannot be eliminated, then we recommend upgrading the current compressors and adding VFD controls to minimize compressed air energy demand.

Air compressors that are controlled by a VFD will operate more efficiently at partial load conditions, modulating speed to match the demand for compressed air rather than mechanically unloading. Energy savings results from reducing compressor speed (and power) when there is a reduced load. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

4.1.5 Gas-Fired Heating System Replacements

Our recommendations for gas-fired heating system replacements are summarized in Figure 20 below.

Figure 20 - 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**	**855.7**	**$7,041.39**	**$173,247.39**	**$0.00**	**$173,247.39**	**24.6**	**100,195**
ECM 10	Install High Efficiency Hot Water Boilers	0	0.0	855.7	$7,041.39	$173,247.39	$0.00	$173,247.39	24.6	100,195

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	855.7	$7,041.39	$173,247.39	$0.00	$173,247.39	24.6	100,195

Measure Description

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

The most notable efficiency improvement is condensing hydronic boilers that can achieve over 90% efficiency under the proper conditions. Condensing hydronic boilers typically operate at efficiencies between 85% and 87% (comparable to other high efficiency boilers) when the return water temperature is above 130°F. The boiler efficiency increases as the return water temperature drops below 130°F.

Condensing hydronic boilers were recommended for this site, as the most efficient option, though additional analysis may be necessary to determine whether a new system would be able operate at the school with a return water temperature below 130°F. Also, while our analysis assumed a one-for-one replacement – i.e. two boilers being replaced by two similarly sized high efficiency models – additional

savings may be possible through replacement of the current boilers with multiple smaller modular units, which a designed to run more often at full load and start up only as needed.

4.1.6 Plug Load Equipment Control - Vending Machines

Our recommendations for plug load equipment is summarized in Figure 21 below.

Figure 21 – Summary of Plug Load Equipment 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	**3,566**	**0.0**	**0.0**	**$352.87**	**$690.00**	**$0.00**	**$690.00**	**2.0**	**3,591**
ECM 11 Vending Machine Control	3,566	0.0	0.0	$352.87	$690.00	$0.00	$690.00	2.0	3,591

ECM 11: 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)
3,566	0.0	0.0	$352.87	$690.00	$0.00	$690.00	2.0	3,591

Measure Description

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

4.2 ECMs Evaluated But Not Recommended

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

Figure 22 -Summary of Measures Evaluated, But Not Recommended

Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Electric Unitary HVAC Measures	**11,443**	**6.0**	**0.0**	**$1,132.26**	**$31,421.21**	**$1,951.50**	**$29,469.71**	**26.0**	**11,523**
Install High Efficiency Electric AC	11,443	6.0	0.0	$1,132.26	$31,421.21	$1,951.50	$29,469.71	26.0	11,523
HVAC System Improvements	**7,327**	**1.7**	**0.0**	**$725.00**	**$3,000.00**	**$1,250.00**	**$1,750.00**	**2.4**	**7,378**
Install Dual Enthalpy Outside Economizer Control	7,327	1.7	0.0	$725.00	$3,000.00	$1,250.00	$1,750.00	2.4	7,378
TOTALS	**18,770**	**7.6**	**0.0**	**$1,857.26**	**$34,421.21**	**$3,201.50**	**$31,219.71**	**16.8**	**18,901**

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

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

Install High Efficiency Air Conditioning Units

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
11,443	6.0	0.0	$1,132.26	$31,421.21	$1,951.50	$29,469.71	26.0	11,523

Measure Description

We evaluated the cost and benefits for replacement of five standard efficiency split system air conditioning units with high efficiency air conditioning units. We included in our analysis all units that were more than 15 years old.

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

Reasons for not Recommending

The payback period for the split system AC unit replacements were too long. The average was about 20 years for each. None of the units appeared to be in poor condition. So, there is no dire need for early replacement of these. Nevertheless, replacement of these older units would save some additional energy. Though, these measures are a lower priority and could be deferred for a few years.

Install Dual-Enthalpy Economizers

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)
7,327	1.7	0.0	$725.00	$3,000.00	$1,250.00	$1,750.00	2.4	7,378

Measure Description

Dual enthalpy economizers are used to control a ventilation system's outside air intake in order to reduce a facility's total cooling load. A dual-enthalpy economizer monitors the air temperature and humidity of both the outside and return air. The control supplies the lowest energy (temperature and humidity) air to the air handling system. When outside air conditions allow, outside air can be used for cooling instead of running the air handling system's compressor. This reduces the demand on the cooling system, lowering its usage hours and saving energy.

Savings result from using outside air instead of mechanical cooling when outside air conditions permit.

Reasons for not Recommending

We also looked at added economizer controls to the split system units that were over 15 years old. Because unit replacement was not determined to be a high priority measure at this time, adding additional controls should wait as well until the units are replaced. When the split system AC units are retired we recommend replacing them with new high efficiency units that include economizer controls.

5 ENERGY EFFICIENT BEST 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. The recommendations below are for informational purposes only and do not reflect actual efforts actively being performed by Brick Township Board of Education

Reduce Air Leakage

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

Close Doors and Windows

Ensure doors and windows are closed in conditioned spaces. Leaving doors and windows open leads to a significant increase in heat transfer between conditioned spaces and the outside air. Reducing a facility's air changes per hour (ACH) can lead to increased occupant comfort as well as significant heating and cooling savings, especially when combined with proper HVAC controls and adequate ventilation.

Turn Off Unneeded Motors

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

Reduce Motor Short Cycling

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

Perform Routine Motor Maintenance

Motors consist of many moving parts whose collective degradation can contribute to a significant loss of motor efficiency. 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.

Use Fans to Reduce Cooling Load

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

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.

Assess Chillers & Request Tune-Ups

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

Clean Evaporator/Condenser Coils on AC Systems

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

Clean and/or Replace HVAC Filters

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

Perform Proper Boiler Maintenance

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

Perform Proper Water Heater Maintenance

At least once a year, drain a few gallons out of the water heater using the drain valve. If there is a lot of sediment or debris, then a full flush is recommended. Turn the temperature down and then completely drain the tank. Once a year check for any leaks or heavy corrosion on the pipes and valves. For gas water heaters, check the draft hood and make sure it is placed properly, with a few inches of air space between

the tank and where it connects to the vent. Look for any corrosion or wear on the gas line and on the piping. If you noticed any black residue, soot or charred metal, this is a sign you may be having combustion issues and you should have the unit serviced by a professional. For electric water heaters, look for any signs of leaking such as rust streaks or residue around the upper and lower panels covering the electrical components on the tank. For water heaters over three to four years old have a technician inspect the sacrificial anode annually.

Perform Maintenance on Compressed Air Systems

Like all electro-mechanical equipment, compressed air systems require periodic maintenance to operate at peak efficiency. A maintenance plan should be developed for process related compressed air systems to include inspection, cleaning, and replacement of inlet filter cartridges, cleaning of drain traps, daily inspection of lubricant levels to reduce unwanted friction, inspection of belt condition and tension, checking for system leaks and adjustment of loose connections, and overall system cleaning. Contact a qualified technician for help with setting up periodic maintenance schedule.

Plug Load Controls

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

Replace Computer and TV Monitors

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

There are TV monitor in most classrooms used for school-wide announcements. Most were observed to be left on throughout the day. Upgrading to new high efficiency flat panel LCD TVs would help reduce classroom plug load.

Water Conservation

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

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

6 On-Site Generation Measures

On-site generation measure options include both renewable (e.g., solar, wind) and non-renewable (e.g., fuel cells) on-site technologies that generate power to meet all or a portion of the electric energy needs of a 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.

In 2010, Brick Memorial High School installed a 565-kW solar array on the building's rooftop. The image below shows that virtually every available square foot of flat unshaded roof space has been developed for solar electric generation. The site has been fully developed for solar power generation. No opprtunities for expansion of the current on-site solar generation appear to be availableat Brick Memorial High School.

Image 11: Aerial view of BMHS showing solar array

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

7 DEMAND RESPONSE

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

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

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

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

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

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

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

Based on the building's load profile, there may be some financial benefit to the school from participation in a demand response program. TRC recommends that the customer investigate DR opportunities for this facility.

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

Figure 23 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers				X
ECM 2	Retrofit Fixtures with LED Lamps	X			X
ECM 3	Install Occupancy Sensor Lighting Controls	X			X
ECM 4	Premium Efficiency Motors	X	X		X
ECM 5	Install VFDs on Constant Volume (CV) HVAC	X	X		X
ECM 6	Install VFDs on Chilled Water Pumps		X		X
ECM 7	Install VFDs on Hot Water Pumps		X		X
ECM 8	Install VFDs on Cooling Tower Fans	X	X		X
ECM 9	Install Air Compressors with VFDs		X		X
ECM 10	Install High Efficiency Hot Water Boilers		X		X
ECM 11	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 SS 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 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.

8.4 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
Boiler Rm	3	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,700	0.12	346	0.0	$34.24	$351.00	$0.00	10.25
Boiler Rm	6	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,700	Relamp	No	6	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,700	0.07	205	0.0	$20.31	$215.40	$30.00	9.13
Electrical Rm	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	800	Relamp & Reballast	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	800	0.15	217	0.0	$21.48	$468.00	$0.00	21.78
Electrical Rm	2	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	800	Relamp & Reballast	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	800	0.04	58	0.0	$5.74	$196.00	$0.00	34.18
Boiler Rm 2	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,275	Relamp & Reballast	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,275	0.08	173	0.0	$17.12	$234.00	$0.00	13.67
Lab Rm 274	14	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,125	Relamp	Yes	14	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,488	0.67	2,511	0.0	$248.48	$1,601.87	$315.00	5.18
Lab Rm 274	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,125	0.02	71	0.0	$7.01	$63.20	$0.00	9.01
Lab Rm 275	14	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,125	Relamp	Yes	14	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,488	0.67	2,511	0.0	$248.48	$1,601.87	$315.00	5.18
Lab Rm 275	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,125	0.02	71	0.0	$7.01	$63.20	$0.00	9.01
Lab Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,125	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,488	0.10	359	0.0	$35.50	$306.27	$60.00	6.94
Lab Rm 250	18	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.80	2,978	0.0	$294.66	$2,646.00	$70.00	8.74
Lab Rm 250 Storage	4	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	1,700	Relamp & Reballast	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,190	0.09	280	0.0	$27.74	$508.00	$20.00	17.59
Rm 225	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.55	2,038	0.0	$201.66	$1,710.00	$270.00	7.14
Rm 227	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.55	2,038	0.0	$201.66	$1,710.00	$270.00	7.14
Rm 229	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.55	2,038	0.0	$201.66	$1,710.00	$270.00	7.14
AV Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,700	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.11	326	0.0	$32.27	$350.00	$60.00	8.99
Break Rm	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.11	408	0.0	$40.33	$350.00	$60.00	7.19
Short Hallway	3	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	3,520	Relamp & Reballast	No	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,520	0.06	383	0.0	$37.85	$294.00	$0.00	7.77
Rm 236	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.55	2,038	0.0	$201.66	$1,710.00	$270.00	7.14
Rm 238	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.41	1,529	0.0	$151.25	$1,147.50	$185.00	6.36
Rm 240	25	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	25	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.68	2,548	0.0	$252.08	$2,002.50	$320.00	6.67
Mech Rm #3	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,000	Relamp	No	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,000	0.03	60	0.0	$5.97	$107.70	$15.00	15.52
Mech Rm #3	1	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	1,000	Relamp & Reballast	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,000	0.02	36	0.0	$3.58	$98.00	$0.00	27.34
Mech Rm #4	1	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	1,000	Relamp & Reballast	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,000	0.02	36	0.0	$3.58	$98.00	$0.00	27.34
Gym 1	80	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,125	Relamp	Yes	80	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,488	3.85	14,350	0.0	$1,419.87	$8,690.67	$1,740.00	4.90

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Gym 1	80	Linear Fluorescent - T8: 4' T8 (32W) - 6L	Wall Switch	176	2,125	Relamp	Yes	80	LED - Linear Tubes: (6) 4' Lamps	Occupancy Sensor	87	1,488	6.04	22,502	0.0	$2,226.53	$11,817.87	$2,540.00	4.17
Gym 2	16	Linear Fluorescent - T8: 4' T8 (32W) - 6L	Wall Switch	176	2,125	Relamp	Yes	16	LED - Linear Tubes: (6) 4' Lamps	Occupancy Sensor	87	1,488	1.21	4,500	0.0	$445.31	$2,687.57	$550.00	4.80
Gym 3	8	Linear Fluorescent - T8: 4' T8 (32W) - 6L	Wall Switch	176	2,125	Relamp	Yes	8	LED - Linear Tubes: (6) 4' Lamps	Occupancy Sensor	87	1,488	0.60	2,250	0.0	$222.65	$1,343.79	$275.00	4.80
Gym Equip Storage	6	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	2,125	Relamp & Reballast	Yes	6	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,488	0.14	526	0.0	$52.01	$704.00	$20.00	13.15
Gym Mech Rm 1	2	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	2,125	Relamp & Reballast	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.04	154	0.0	$15.23	$196.00	$0.00	12.87
Gym Mech Rm 2	2	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	1,000	Relamp & Reballast	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,000	0.04	72	0.0	$7.17	$196.00	$0.00	27.34
Sports Medicine	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,700	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.29	861	0.0	$85.19	$686.80	$140.00	6.42
Sports Medicine Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,700	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.10	287	0.0	$28.40	$306.27	$60.00	8.67
Trophy Case	6	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	3,520	Relamp & Reballast	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.23	1,433	0.0	$141.79	$702.00	$0.00	4.95
Boy's Locker Rm	46	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	46	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	1.26	4,688	0.0	$463.83	$3,771.00	$600.00	6.84
Boy's Locker Rm	10	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	2,125	Relamp & Reballast	Yes	10	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,488	0.23	876	0.0	$86.69	$1,250.00	$35.00	14.02
Gym Office	8	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.36	1,059	0.0	$104.77	$1,052.00	$20.00	9.85
Gym Office Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,000	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	700	0.05	96	0.0	$9.49	$233.00	$40.00	20.34
Restroom	1	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	1,275	Relamp & Reballast	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	893	0.02	53	0.0	$5.20	$214.00	$0.00	41.14
Restroom	1	Incandescent: 60W Screw-in Bulbs	Wall Switch	60	1,275	Relamp	Yes	1	LED Screw-In Lamps: 9W LED Bulbs	Occupancy Sensor	9	893	0.04	79	0.0	$7.79	$169.75	$5.00	21.15
Girl's Locker Rm	46	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	46	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	1.26	4,688	0.0	$463.83	$3,771.00	$600.00	6.84
Girl's Locker Rm	10	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	2,125	Relamp & Reballast	Yes	10	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,488	0.23	876	0.0	$86.69	$1,250.00	$35.00	14.02
Gym Office	8	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.36	1,059	0.0	$104.77	$1,052.00	$20.00	9.85
Gym Office Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,000	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	700	0.05	96	0.0	$9.49	$233.00	$40.00	20.34
Restroom	1	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	1,275	Relamp & Reballast	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	893	0.02	53	0.0	$5.20	$214.00	$0.00	41.14
Restroom	1	Incandescent: 60W Screw-in Bulbs	Wall Switch	60	1,275	Relamp	Yes	1	LED Screw-In Lamps: 9W LED Bulbs	Occupancy Sensor	9	893	0.04	79	0.0	$7.79	$169.75	$5.00	21.15
Concession Stand	3	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,275	Relamp & Reballast	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,275	0.12	260	0.0	$25.68	$351.00	$0.00	13.67
Boy's Rm	3	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.13	496	0.0	$49.11	$621.00	$35.00	11.93
Janitor's Closet	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	3,520	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.04	239	0.0	$23.63	$117.00	$0.00	4.95

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Auditorium	52	Halogen Incandescent: 75W Halogen Spotlight Bulbs	Wall Switch	75	3,520	Relamp	No	52	LED Screw-In Lamps: 12W LED Spotlight Bulbs	Wall Switch	12	3,520	2.15	13,261	0.0	$1,312.17	$2,540.36	$260.00	1.74
Stage	10	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,275	Relamp & Reballast	No	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,275	0.39	865	0.0	$85.60	$1,170.00	$0.00	13.67
Chorus Rm	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.55	2,038	0.0	$201.66	$1,710.00	$270.00	7.14
Chorus Rm Storage	6	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	1,200	Relamp & Reballast	Yes	6	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	840	0.14	297	0.0	$29.37	$704.00	$20.00	23.29
Server Rm	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,520	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.04	267	0.0	$26.44	$117.00	$20.00	3.67
Cafeteria 1	88	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,520	Relamp	Yes	88	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,464	2.41	14,855	0.0	$1,469.83	$7,308.00	$1,160.00	4.18
Kitchen	66	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	2,125	Relamp & Reballast	No	66	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	1.36	5,081	0.0	$502.71	$6,468.00	$0.00	12.87
Serving Line	34	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	2,125	Relamp & Reballast	No	34	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.70	2,617	0.0	$258.97	$3,332.00	$0.00	12.87
Serving Line	6	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,125	0.23	865	0.0	$85.60	$702.00	$0.00	8.20
Kitchen Equip Storage	12	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	3,520	Relamp & Reballast	Yes	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,464	0.28	1,741	0.0	$172.31	$1,292.00	$20.00	7.38
Kitchen Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,700	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.08	245	0.0	$24.20	$291.50	$50.00	9.98
Kitchen Locker Rm	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,275	Relamp & Reballast	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	893	0.04	99	0.0	$9.82	$233.00	$0.00	23.72
Kitchen Locker Rm	1	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	1,275	Relamp & Reballast	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	893	0.02	53	0.0	$5.20	$98.00	$0.00	18.84
Broom Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,520	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.04	267	0.0	$26.44	$117.00	$20.00	3.67
Kitchen Office	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.04	132	0.0	$13.10	$233.00	$0.00	17.79
Kitchen Office	1	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	1,700	Relamp & Reballast	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,190	0.02	70	0.0	$6.93	$98.00	$0.00	14.13
Custodial Area	7	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	2,125	Relamp & Reballast	Yes	7	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,488	0.16	613	0.0	$60.68	$956.00	$35.00	15.18
Custodial Locker Rm	1	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	2,125	Relamp & Reballast	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,488	0.02	88	0.0	$8.67	$214.00	$0.00	24.69
Custodial Restroom	1	Incandescent: 60W Screw-in Bulbs	Wall Switch	60	1,000	Relamp	Yes	1	LED Screw-In Lamps: 9W LED Bulbs	Occupancy Sensor	9	700	0.04	62	0.0	$6.11	$169.75	$5.00	26.96
Custodial Office	4	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	1,700	Relamp & Reballast	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,190	0.09	280	0.0	$27.74	$508.00	$20.00	17.59
Cafeteria 2	54	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,520	Relamp	Yes	54	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,464	2.60	16,045	0.0	$1,587.59	$6,487.20	$1,255.00	3.30
Cafeteria Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,000	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	700	0.05	96	0.0	$9.49	$233.00	$40.00	20.34
Culinary Arts	17	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,125	Relamp	Yes	17	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,488	0.82	3,049	0.0	$301.72	$1,887.27	$375.00	5.01
Culinary Arts	8	Incandescent: 60W Screw-in Bulbs	Wall Switch	60	2,125	Relamp	No	8	LED Screw-In Lamps: 9W LED Bulbs	Wall Switch	9	2,125	0.27	997	0.0	$98.66	$430.02	$40.00	3.95
Culinary Arts	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,488	0.05	190	0.0	$18.81	$242.40	$20.00	11.82

	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
Culinary Arts Pantry	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,200	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	840	0.05	115	0.0	$11.39	$233.00	$20.00	18.70
Computer Rm 154	25	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	25	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	1.11	4,136	0.0	$409.25	$3,465.00	$70.00	8.30
Rm 153	15	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,125	Relamp	Yes	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,488	0.72	2,691	0.0	$266.23	$1,697.00	$335.00	5.12
Childcare	21	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,125	Relamp	Yes	21	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,488	1.01	3,767	0.0	$372.72	$2,537.80	$490.00	5.49
Childcare Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,275	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	893	0.19	430	0.0	$42.60	$496.53	$100.00	9.31
Childcare Classroom	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,125	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,488	0.43	1,614	0.0	$159.74	$1,126.20	$215.00	5.70
Childcare Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,000	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	700	0.05	84	0.0	$8.35	$211.13	$20.00	22.88
Rm 151	20	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,125	Relamp	Yes	20	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,488	0.96	3,587	0.0	$354.97	$2,442.67	$470.00	5.56
Back Corridor	28	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,520	Relamp	No	28	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.61	3,740	0.0	$370.10	$1,638.00	$280.00	3.67
Band Rm	16	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	Yes	16	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,488	0.23	854	0.0	$84.53	$844.40	$115.00	8.63
Rm 110	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.25	917	0.0	$90.75	$796.50	$125.00	7.40
Rm 109	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.25	917	0.0	$90.75	$796.50	$125.00	7.40
Rm 108	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.25	917	0.0	$90.75	$796.50	$125.00	7.40
Rm 107	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.16	611	0.0	$60.50	$621.00	$95.00	8.69
Rm 106	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.33	1,223	0.0	$121.00	$972.00	$155.00	6.75
Rm 105	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.33	1,223	0.0	$121.00	$972.00	$155.00	6.75
Faculty Rm	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.25	917	0.0	$90.75	$796.50	$125.00	7.40
Men's Rm	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,275	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	893	0.09	199	0.0	$19.64	$504.00	$35.00	23.87
Women's Rm	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,275	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	893	0.09	199	0.0	$19.64	$504.00	$35.00	23.87
Rear Foyer	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,520	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.26	1,603	0.0	$158.61	$702.00	$120.00	3.67
1st Flr Corridors	34	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,520	Relamp	No	34	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.74	4,542	0.0	$449.41	$1,989.00	$340.00	3.67
Corridor (Auditorium/Gym)	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,520	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.39	2,405	0.0	$237.92	$1,053.00	$180.00	3.67
Front Foyer	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,520	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.13	802	0.0	$79.31	$351.00	$60.00	3.67
Front Entrance	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,520	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,520	0.36	2,204	0.0	$218.09	$827.20	$165.00	3.04
Front Vestibule	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,520	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.06	401	0.0	$39.65	$175.50	$30.00	3.67

	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
Women's Rm	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,700	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.05	163	0.0	$16.13	$387.00	$55.00	20.58
Social Studies	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.16	611	0.0	$60.50	$621.00	$95.00	8.69
Storage Rm	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,000	Relamp & Reballast	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	700	0.04	78	0.0	$7.70	$233.00	$0.00	30.25
Rm 104	15	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	2,125	Relamp & Reballast	Yes	15	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,488	0.35	1,314	0.0	$130.03	$1,740.00	$35.00	13.11
Rm 103	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.62	2,293	0.0	$226.87	$1,398.00	$260.00	5.02
Rm 102	18	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.80	2,978	0.0	$294.66	$2,646.00	$70.00	8.74
Principal's Office	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.18	529	0.0	$52.38	$584.00	$20.00	10.77
Principal's Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,700	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.19	574	0.0	$56.79	$496.53	$100.00	6.98
Office	3	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.13	397	0.0	$39.29	$467.00	$20.00	11.38
Rm 120	9	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,488	0.80	2,978	0.0	$294.66	$1,726.50	$35.00	5.74
Control Rm	3	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	2,125	Relamp & Reballast	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,488	0.27	993	0.0	$98.22	$601.50	$20.00	5.92
Control Rm	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,125	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,488	0.05	179	0.0	$17.75	$211.13	$40.00	9.64
Side Office 1	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.09	265	0.0	$26.19	$350.00	$20.00	12.60
Side Office 2	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.09	265	0.0	$26.19	$350.00	$20.00	12.60
TV Studio	7	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	No	7	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,700	0.27	807	0.0	$79.89	$819.00	$0.00	10.25
Corridor (near TV Studio)	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,700	Relamp	No	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,700	0.19	581	0.0	$57.45	$526.50	$90.00	7.60
Editing Rm 1	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.18	529	0.0	$52.38	$584.00	$20.00	10.77
Editing Rm 2	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.09	265	0.0	$26.19	$350.00	$20.00	12.60
Mid Corridor (Left)	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,520	Relamp	No	24	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.52	3,206	0.0	$317.23	$1,404.00	$240.00	3.67
Corridor (Mid to Back)	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,520	Relamp	No	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.19	1,202	0.0	$118.96	$526.50	$90.00	3.67
Corridor (Mid to Front)	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,520	Relamp	No	16	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.35	2,137	0.0	$211.49	$936.00	$160.00	3.67
Corridor by Gym	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,520	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.32	2,004	0.0	$198.27	$877.50	$150.00	3.67
Trophy Cases	12	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	3,520	Relamp & Reballast	No	12	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,520	0.25	1,530	0.0	$151.40	$1,176.00	$0.00	7.77
Boy's Rm	3	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.13	496	0.0	$49.11	$621.00	$35.00	11.93
Girl's Rm	3	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.13	496	0.0	$49.11	$621.00	$35.00	11.93

	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
Guidance Office	17	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,700	Relamp	Yes	17	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.46	1,386	0.0	$137.13	$1,264.50	$205.00	7.73
Guidance Office 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,700	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.10	287	0.0	$28.40	$306.27	$60.00	8.67
Guidance Office 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,700	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.10	287	0.0	$28.40	$306.27	$60.00	8.67
Guidance Office 3	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,700	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.10	287	0.0	$28.40	$306.27	$60.00	8.67
Guidance Office 4	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,700	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.10	287	0.0	$28.40	$306.27	$60.00	8.67
Guidance Office 5	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,700	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.10	287	0.0	$28.40	$306.27	$60.00	8.67
Guidance Office 6	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,700	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.10	287	0.0	$28.40	$306.27	$60.00	8.67
Guidance Office 7	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,700	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.10	287	0.0	$28.40	$306.27	$60.00	8.67
Guidance Office 8	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,700	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.10	287	0.0	$28.40	$306.27	$60.00	8.67
Guidance Office 9	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,700	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.10	287	0.0	$28.40	$306.27	$60.00	8.67
Conf Rm	4	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	1,700	Relamp & Reballast	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.36	1,059	0.0	$104.77	$763.33	$20.00	7.09
Men's Rm	2	Incandescent: 60W Screw-in Bulbs	Wall Switch	60	1,275	Relamp	Yes	2	LED Screw-In Lamps: 9W LED Bulbs	Occupancy Sensor	9	893	0.07	157	0.0	$15.58	$223.51	$30.00	12.42
Women's Rm	2	Incandescent: 60W Screw-in Bulbs	Wall Switch	60	1,275	Relamp	Yes	2	LED Screw-In Lamps: 9W LED Bulbs	Occupancy Sensor	9	893	0.07	157	0.0	$15.58	$223.51	$30.00	12.42
Bookkeeper Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,700	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.05	163	0.0	$16.13	$233.00	$40.00	11.96
Conf Rm	4	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	1,700	Relamp & Reballast	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.36	1,059	0.0	$104.77	$763.33	$20.00	7.09
Break Rm	6	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.27	794	0.0	$78.58	$818.00	$20.00	10.16
Conf Rm	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,700	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.19	574	0.0	$56.79	$496.53	$100.00	6.98
Social Worker Office 1	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,700	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.14	430	0.0	$42.60	$401.40	$80.00	7.55
Social Worker Office 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,700	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.10	287	0.0	$28.40	$306.27	$60.00	8.67
Social Worker Office 3	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,700	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.10	287	0.0	$28.40	$306.27	$60.00	8.67
Social Worker Office 4	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,700	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.10	287	0.0	$28.40	$306.27	$60.00	8.67
SW File Rm	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,275	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	893	0.10	215	0.0	$21.30	$306.27	$60.00	11.56
Child Study Team Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,700	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.19	574	0.0	$56.79	$496.53	$100.00	6.98
CST Meeting Rm	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,700	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.10	287	0.0	$28.40	$306.27	$60.00	8.67
CST File Rm	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,275	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	893	0.10	215	0.0	$21.30	$306.27	$60.00	11.56

	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
Rm 119	16	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,125	Relamp	Yes	16	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,488	0.77	2,870	0.0	$283.97	$1,792.13	$355.00	5.06
Front Door Foyer	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,520	Relamp	No	4	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,520	0.15	907	0.0	$89.72	$380.53	$80.00	3.35
Nurse's Office	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,700	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.16	489	0.0	$48.40	$621.00	$95.00	10.87
Nurse's Office	6	Compact Fluorescent: 17W CFL Bulbs	Wall Switch	17	1,700	Relamp	No	6	LED Screw-In Lamps: 9W LED Bulbs	Wall Switch	9	1,700	0.03	94	0.0	$9.29	$322.52	$0.00	34.73
Nurse's Restroom	2	Compact Fluorescent: 17W CFL Bulbs	Wall Switch	17	1,200	Relamp	No	2	LED Screw-In Lamps: 9W LED Bulbs	Wall Switch	9	1,200	0.01	22	0.0	$2.18	$107.51	$0.00	49.21
Nurse's Office Storage	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,000	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	700	0.09	156	0.0	$15.41	$350.00	$20.00	21.42
Nurse - Office 1	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.18	529	0.0	$52.38	$584.00	$20.00	10.77
Nurse - Office 2	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.09	265	0.0	$26.19	$350.00	$20.00	12.60
Wood Shop	50	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	2,125	Relamp & Reballast	Yes	50	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,488	1.17	4,380	0.0	$433.43	$5,980.00	$140.00	13.47
Band Rm	29	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	2,125	Relamp & Reballast	Yes	29	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,488	0.68	2,541	0.0	$251.39	$3,382.00	$70.00	13.17
Band Rm	41	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	41	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	1.12	4,178	0.0	$413.41	$2,938.50	$480.00	5.95
Band Rm Storage	2	Compact Fluorescent: 17W CFL Bulbs	Wall Switch	17	1,275	Relamp	No	2	LED Screw-In Lamps: 9W LED Bulbs	Wall Switch	9	1,275	0.01	23	0.0	$2.32	$107.51	$0.00	46.31
Band Rm Office	2	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	1,700	Relamp & Reballast	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,190	0.05	140	0.0	$13.87	$312.00	$0.00	22.49
Reception Office	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,700	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.38	1,148	0.0	$113.59	$1,031.07	$195.00	7.36
Vice Pincipal's Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,700	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.19	574	0.0	$56.79	$496.53	$100.00	6.98
Detective's Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,700	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.19	574	0.0	$56.79	$496.53	$100.00	6.98
1st Flr Corridor (New Wing)	28	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,520	Relamp	No	28	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,520	1.03	6,347	0.0	$628.05	$2,663.73	$560.00	3.35
Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,275	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	893	0.05	122	0.0	$12.10	$233.00	$40.00	15.95
Lab Rm 172	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.57	2,140	0.0	$211.75	$1,322.80	$245.00	5.09
Lab Rm 172	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.02	86	0.0	$8.46	$71.80	$10.00	7.30
Lab Rm 172	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,125	0.02	71	0.0	$7.01	$63.20	$0.00	9.01
Lab Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.08	306	0.0	$30.25	$266.40	$50.00	7.15
Lab Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.05	204	0.0	$20.17	$233.00	$40.00	9.57
Lab Rm 171	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.57	2,140	0.0	$211.75	$1,322.80	$245.00	5.09
Lab Rm 171	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	4	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.05	171	0.0	$16.93	$143.60	$20.00	7.30

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Lab Rm 171	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,125	0.04	161	0.0	$15.96	$117.00	$20.00	6.08
Lab Rm 171	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,125	0.02	71	0.0	$7.01	$63.20	$0.00	9.01
Rm 170	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.49	1,834	0.0	$181.50	$1,172.40	$215.00	5.27
Rm 170	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.02	86	0.0	$8.46	$71.80	$10.00	7.30
Rm 169	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.49	1,834	0.0	$181.50	$1,172.40	$215.00	5.27
Rm 169	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.02	86	0.0	$8.46	$71.80	$10.00	7.30
Rm 168	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.49	1,834	0.0	$181.50	$1,172.40	$215.00	5.27
Rm 168	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.02	86	0.0	$8.46	$71.80	$10.00	7.30
Rm 167	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.49	1,834	0.0	$181.50	$1,172.40	$215.00	5.27
Rm 167	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.02	86	0.0	$8.46	$71.80	$10.00	7.30
Rm 166	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.49	1,834	0.0	$181.50	$1,172.40	$215.00	5.27
Rm 166	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.02	86	0.0	$8.46	$71.80	$10.00	7.30
Rm 165	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.25	917	0.0	$90.75	$721.20	$125.00	6.57
Rm 165	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.02	86	0.0	$8.46	$71.80	$10.00	7.30
Rm 164	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.49	1,834	0.0	$181.50	$1,172.40	$215.00	5.27
Rm 164	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.02	86	0.0	$8.46	$71.80	$10.00	7.30
Rm 163	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.49	1,834	0.0	$181.50	$1,172.40	$215.00	5.27
Rm 163	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.02	86	0.0	$8.46	$71.80	$10.00	7.30
Rm 162	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.49	1,834	0.0	$181.50	$1,172.40	$215.00	5.27
Rm 162	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.02	86	0.0	$8.46	$71.80	$10.00	7.30
Rm 161	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.49	1,834	0.0	$181.50	$1,172.40	$215.00	5.27
Rm 161	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.02	86	0.0	$8.46	$71.80	$10.00	7.30
Rm 160	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.49	1,834	0.0	$181.50	$1,172.40	$215.00	5.27
Rm 160	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.02	86	0.0	$8.46	$71.80	$10.00	7.30
Storage Closet	1	Compact Fluorescent: 17W CFL Bulbs	Wall Switch	17	1,200	Relamp	No	1	LED Screw-In Lamps: 9W LED Bulbs	Wall Switch	9	1,200	0.01	11	0.0	$1.09	$53.75	$0.00	49.21

	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
Stairwell	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,520	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.04	267	0.0	$26.44	$117.00	$20.00	3.67
Stairwell	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,200	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	840	0.05	115	0.0	$11.39	$233.00	$40.00	16.95
Custodial Closet	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	800	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	800	0.02	27	0.0	$2.64	$63.20	$0.00	23.94
Custodial Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	800	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	800	0.02	30	0.0	$3.00	$58.50	$10.00	16.14
Women's Rm	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,275	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	893	0.05	122	0.0	$12.10	$233.00	$40.00	15.95
Men's Rm	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	0	0.05	303	0.0	$29.98	$233.00	$40.00	6.44
Lab Rm 272	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.57	2,140	0.0	$211.75	$1,322.80	$245.00	5.09
Lab Rm 272	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.02	86	0.0	$8.46	$71.80	$10.00	7.30
Lab Rm 272	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,125	0.02	71	0.0	$7.01	$63.20	$0.00	9.01
Lab Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,700	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,190	0.08	245	0.0	$24.20	$266.40	$50.00	8.94
Lab Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,700	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.05	163	0.0	$16.13	$233.00	$40.00	11.96
Lab Rm 271	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.57	2,140	0.0	$211.75	$1,322.80	$245.00	5.09
Lab Rm 271	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	4	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.05	171	0.0	$16.93	$143.60	$20.00	7.30
Lab Rm 271	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,125	0.04	161	0.0	$15.96	$117.00	$20.00	6.08
Lab Rm 271	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,125	0.02	71	0.0	$7.01	$63.20	$0.00	9.01
Rm 270	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.49	1,834	0.0	$181.50	$1,172.40	$215.00	5.27
Rm 270	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.02	86	0.0	$8.46	$71.80	$10.00	7.30
Rm 269	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.49	1,834	0.0	$181.50	$1,172.40	$215.00	5.27
Rm 269	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.02	86	0.0	$8.46	$71.80	$10.00	7.30
Rm 268	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.49	1,834	0.0	$181.50	$1,172.40	$215.00	5.27
Rm 268	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.02	86	0.0	$8.46	$71.80	$10.00	7.30
Rm 267	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.49	1,834	0.0	$181.50	$1,172.40	$215.00	5.27
Rm 267	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.02	86	0.0	$8.46	$71.80	$10.00	7.30
Rm 266	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.49	1,834	0.0	$181.50	$1,172.40	$215.00	5.27

	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
Rm 266	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.02	86	0.0	$8.46	$71.80	$10.00	7.30
Rm 265	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.49	1,834	0.0	$181.50	$1,018.40	$200.00	4.51
Rm 265	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,488	0.03	107	0.0	$10.57	$71.80	$10.00	5.85
Rm 264	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.49	1,834	0.0	$181.50	$1,172.40	$215.00	5.27
Rm 264	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.02	86	0.0	$8.46	$71.80	$10.00	7.30
Rm 263	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.49	1,834	0.0	$181.50	$1,172.40	$215.00	5.27
Rm 263	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.02	86	0.0	$8.46	$71.80	$10.00	7.30
Rm 262	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.49	1,834	0.0	$181.50	$1,172.40	$215.00	5.27
Rm 262	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.02	86	0.0	$8.46	$71.80	$10.00	7.30
Rm 261	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.16	611	0.0	$60.50	$467.00	$80.00	6.40
Rm 260	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.49	1,834	0.0	$181.50	$1,172.40	$215.00	5.27
Rm 260	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.02	86	0.0	$8.46	$71.80	$10.00	7.30
Women's Rm	5	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	1,700	Relamp	Yes	5	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,190	0.13	380	0.0	$37.62	$586.00	$35.00	14.64
Custodial Closet	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	800	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	560	0.03	36	0.0	$3.54	$179.20	$20.00	44.96
Rm 248	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.49	1,834	0.0	$181.50	$1,593.00	$250.00	7.40
Boys' Rm	3	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.13	397	0.0	$39.29	$467.00	$20.00	11.38
Girls' Rm	3	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,190	0.09	278	0.0	$27.51	$601.50	$20.00	21.14
Custodial Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	800	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	800	0.01	16	0.0	$1.59	$35.90	$5.00	19.40
Rm 249	8	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	2,125	Relamp & Reballast	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,488	0.71	2,647	0.0	$261.92	$1,410.67	$20.00	5.31
Rm 248	8	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	2,125	Relamp & Reballast	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,488	0.71	2,647	0.0	$261.92	$1,564.67	$35.00	5.84
Storage Rm	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,275	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,275	0.01	26	0.0	$2.54	$35.90	$5.00	12.17
Lab Rm 236	25	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	25	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.68	2,548	0.0	$252.08	$2,002.50	$320.00	6.67
Lab Rm 250	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.41	1,529	0.0	$151.25	$1,147.50	$185.00	6.36
Lab Rm 250	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.03	128	0.0	$12.69	$107.70	$15.00	7.30
Lab Rm 250 Closet	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,000	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	700	0.11	192	0.0	$18.98	$350.00	$60.00	15.28

	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
Faculty Dining Area	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,700	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,700	0.09	258	0.0	$25.53	$234.00	$40.00	7.60
Lab Rm 229	25	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	25	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.68	2,548	0.0	$252.08	$2,002.50	$320.00	6.67
Lab Rm 227	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.55	2,038	0.0	$201.66	$1,710.00	$270.00	7.14
Lab Rm 225	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.55	2,038	0.0	$201.66	$1,710.00	$270.00	7.14
Rm 250 Storage	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,000	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	700	0.07	126	0.0	$12.43	$295.50	$45.00	20.15
Lab Rm 238	15	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.67	2,482	0.0	$245.55	$2,025.00	$35.00	8.10
Lab Rm 240	25	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	25	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.68	2,548	0.0	$252.08	$2,002.50	$320.00	6.67
Asst Principal Office 1	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,700	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.11	326	0.0	$32.27	$504.00	$75.00	13.30
Asst Principal Office 2	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,700	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.16	489	0.0	$48.40	$621.00	$95.00	10.87
Asst Principal Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,520	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,464	0.11	675	0.0	$66.81	$504.00	$75.00	6.42
Library Conf Rm	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,700	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.25	734	0.0	$72.60	$796.50	$125.00	9.25
Men's Rm	2	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	1,200	Relamp & Reballast	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	840	0.18	374	0.0	$36.98	$593.67	$35.00	15.11
Ladies' Rm	2	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	1,200	Relamp & Reballast	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	840	0.18	374	0.0	$36.98	$593.67	$35.00	15.11
Rm 223	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,125	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.25	917	0.0	$90.75	$796.50	$125.00	7.40
Library	120	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	120	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	5.33	19,853	0.0	$1,964.42	$16,740.00	$350.00	8.34
Library Storage Rm	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,275	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	893	0.18	397	0.0	$39.29	$584.00	$20.00	14.36
Library Storage Rm	4	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	1,275	Relamp & Reballast	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	893	0.09	210	0.0	$20.80	$508.00	$20.00	23.46
Library Office	6	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.27	794	0.0	$78.58	$818.00	$20.00	10.16
2nd Flr Corridors	131	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,520	Relamp	No	131	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	2.83	17,500	0.0	$1,731.54	$7,663.50	$1,310.00	3.67
Sports Office 1	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,700	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,190	0.49	1,467	0.0	$145.20	$1,172.40	$215.00	6.59
Sports Office 2	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.18	529	0.0	$52.38	$584.00	$20.00	10.77
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,275	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	893	0.03	61	0.0	$6.05	$174.50	$10.00	27.19
Stairwell	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,520	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,520	0.09	534	0.0	$52.87	$234.00	$40.00	3.67
Storage Rm	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,275	Relamp & Reballast	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	893	0.04	99	0.0	$9.82	$233.00	$0.00	23.72
Math Work Rm	6	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,600	Relamp & Reballast	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,120	0.27	747	0.0	$73.95	$818.00	$20.00	10.79

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Rm 242	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 241	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 239	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 237	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 235	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 234	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 233	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 232	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 231	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 230	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 228	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 226	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 224	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 222	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 221	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 220	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 219	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 218	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 217	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 216	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 215	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 214	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 213	6	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.27	993	0.0	$98.22	$972.00	$35.00	9.54
Rm 212	6	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.27	993	0.0	$98.22	$818.00	$20.00	8.12
Rm 211	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74

	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
Rm 210	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 209	6	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.27	993	0.0	$98.22	$972.00	$35.00	9.54
Rm 208	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 207	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,488	0.28	1,043	0.0	$103.15	$1,726.50	$35.00	16.40
Rm 206	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 205	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 204	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 203	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 202	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 201	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Rm 201	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.40	1,489	0.0	$147.33	$1,323.00	$35.00	8.74
Men's Rm	3	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.13	397	0.0	$39.29	$621.00	$35.00	14.92
Ladies' Rm	3	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.13	397	0.0	$39.29	$621.00	$35.00	14.92
Rm 210 Storage	3	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	1,200	Relamp & Reballast	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	840	0.07	148	0.0	$14.69	$410.00	$20.00	26.56
Storage Rm	3	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	1,275	Relamp & Reballast	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	893	0.07	158	0.0	$15.60	$410.00	$20.00	24.99
Work Rm	6	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.27	794	0.0	$78.58	$818.00	$20.00	10.16
Men's Rm	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.09	265	0.0	$26.19	$504.00	$35.00	17.91
Ladies' Rm	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.09	265	0.0	$26.19	$504.00	$35.00	17.91
Custodial Closet	2	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	1,000	Relamp & Reballast	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,000	0.04	72	0.0	$7.17	$196.00	$0.00	27.34
Asst Principal Office	6	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.27	794	0.0	$78.58	$972.00	$35.00	11.92
Asst Principal Office 1	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.18	529	0.0	$52.38	$584.00	$20.00	10.77
Asst Principal Office 2	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.18	529	0.0	$52.38	$584.00	$20.00	10.77
Rm 244	25	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	25	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	1.11	4,136	0.0	$409.25	$3,465.00	$70.00	8.30
Rm 244	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,125	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.01	43	0.0	$4.23	$35.90	$5.00	7.30
Ante Rm 244	6	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	1,600	Relamp & Reballast	Yes	6	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,120	0.14	396	0.0	$39.16	$704.00	$20.00	17.47

	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
Rm 260	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,125	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,488	0.49	1,834	0.0	$181.50	$1,172.40	$215.00	5.27
Athletic Office	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,700	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.25	734	0.0	$72.60	$796.50	$125.00	9.25
Athletic Director	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,700	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,190	0.18	529	0.0	$52.38	$584.00	$20.00	10.77
Sm. Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,000	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	700	0.03	48	0.0	$4.75	$174.50	$10.00	34.67
Storage Rm	8	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,000	Relamp	Yes	8	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	700	0.11	201	0.0	$19.89	$403.20	$60.00	17.25
Rm 246	10	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.44	1,654	0.0	$163.70	$1,440.00	$35.00	8.58
Rm 245	10	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.44	1,654	0.0	$163.70	$1,440.00	$35.00	8.58
Mech Rm	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,000	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,000	0.01	20	0.0	$1.99	$35.90	$5.00	15.52
Mech Rm	1	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	1,000	Relamp & Reballast	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,000	0.02	36	0.0	$3.58	$98.00	$0.00	27.34
Storage Rm	6	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,275	Relamp	Yes	6	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	893	0.09	192	0.0	$19.02	$331.40	$50.00	14.79
Costume Storage	5	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,275	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	893	0.22	496	0.0	$49.11	$855.00	$35.00	16.70
Rm 243	20	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,125	Relamp & Reballast	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,488	0.89	3,309	0.0	$327.40	$2,880.00	$70.00	8.58
Rm 243	1	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	2,125	Relamp & Reballast	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,125	0.02	77	0.0	$7.62	$98.00	$0.00	12.87
Rm 243 Storage	6	Linear Fluorescent - T12: 4' T12 (40W) - 1L	None	46	1,275	Relamp & Reballast	Yes	6	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	893	0.14	315	0.0	$31.21	$704.00	$20.00	21.92
School Exit Signs	132	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	132	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior Perimeter	22	LED - Fixtures: Architectural Flood/Spot Luminaire	None	17	4,380	None	No	22	LED - Fixtures: Architectural Flood/Spot Luminaire	None	17	4,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Parking Lot Poles	40	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	None	86	4,380	None	No	40	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	None	86	4,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Entrances	5	Compact Fluorescent: 17W CFL Bulbs	None	17	4,380	Relamp	No	5	LED Screw-In Lamps: 9W LED Bulbs	None	9	4,380	0.03	201	0.0	$19.94	$268.77	$0.00	13.48
Front Covered Walkway	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,380	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,380	0.26	1,995	0.0	$197.37	$702.00	$120.00	2.95

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	Original Building	2	Heating Hot Water Pump	20.0	91.0%	No	2,745	Yes	93.0%	Yes	2	5.19	39,620	0.0	$3,920.29	$17,164.06	$0.00	4.38
Boiler Rm	Original Building	2	Chilled Water Pump	20.0	91.0%	No	2,745	No	91.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Rm	Original Building	2	Air Compressor	7.5	88.5%	No	2,479	Yes	91.0%	Yes	2	1.93	5,610	0.0	$555.09	$9,476.48	$0.00	17.07
2nd Flr Mech Rm	2002 Addition	1	Process Pump	0.3	75.0%	No	2,745	No	75.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
2nd Flr Mech Rm	2002 Addition	2	Chilled Water Pump	15.0	91.0%	No	3,391	Yes	93.0%	Yes	2	3.89	36,708	0.0	$3,632.16	$14,082.34	$0.00	3.88
2nd Flr Mech Rm	2002 Addition	2	Heating Hot Water Pump	5.0	87.5%	No	2,745	Yes	89.5%	Yes	2	1.35	10,306	0.0	$1,019.74	$8,152.44	$0.00	7.99
Outside Boiler Rm	Cooling Tower	1	Cooling Tower Fan	15.0	91.0%	No	3,391	No	91.0%	Yes	1	0.00	18,139	0.0	$1,794.79	$5,194.45	$900.00	2.39
Roof	Gym AHUs	3	Ventilation Fan	10.0	89.5%	Yes	3,391	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mech Rm	Trane AHUs	2	Ventilation Fan	15.0	90.0%	No	2,745	Yes	92.4%	Yes	2	4.25	13,164	0.0	$1,302.57	$14,171.74	$2,400.00	9.04
Roof	Trane AHUs	12	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	Trane AHUs	12	Return 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
2nd Flr Mech Rm	2002 Addition	2	Chilled Water Pump	25.0	93.6%	Yes	3,391	No	93.6%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	Classrooms in 2002 Addition	1	Packaged AC	6.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Classrooms in 2002 Addition	1	Packaged AC	5.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Classrooms in 2002 Addition	1	Packaged AC	7.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Classrooms in 2002 Addition	1	Packaged AC	7.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Classrooms in 2002 Addition	1	Packaged AC	6.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Library	1	Split-System AC	6.00		Yes	1	Split-System AC	6.00		11.50		Yes	1.56	3,698	0.0	$365.92	$7,732.62	$688.00	19.25
Roof	Library	1	Split-System AC	7.50		Yes	1	Split-System AC	7.50		11.50		Yes	1.94	4,623	0.0	$457.40	$9,478.28	$797.50	18.98
Roof	Library	1	Split-System AC	5.00		Yes	1	Split-System AC	5.00		14.00		Yes	1.96	4,327	0.0	$428.16	$7,981.10	$710.00	16.98
Roof	Classrooms	1	Split-System AC	5.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Classrooms	1	Split-System AC	3.00		Yes	1	Split-System AC	3.00		14.00		Yes	1.18	2,596	0.0	$256.90	$4,988.66	$526.00	17.37
Roof	Classrooms	1	Split-System AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Classrooms	1	Split-System AC	2.50		Yes	1	Split-System AC	2.50		14.00		Yes	0.98	2,164	0.0	$214.08	$4,240.55	$480.00	17.57
Roof	Classrooms	3	Split-System AC	7.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Classrooms	1	Split-System AC	2.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classrooms	Classrooms	3	Ductless Mini-Split AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Server Rm	Server Rm	2	Ductless Mini-Split AC	3.82		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric Chiller Inventory & Recommendations

		Existing Conditions			Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Chiller Quantity	System Type	Cooling Capacity per Unit (Tons)	Install High Efficiency Chillers?	Chiller Quantity	System Type	Constant/ Variable Speed	Cooling Capacity (Tons)	Full Load Efficiency (kW/Ton)	IPLV Efficiency (kW/Ton)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Rm	AHUs	1	Air-Cooled Screw Chiller	325.00	No							0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	AHUs, Chilled Water Coils	1	Air-Cooled Scroll Chiller	170.00	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	Original Building	2	Non-Condensing Hot Water Boiler	4,914.00	Yes	2	Condensing Hot Water Boiler	4,914.00	93.00%	Ec	0.00	0	772.3	$6,354.56	$180,177.28	$0.00	28.35
2nd Flr Mech Rm	2002 Addition	1	Non-Condensing Hot Water Boiler	1,425.06	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

DHW Inventory & Recommendations

		Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Rm	Original Building	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mech Rm	2002 Addition	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions		Proposed Conditions			Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Evaporator Fan Control?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	2	Cooler (35F to 55F)	No	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Medium Temp Freezer (0F to 30F)	No	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
BMHS	6	Stand-Up Refrigerator, Solid Door (≤15 cu. ft.)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
BMHA	11	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	4	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	2	Stand-Up Refrigerator, Glass Door (≤15 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Stand-Up Refrigerator, Glass Door (16 - 30 cu. ft.)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	2	Stand-Up Freezer, Glass Door (16 - 30 cu. ft.)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Commercial Ice Maker Inventory & Recommendations

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Ice Maker Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
BMHS	2	Ice Making Head (<450 lbs/day), Continuous	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Cooking Equipment Inventory & Recommendations

	Existing Conditions			Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	High Efficiency Equipement?	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	2	Insulated Food Holding Cabinet (Full Size)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Electric Steamer	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
BMHS	331	Desktop Computers + Monitors	150.0	Yes
BMHS	7	Lg. Copy Machines	380.0	Yes
BMHS	42	Sm. Printers	13.0	Yes
BMHS	3	Server	450.0	No
BMHS	111	CRT TVs	150.0	No
BMHS	13	LED TVs	55.0	Yes
BMHS	11	Microwave & Toaster Ovens	900.0	No
BMHS	2	Washing Machines	567.0	Yes
BMHS	2	Dryers	3,500.0	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
BMHS	2	Refrigerated	Yes	0.00	3,224	0.0	$318.98	$460.00	$0.00	1.44
BMHS	2	Non-Refrigerated	Yes	0.00	685	0.0	$67.78	$460.00	$0.00	6.79

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Brick Township High School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 207,400
Built: 1958

For Year Ending: February 29, 2016
Date Generated: August 02, 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
Brick Township High School 300 Chambersbridge Road Brick, New Jersey 08723	Brick Township Board of Education 101 Hendrickson Avenue Brick, NJ 08724 (732) 785-3000	James Edwards 101 Hendrickson Avenue Brick, NJ 08724 (732) 785-3000 jedwards@brickschools.org

Property ID: 5991744

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
77.2 kBtu/ft²

Source EUI
133 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	10,862,779 (68%)
Electric - Grid (kBtu)	5,154,869 (32%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	84.7
National Median Source EUI (kBtu/ft²)	145.8
% Diff from National Median Source EUI	-9%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	1,168

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)