Local Government Energy Audit:
Energy Audit Report

George Inness High School

Annex

Montclair Board of Education

141 Park Street

Montclair, New Jersey 07042

January 3, 2019

Final Report by:

TRC Energy Services

Disclaimer

The intent of this energy analysis report is to identify energy savings opportunities and recommend upgrades to the facility's energy using equipment and systems. Approximate savings are included in this report to help make decisions about reducing energy use at the facility. 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.

Table of Contents

1 Executive Summary 1

1.1 Facility Summary 1
1.2 Your Cost Reduction Opportunities 1

Energy Conservation Measures 1
Energy Efficient Practices 3
Self-Generation Measures 3

1.3 Implementation Planning 4

2 Facility Information and Existing Conditions 6

2.1 Project Contacts 6
2.2 General Site Information 6
2.3 Building Occupancy 7
2.4 Building Envelope 7
2.5 On-site Generation 8
2.6 Energy-Using Systems 8

Lighting System 8
Steam Heating System 8
Air Side Conditioning Systems 9
Building Energy Management System 9
Domestic Hot Water 10
Food Service & Refrigeration 10
Plug load & Vending Machines 11

2.7 Water-Using Systems 11

3 Site Energy Use and Costs 12

3.1 Total Cost of Energy 12
3.2 Electricity Usage 13
3.3 Natural Gas Usage 14
3.4 Benchmarking 15
3.5 Energy End-Use Breakdown 16

4 Energy Conservation Measures 17

4.1 Recommended ECMs 17
4.1.1 Lighting Upgrades 18

ECM 1: Install LED Fixtures 18
ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers 19
ECM 3: Retrofit Fixtures with LED Lamps 20

4.1.2 Lighting Control Measures 21

ECM 4: Install Occupancy Sensor Lighting Controls 21
ECM 5: Install High/Low Lighting Controls 22

4.1.3 HVAC System Improvements 23

ECM 6: Install Dual Enthalpy Outside Economizer Control 23

4.1.4 Domestic Water Heating Upgrade 24
ECM 7: Install Low-Flow DHW Devices 24
4.1.5 Plug Load Equipment Control - Vending Machine 25
ECM 8: Vending Machine Control 25
4.2 ECMs Evaluated but Not Recommended 25
Premium Efficiency Motors 26
Install High Efficiency Electric AC 27
Install High Efficiency Steam Boilers 27
Install High Efficiency Furnaces 28
Install High Efficiency Gas Water Heater 28
5 Energy Efficient Practices 29
Reduce Air Leakage 29
Close Doors and Windows 29
Ensure Lighting Controls Are Operating Properly 29
Practice Proper Use of Thermostat Schedules and Temperature Resets 29
Clean and/or Replace HVAC Filters 29
Perform Proper Boiler Maintenance 30
Perform Proper Water Heater Maintenance 30
Plug Load Controls 30
Water Conservation 30
6 Self-Generation Measures 31
6.1 Photovoltaic 32
6.2 Combined Heat and Power 33
7 Demand Response 34
8 Project Funding / Incentives 35
8.1 SmartStart 36
8.2 Pay for Performance - Existing Buildings 37
8.3 Direct Install 38
8.4 Energy Savings Improvement Program 39
9 Energy Purchasing and Procurement Strategies 40
9.1 Retail Electric Supply Options 40
9.2 Retail Natural Gas Supply Options 40

Appendix A: Equipment Inventory & Recommendations

Appendix B: ENERGY STAR® Statement of Energy Performance

Table of Figures

Figure 1 – Previous 12 Month Utility Costs 1
Figure 2 – Potential Post-Implementation Costs 1
Figure 3 – Summary of Energy Reduction Opportunities 2
Figure 4 – Project Contacts 6
Figure 5 - Building Schedule 7
Figure 6 - Utility Summary 12
Figure 7 - Energy Cost Breakdown 12
Figure 8 - Electric Usage & Demand 13
Figure 9 - Electric Usage & Demand 13
Figure 10 - Natural Gas Usage 14
Figure 11 - Natural Gas Usage 14
Figure 12 - Energy Use Intensity Comparison – Existing Conditions 15
Figure 13 - Energy Use Intensity Comparison – Following Installation of Recommended Measures 15
Figure 14 - Energy Balance (% and kBtu/SF) 16
Figure 15 – Summary of Recommended ECMs 17
Figure 16 – Summary of Lighting Upgrade ECMs 18
Figure 17 – Summary of Lighting Control ECMs 21
Figure 18 - Summary of HVAC System Improvement ECMs 23
Figure 19 - Summary of Domestic Water Heating ECMs 24
Figure 20 - Summary of Plug Load Equipment Control ECMs 25
Figure 21 – Summary of Evaluated but Not Recommended ECMs 25
Figure 22 - Photovoltaic Screening 32
Figure 23 - Combined Heat and Power Screening 33
Figure 24 - ECM Incentive Program Eligibility 35

1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for the George Inness High School Annex.

The goal of a LGEA is to provide you with information on how your facility uses energy, identify energy conservation measures (ECMs) that can reduce your energy use, and put you in a position to implement the ECMs. The LGEA also sets you on the path to receive financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing the ECMs.

This study was conducted by TRC Energy Services (TRC), as part of a comprehensive effort to assist New Jersey school districts in controlling energy costs and protecting our environment by offering a full spectrum of energy management options.

1.1 Facility Summary

The George Inness High School Annex is a three-story building totaling 89,261 square foot facility and originally constructed in 1925. The building has both pitched and flat roof sections. Exterior walls are finished with brick masonry. Interior lighting consists mainly of linear fluorescent lamps and fixtures which are mostly controlled with manual wall switches. Heating is provided by two steam boilers and gas-fired furnaces. The cooling system consists of window air conditioners (ACs), split system ACs, two air-cooled scroll chillers and rooftop packaged units.

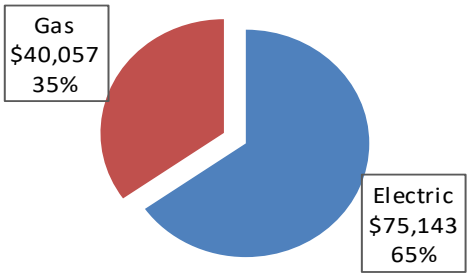
A thorough description of the facility and our observations are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

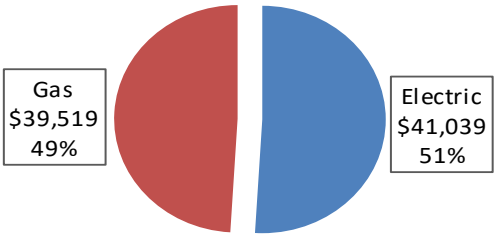
TRC evaluated 13 measures. Five measures were recommended for implementation which together represent an opportunity for George Inness High School Annex to reduce annual energy costs by roughly $27,952 and annual greenhouse gas emissions by 208,065 lbs CO_2e. The measures would pay for themselves in roughly 4.4 years. The breakdown of existing and potential utility costs is illustrated in Figure 1 and Figure 2, respectively. These projects represent an opportunity to reduce the George Inness High School Annex's annual energy use by 12.1%.

Figure 1 – Previous 12 Month Utility Costs



$115,200

Figure 2 – Potential Post-Implementation Costs



$80,558

A detailed description of the George Inness High School Annex's existing energy use can be found in Section 3.

The evaluated measures have been listed and grouped into major categories as shown in Figure 3. Brief descriptions of the categories can be found below and descriptions of the individual opportunities can be found in Section 4. Measures without an "ECM #" in the table below have been evaluated, but are not recommended for implementation.

Figure 3 – Summary of Energy Reduction Opportunities

	Energy Conservation Measure	Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**164,362**	**56.3**	**0.0**	**$22,561.48**	**$118,805.52**	**$13,970.00**	**$104,835.52**	**4.65**	**165,512**
ECM 1	Install LED Fixtures	Yes	81,117	30.1	0.0	$11,134.72	$54,426.60	$1,900.00	$52,526.60	4.72	81,685
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	5,345	1.8	0.0	$733.72	$5,499.00	$450.00	$5,049.00	6.88	5,383
ECM 3	Retrofit Fixtures with LED Lamps	Yes	77,900	24.4	0.0	$10,693.04	$58,879.92	$11,620.00	$47,259.92	4.42	78,444
Lighting Control Measures			**21,288**	**6.6**	**0.0**	**$2,922.15**	**$18,068.00**	**$2,305.00**	**$15,763.00**	**5.39**	**21,437**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	19,148	6.0	0.0	$2,628.41	$15,468.00	$2,305.00	$13,163.00	5.01	19,282
ECM 5	Install High/Low Lighitng Controls	Yes	2,140	0.6	0.0	$293.74	$2,600.00	$0.00	$2,600.00	8.85	2,155
Motor Upgrades			**550**	**0.4**	**0.0**	**$75.47**	**$1,596.51**	**$0.00**	**$1,596.51**	**21.15**	**554**
	Premium Efficiency Motors	No	550	0.4	0.0	$75.47	$1,596.51	$0.00	$1,596.51	21.15	554
Electric Unitary HVAC Measures			**4,957**	**4.2**	**0.0**	**$680.44**	**$44,603.20**	**$2,528.00**	**$42,075.20**	**61.84**	**4,992**
	Install High Efficiency Electric AC	No	4,957	4.2	0.0	$680.44	$44,603.20	$2,528.00	$42,075.20	61.84	4,992
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**72.5**	**$656.65**	**$158,612.96**	**$8,744.00**	**$149,868.96**	**228.23**	**8,489**
	Install High Efficiency Steam Boilers	No	0	0.0	59.2	$536.32	$140,215.20	$7,544.00	$132,671.20	247.37	6,933
	Install High Efficiency Furnaces	No	0	0.0	13.3	$120.32	$18,397.75	$1,200.00	$17,197.75	142.93	1,555
HVAC System Improvements			**9,233**	**2.1**	**0.0**	**$1,267.34**	**$1,800.00**	**$500.00**	**$1,300.00**	**1.03**	**9,297**
ECM 6	Install Dual Enthalpy Outside Economizer Control	Yes	9,233	2.1	0.0	$1,267.34	$1,800.00	$500.00	$1,300.00	1.03	9,297
Domestic Water Heating Upgrade			**0**	**0.0**	**69.2**	**$627.16**	**$5,012.53**	**$170.00**	**$4,842.53**	**7.72**	**8,107**
	Install High Efficiency Gas Water Heater	No	0	0.0	9.9	$89.59	$4,912.15	$170.00	$4,742.15	52.93	1,158
ECM 7	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	59.4	$537.57	$100.38	$0.00	$100.38	0.19	6,949
Plug Load Equipment Control - Vending Machine			**4,836**	**0.0**	**0.0**	**$663.76**	**$2,156.40**	**$0.00**	**$2,156.40**	**3.25**	**4,869**
ECM 8	Vending Machine Control	Yes	4,836	0.0	0.0	$663.76	$2,156.40	$0.00	$2,156.40	3.25	4,869
TOTAL FOR ALL RECOMMENDED MEASURES			**199,719**	**65.0**	**59.4**	**$27,952.30**	**$140,930.30**	**$16,775.00**	**$124,155.30**	**4.44**	**208,065**
TOTALS			**205,226**	**69.6**	**141.7**	**$29,454.45**	**$350,655.12**	**$28,217.00**	**$322,438.12**	**10.95**	**223,257**

* - 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 conditions allow. 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 old standard efficiency motors with motors of the current efficiency standard (EISA 2007). Motors will be replaced with the same size motors. This measure saves energy by reducing the power used by the motors due to improved electrical efficiency.

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

Gas Heating (HVAC/Process) measures generally involve replacing old inefficient hydronic heating systems with modern energy efficient systems. Gas heating systems can provide heating equivalent to older systems, but use less energy. These measures save energy by reducing the fuel used by the 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 when conditions allow. These measures could encompass changing temperature setpoints, using outside air for free cooling, or limiting excessive outside air during extreme outdoor air temperatures. These measures save energy by reducing the demand on the systems and the amount of time systems operate.

Domestic Water Heating upgrade measures generally involve replacing old inefficient domestic water heating systems with modern energy efficient systems. New domestic water heating systems can provide equivalent or greater capacity as older systems, but use less energy. These measures save energy by reducing the fuel used by the domestic water heating systems due to improved efficiency or the removal of standby losses.

Plug Load Equipment control measures generally involve installing automation that limits the power use or operation of equipment plugged into an electrical receptacle based on occupancy.

Energy Efficient Practices

TRC also identified nine low cost (or no cost) energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral and operational adjustments as well as performing routine maintenance on building systems. Through these practices equipment lifetime can be extended; occupant comfort, health and safety can be improved; and annual energy, operation, and maintenance costs can be reduced. Opportunities identified at the George Inness High School Annex include:

- Reduce Air Leakage
- Close Doors and Windows
- Ensure Lighting Controls Are Operating Properly
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Clean and/or Replace HVAC Filters
- Perform Proper Boiler Maintenance
- Perform Proper Water Heater Maintenance
- Install Plug Load Controls
- Water Conservation

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

Self-Generation Measures

TRC evaluated the potential for installing self-generation sources for the George Inness High School Annex. 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 the self-generation potential, please refer to Section 6.

1.3 Implementation Planning

To realize the energy savings from the ECMs listed in this report, the equipment changes outlined for each ECM need to be selected and installed through project implementation. One of the first considerations is if there is capital available for project implementation. Another consideration is whether to pursue individual ECMs, a group of ECMs, or a comprehensive approach wherein all ECMs are pursued, potentially in conjunction with other facility projects or improvements.

Rebates, incentives, and financing are available from the NJBPU, NJCEP, as well as some of the state's investor-owned utilities, to help reduce the costs associated with the implementation of energy efficiency projects. Prior to implementing any project, please review the appropriate incentive program guidelines before proceeding. This is important because in most cases you will need to submit an application for the incentives before purchasing materials and beginning installation.

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

- SmartStart
- Direct Install
- Pay for Performance - Existing Building (P4P EB)
- Energy Savings Improvement Program (ESIP)

For facilities with capital available for implementation of selected individual measures or phasing 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 design the ECM(s), select the equipment and apply for the incentive(s). Program pre-approval is required for some SmartStart incentives, so only after receiving approval may the ECM(s) be installed. The incentive values listed above in Figure 3 represent the SmartStart program and will be explained further in Section 8, as well as the other programs as mentioned below.

For facilities without capital available 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 external project development, design, and implementation services as well as financing for implementing ECMs. This LGEA report is the first step for participating in ESIP and should help you determine next steps. Refer to Section 8.4 for additional information on the ESIP Program.

The Demand Response Energy Aggregator is a program (non-NJCEP) designed to reduce consumer electric load when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak 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 locally. By enabling grid operators to call upon Curtailment Service Providers and energy consumers 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 will receive payments whether or not their facility is called upon to curtail their load. Refer to Section 7 for additional information on this program.

Additional descriptions of all relevant incentive programs are located in Section 8 or: www.njcleanenergy.com/ci.

To ensure projects are implemented such that maximum savings and incentives are achieved, bids and specifications should be reviewed by your procurement personnel and/or consultant(s) to ensure that selected equipment coincides with LGEA recommendations, as well as applicable incentive program guidelines and requirements.

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 4 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Brian Fleischer	Business Administrator	bfleischer@montclair.k12.nj.us	973-509-4050
Designated Representative			
Eric Bonilla	Custodian		973-652-9495
TRC Energy Services			
Moussa Traore	Auditor	mtraore@trcsolutions.com	732-855-0033

2.2 General Site Information

On November 08, 2016, TRC performed an energy audit at the George Inness High School Annex located in Montclair, New Jersey. TRC's auditor met with Eric Bonilla to review the facility operations and focus the investigation on specific energy-using systems.

Image 1 – Auditorium

The 89,261-square foot facility is a three-story building comprised of classrooms, administrative offices, gymnasium, auditorium, locker rooms, cafeteria, kitchen, storage and mechanical spaces. The original building was constructed in 1925. Three years later in 1928, the auditorium stage and dressing rooms were added. A new section comprised of a kitchen, a cafeteria and additional classrooms was constructed in 2003. The building is used primarily for high school programs.

2.3 Building Occupancy

The school operates on an 11-month schedule and is open Monday through Friday. The gymnasium and auditorium are used after school hours. The school is also used in the summer for various classes and events. The typical schedule is presented in the table below. During a typical day, the school is occupied by approximately 475 students and staff

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
George Inness High School Annex	Weekday	7:00 AM - 6:30 PM
George Inness High School Annex	Weekend	Closed

2.4 Building Envelope

Image 2 – Building Envelope

The three-story building with basement has a reinforced concrete foundation. The roofing system consists of a pitched asphalt shingled roof on the front facing section and perimeter, and a membrane type flat roof on the back of the building where the HVAC equipment resides. The exterior walls are finished with brick masonry. The windows throughout the facility are operable double-pane with aluminum frames. Windows are in acceptable condition with little sign of outside air infiltration. Exterior doors are constructed of metal and are in good condition. Overall, the building's envelope is in good condition.

2.5 On-site Generation

The George Inness High School Annex does not have any on-site electric generation capacity.

2.6 Energy-Using Systems

Please refer to Appendix A: Equipment Inventory & Recommendations for an inventory of your equipment.

Lighting System

Lighting at the facility is provided predominately by 32-Watt linear fluorescent T8 lamps with electronic ballasts as well as linear 40-Watt fluorescent T12 and incandescent lamps. Most of the building classrooms use 2-lamp or 4-lamp, 2-foot wide by 4-foot long troffers with diffusers. The girl's and the boy's gymnasiums are illuminated with 350-Watt and 400-Watt metal halide respectively. The boiler room, auditorium stage, fitting room are illuminated with a combination of 32-Watt linear fluorescent T8 and 40-Watt fluorescent T12 lamps while the auditorium is lit with 40 and 55-Watt Candelabra and 100-Watt incandescent screw-in lamps. The attic is also illuminated with 100-Watt incandescent lamps. A small number of 60 and 150-Watt incandescent are found in spaces such as closets, storage and boiler rooms. Remaining building spaces are illuminated by 32-Watt linear fluorescent T8 lamps. Lighting control is provided mostly by manual wall switches. The facility exterior lighting system consists of 150-Watt incandescent and 45-Watt LED outdoor wall-mounted area fixture, controlled by photocells.

Steam Heating System

Image 3 – Steam System

The steam system consists of two 3,772 MBh output steam boilers, each with an estimated combustion efficiency of 75%, plus the associated distribution system. Each boiler has a 1 hp combustion air fan, a 3 hp feed water pump and a control valve that maintains the boiler water level. The boilers operate in a lead/lag configuration. The boilers are 29 years old and have passed their useful service life. Steam is supplied to the radiators and heating unit ventilators at 15 psi. Local thermostats are used to control the temperatures in spaces. The school should consider re-evaluating the building heating load and installing modular boilers when existing equipment is replaced.

Air Side Conditioning Systems

Cooling is provided by a combination of window air conditioners (ACs), split system ACs, two air-cooled scroll chillers and rooftop packaged units. There are 12 window ACs ranging from 0.7 to 1.9 ton. They are in relatively good condition and serve spaces such as offices, data room, teacher room, and nurse office. The cafeteria office is served by 1-ton Mitsubishi split AC while the auditorium control center and room 500A are served by a 4-ton Trane split AC. The split system ACs are in good condition. The two 60-ton Trane air-cooled scroll chillers all located on the roof and are used to condition the cafeteria and auditorium. They are eight years old and appear in good condition.

Two 16-ton AAON rooftop packaged units (RTU1-RTU2) equipped with a gas fired furnace section are used to condition rooms 600B and 602. The units are constant air volume, utilize a scroll compressor and a direct-expansion (DX) coil. They appear in good condition. A McQuay rooftop unit equipped with a gas-fired furnace section provides supplemental heating to the auditorium. One Greenheck energy recovery ventilation unit (ERV) is used to condition the kitchen and is in good condition as well. The rooftop packaged units are controlled by Energy of America remote building energy management system. Air is exhausted from the kitchen and cafeteria through the roof exhausters.

Image 4 – Air Conditioning

Building Energy Management System

Most of the rooftop units are controlled by Energy of America remote control system which was not accessible during the survey.

Domestic Hot Water

Domestic hot water is provided by two natural gas fired water heaters. One eight-year-old, Bradford White 75-gallon storage tank non-condensing 76 Mbh water heater is located in the boiler room. It appears in good condition and serves the kitchen and cafeteria. The primary water heater is a 150 Mbh A.O. Smith 15-year-old condensing unit that appears in poor condition. It has a 100-gallon storage tank and is located in the custodial closet. Both heaters are nominally 85% efficient.

Image 5 – Hot Water System

Food Service & Refrigeration

The school houses one small kitchen and a cafeteria. The kitchen includes gas convection ovens and insulated food holding cabinets, two standup refrigerators, one walk-in cooler and one walk-in medium freezer. The kitchen is well maintained. Two other standup refrigerators are in the teacher's and nurse's rooms.

Plug load & Vending Machines

The building has approximately 105 computers with LCD monitors that are used daily, plus servers, three large photocopiers, and seven printers. The computers, monitors, and printers seemed to be all recent models designed with power management software to reduce power when they sit idle for more than a few minutes. The building has two vending machines located in the cafeteria and teacher room.

Image 6 – Typical Plug Load Equipment

2.7 Water-Using Systems

There are several restrooms at this facility. A sampling of restrooms found that the faucets are rated for 2.2 gallons per minute (gpm) or higher, the toilets are rated at 2.5 gallons per flush (gpf)and the urinals are rated at 2 gpf. The kitchen has four faucets that are rated for 3 gpm.

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/ft^2 and energy use/ft^2. These energy use indices are indicative of the relative energy effectiveness of this building. There are many factors that could cause the energy use of this building to vary from the "typical" energy use for other facilities identified as: School (K-12). Specific local climate conditions, daily occupancy hours of the facility, seasonal fluctuations in occupancy, daily operating hours of energy use systems, and the behavior of the occupants with regard to operating systems that impact energy use such as turning off appliances and leaving windows open. Please refer to the Benchmarking section within Section 3.4 for additional information.

3.1 Total Cost of Energy

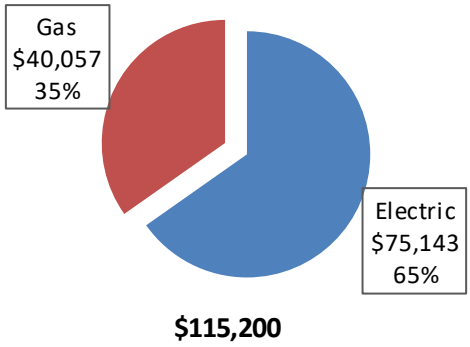
The following energy consumption and cost data is based on the last 12-month period of utility usage data that was provided for each utility. The annual consumption and cost was developed from this information.

Figure 6 - Utility Summary

Utility Summary for George Inness High School Annex		
Fuel	**Usage**	**Cost**
Electricity	494,368 kWh	$75,143
Natural Gas	44,225 Therms	$40,057
Total		**$115,200**

The current utility cost for this site is $115,200 as shown in the chart below.

Figure 7 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by PSE&G. The average electric cost (combined for commodity, transmission and distribution) for the past 12 months is $0.137/kWh, which is the blended rate used throughout the analyses in this report. The monthly electricity consumption and peak demand is represented graphically in the chart below. The electricity use profile reflects high occupancy in the summer months.

Figure 8 - Electric Usage & Demand

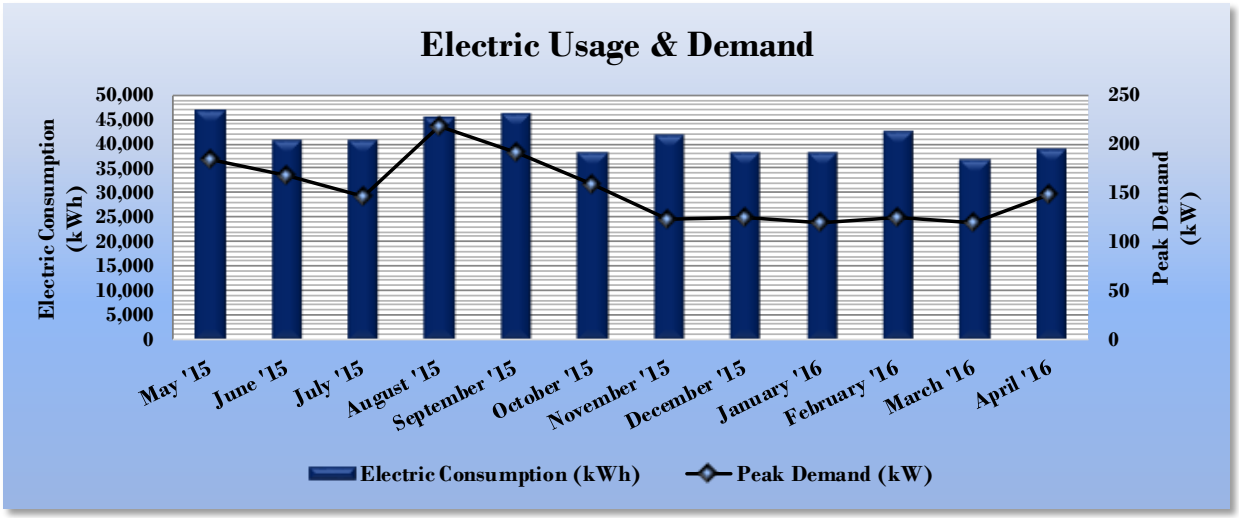


Figure 9 - Electric Usage & Demand

Electric Billing Data for George Inness High School Annex					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
6/15/15	30	46,969	183	$482	$8,486
7/15/15	31	40,814	167	$647	$7,495
8/13/15	30	40,617	146	$661	$7,150
9/14/15	30	45,448	218	$602	$8,524
10/13/15	31	45,968	191	$526	$6,601
11/12/15	30	38,083	159	$1,314	$5,509
12/14/15	30	41,857	123	$693	$5,694
1/14/16	31	38,129	124	$576	$5,082
2/12/16	31	38,163	119	$446	$4,992
3/15/16	31	42,398	125	$451	$5,509
4/14/16	29	36,928	118	$431	$4,884
5/13/16	31	38,994	148	$455	$5,220
Totals	**365**	**494,368**	**218**	**$7,283**	**$75,143**
Annual	**365**	**494,368**	**218**	**$7,283**	**$75,143**

3.3 Natural Gas Usage

Natural gas is provided by PSE&G. The average gas cost for the past 12 months is $0.906/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is represented graphically in the chart below. The gas use profile is typical for a facility with a significant heating load relative to other end uses.

Figure 10 - Natural Gas Usage

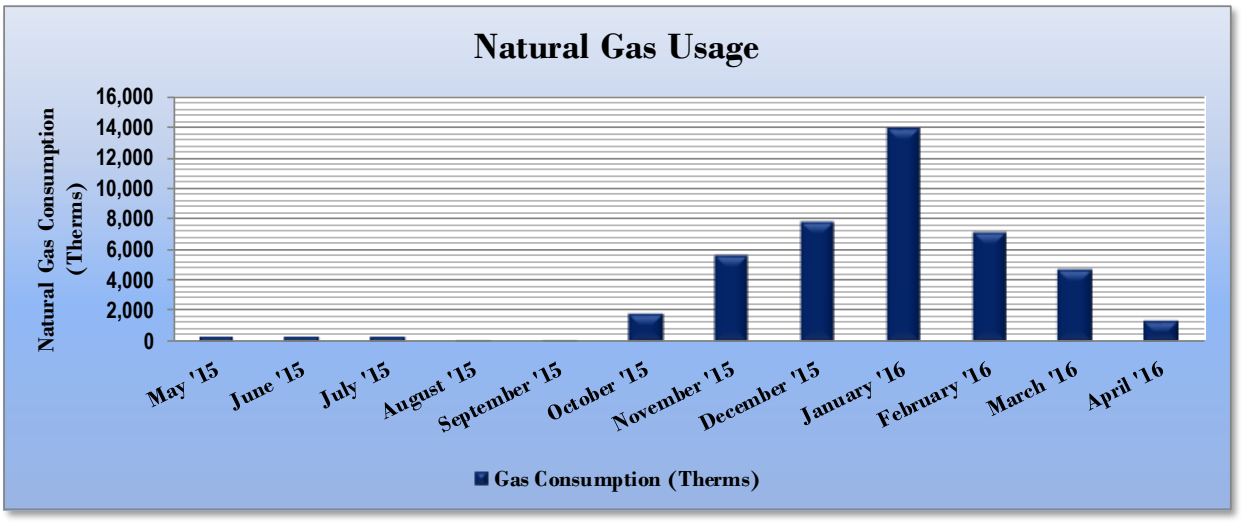


Figure 11 - Natural Gas Usage

Gas Billing Data for George Inness High School Annex				
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost	TRC Estimated Usage?
6/16/15	30	388	$404	Yes
7/20/15	31	377	$402	Yes
8/17/15	30	365	$275	No
9/15/15	30	169	$219	No
10/14/15	31	174	$213	No
11/12/15	30	1,830	$4,049	Yes
12/15/15	30	5,667	$6,379	No
1/15/16	31	7,829	$7,709	No
2/16/16	31	14,004	$10,476	No
3/17/16	31	7,164	$6,143	Yes
4/15/16	29	4,790	$2,787	No
5/17/16	31	1,468	$1,001	No
Totals	**365**	**44,225**	**$40,057**	4
Annual	**365**	**44,225**	**$40,057**	

3.4 Benchmarking

This facility was benchmarked through 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 compares its performance against a yearly baseline, national medians, or similar buildings in your portfolio. Metrics used in this comparison are the Energy Use Intensity (EUI) and ENERGY STAR® score.

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 energy than similar buildings on a square foot basis or if that building performs better than the median. EUI is presented in both 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 is the raw fuel consumed to generate the energy consumed at the site, factoring in energy production and distribution losses.

Figure 12 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	George Inness High School Annex	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	111.4	141.4
Site Energy Use Intensity (kBtu/ft^2)	68.4	58.2

By implementing all recommended measures covered in this reporting, the project's estimated post-implementation EUI improves 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		
	George Inness High School Annex	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	86.7	141.4
Site Energy Use Intensity (kBtu/ft^2)	60.1	58.2

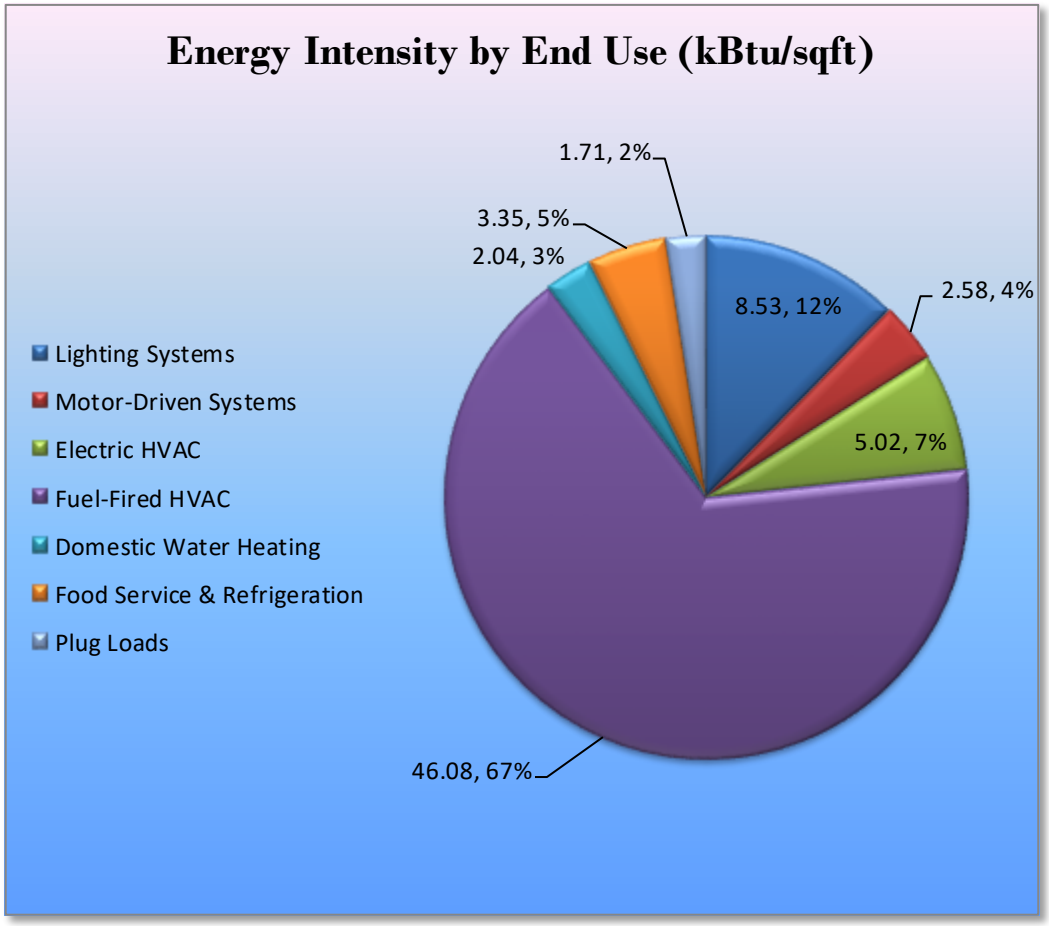
Many buildings can also receive a 1 – 100 ENERGY STAR® score. This score compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide — and may be eligible for ENERGY STAR® certification. This facility has a current score of 67.

The Portfolio Manager®, Statement of Energy Performance can be found in Appendix B: ENERGY STAR® Statement of Energy Performance.

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 and determine their proportional contribution to overall building energy usage. This visual representation of energy end uses highlights systems that may benefit most from energy efficiency projects.

Figure 14 - Energy Balance (% and kBtu/SF)



4 ENERGY CONSERVATION MEASURES

Level of Analysis

The goal of this audit report is to identify potential energy projects, help prioritize specific measures for implementation, and set the George Inness High School Annex on the path to receive financial incentives. 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 considered sufficient to make "Go/No-Go" decisions and to prioritize energy projects. Savings are based on the New Jersey Board of Public Utilities New Jersey Clean Energy Program Protocols to Measure Resource Savings dated June 29, 2016. Further analysis or investigation may be required to calculate more accurate savings to support any custom SmartStart, Pay for Performance, or Large Energy Users incentive applications. Financial incentives for the ECMs identified in this report have been calculated based the NJ prescriptive SmartStart program. Depending on your implementation strategy, the project may be eligible for more lucrative incentives through other programs as identified 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		**164,362**	**56.3**	**0.0**	**$22,561.48**	**$118,805.52**	**$13,970.00**	**$104,835.52**	**4.65**	**165,512**
ECM 1	Install LED Fixtures	81,117	30.1	0.0	$11,134.72	$54,426.60	$1,900.00	$52,526.60	4.72	81,685
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	5,345	1.8	0.0	$733.72	$5,499.00	$450.00	$5,049.00	6.88	5,383
ECM 3	Retrofit Fixtures with LED Lamps	77,900	24.4	0.0	$10,693.04	$58,879.92	$11,620.00	$47,259.92	4.42	78,444
Lighting Control Measures		**21,288**	**6.6**	**0.0**	**$2,922.15**	**$18,068.00**	**$2,305.00**	**$15,763.00**	**5.39**	**21,437**
ECM 4	Install Occupancy Sensor Lighting Controls	19,148	6.0	0.0	$2,628.41	$15,468.00	$2,305.00	$13,163.00	5.01	19,282
ECM 5	Install High/Low Lighitng Controls	2,140	0.6	0.0	$293.74	$2,600.00	$0.00	$2,600.00	8.85	2,155
HVAC System Improvements		**9,233**	**2.1**	**0.0**	**$1,267.34**	**$1,800.00**	**$500.00**	**$1,300.00**	**1.03**	**9,297**
ECM 6	Install Dual Enthalpy Outside Economizer Control	9,233	2.1	0.0	$1,267.34	$1,800.00	$500.00	$1,300.00	1.03	9,297
Domestic Water Heating Upgrade		**0**	**0.0**	**59.4**	**$537.57**	**$100.38**	**$0.00**	**$100.38**	**0.19**	**6,949**
ECM 7	Install Low-Flow Domestic Hot Water Devices	0	0.0	59.4	$537.57	$100.38	$0.00	$100.38	0.19	6,949
Plug Load Equipment Control - Vending Machine		**4,836**	**0.0**	**0.0**	**$663.76**	**$2,156.40**	**$0.00**	**$2,156.40**	**3.25**	**4,869**
ECM 8	Vending Machine Control	4,836	0.0	0.0	$663.76	$2,156.40	$0.00	$2,156.40	3.25	4,869
TOTALS		**199,719**	**65.0**	**59.4**	**$27,952.30**	**$140,930.30**	**$16,775.00**	**$124,155.30**	**4.44**	**208,065**

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

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

4.1.1 Lighting Upgrades

Our recommendations for lighting upgrades 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		**164,362**	**56.3**	**0.0**	**$22,561.48**	**$118,805.52**	**$13,970.00**	**$104,835.52**	**4.65**	**165,512**
ECM 1	Install LED Fixtures	81,117	30.1	0.0	$11,134.72	$54,426.60	$1,900.00	$52,526.60	4.72	81,685
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	5,345	1.8	0.0	$733.72	$5,499.00	$450.00	$5,049.00	6.88	5,383
ECM 3	Retrofit Fixtures with LED Lamps	77,900	24.4	0.0	$10,693.04	$58,879.92	$11,620.00	$47,259.92	4.42	78,444

ECM 1: Install LED Fixtures

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	81,117	30.1	0.0	$11,134.72	$54,426.60	$1,900.00	$52,526.60	4.72	81,685
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.00	0

Measure Description

This measure evaluates replacing existing metal halide fixtures located in the gymnasiums and halogen incandescent auditorium stage lighting with new high-performance LED light fixtures. This measure saves energy by installing LED sources which use less power than other technologies with a comparable light output.

Maintenance savings are anticipated since LED sources have burn hours which are generally more than twice that of a fluorescent source and more than 10 times incandescent sources. Maintenance savings may be partially offset by the higher material costs associated with LED sources.

During planning and design for the installation of new fixtures, we recommend a holistic approach that considers both the technology of the lighting sources and how they are controlled.

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	5,345	1.8	0.0	$733.72	$5,499.00	$450.00	$5,049.00	6.88	5,383
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.00	0

Measure Description

This measure evaluates replacing linear fluorescent T12 lamps, ballasts, and reflectors with LED tube lamps, reflectors, and drivers specifically designed for existing linear fluorescent fixtures. The retrofit uses the existing fixture housing but replaces the rest of the components with an efficient source and reflectors designed for LEDs. This measure saves energy by installing LED sources which use less power than other technologies with a comparable light output and efficiently projects the light into the space.

Maintenance savings are anticipated since LED sources have burn hours which are more than twice that of a fluorescent source. Maintenance savings may be partially offset by the higher material costs associated with LED sources.

During retrofit planning and design, we recommend a holistic approach that considers both the technology of the lighting sources and how they are controlled.

ECM 3: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	74,701	24.0	0.0	$10,254.00	$58,390.65	$11,570.00	$46,820.65	4.57	75,224
Exterior	3,198	0.4	0.0	$439.05	$489.27	$50.00	$439.27	1.00	3,221

Measure Description

This measure evaluates replacing linear fluorescent T5 and T8 lamps with LED tube lamps and replacing incandescent screw-in based lamps with LED lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed although there is a fluorescent fixture ballast in place. Other tube lamps require that fluorescent fixture ballasts be removed or replaced with LED drivers. Screw-in lamps can be used as a direct replacement for most other screw-in lamps. This measure saves energy by installing LED sources which use less power than other technologies with a comparable light output.

Maintenance savings are anticipated since LED sources have burn hours which are more than twice that of a fluorescent source and more than 10 times incandescent sources. LED lamps that use the existing fluorescent fixture ballast will be constrained by the remaining hours of the ballast. Maintenance savings may be partially offset by the higher material costs associated with LED sources.

During retrofit planning and design, we recommend a holistic approach that considers both the technology of the lighting sources and how they are controlled.

4.1.2 Lighting Control Measures

Our recommendations for lighting control measures are summarized in Figure 17 below.

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		**21,288**	**6.6**	**0.0**	**$2,922.15**	**$18,068.00**	**$2,305.00**	**$15,763.00**	**5.39**	**21,437**
ECM 4	Install Occupancy Sensor Lighting Controls	19,148	6.0	0.0	$2,628.41	$15,468.00	$2,305.00	$13,163.00	5.01	19,282
ECM 5	Install High/Low Lighitng Controls	2,140	0.6	0.0	$293.74	$2,600.00	$0.00	$2,600.00	8.85	2,155

ECM 4: Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
19,148	6.0	0.0	$2,628.41	$15,468.00	$2,305.00	$13,163.00	5.01	19,282

Measure Description

This measure evaluates installing occupancy sensors to control light fixtures that are currently manually controlled in some restrooms, storage rooms, classrooms and offices. Sensors detect occupancy using ultrasonic and/or infrared wave technologies. Lighting systems are enabled when an occupant is detected. Fixtures are automatically turned off after an area has been vacant for a preset period. Occupants will also be able to manually turn off fixtures. Energy savings result 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. Ceiling-mounted or remote-mounted sensors require the use of low voltage switching relays or a wireless signal to the switch. In general, use wall switch replacement sensors for single occupant offices and other small rooms. Install ceiling-mounted or remote mounted sensors in locations without local switching, in situations where the existing wall switches are not in the line-of-sight of the main work area, and in large spaces. We recommend a holistic design approach that considers both the technology of the lighting sources and how they are controlled.

Maintenance savings are anticipated due to reduced lamp operation, however, additional maintenance costs may be incurred because the occupancy sensors may require periodic adjustment; it is anticipated that the net effect on maintenance costs will be negligible.

ECM 5: Install High/Low Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
2,140	0.6	0.0	$293.74	$2,600.00	$0.00	$2,600.00	8.85	2,155

Measure Description

This measure evaluates installing occupancy sensors to provide dual level lighting control for light fixtures in spaces that are infrequently occupied but require continuous or night lighting for safety or security reasons. Typical areas for such lighting control are interior corridors.

The light fixtures operate at default low levels when the area is not occupied to provide minimal lighting to meet security or safety requirements. Sensors detect occupancy using ultrasonic and/or infrared wave technologies. The lighting systems are switched to the high-level setting when an occupant is detected. Fixtures are automatically switched back to low level after an area has been vacant for a preset period.

For this application, the occupancy sensors will generally be ceiling or fixture mounted. Sufficient sensor coverage should be provided to turn lights on in an area as an occupant approaches the area.

Maintenance savings are anticipated due to reduced lamp operation, however, additional maintenance costs may be incurred because the occupancy sensors may require periodic adjustment; it is anticipated that the net effect on maintenance costs will be negligible.

4.1.3 HVAC System Improvements

Our recommendations for HVAC system improvement measures are summarized in Figure 18 below.

Figure 18 - Summary of HVAC System Improvement ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
HVAC System Improvements		**9,233**	**2.1**	**0.0**	**$1,267.34**	**$1,800.00**	**$500.00**	**$1,300.00**	**1.03**	**9,297**
ECM 6	Install Dual Enthalpy Outside Economizer Control	9,233	2.1	0.0	$1,267.34	$1,800.00	$500.00	$1,300.00	1.03	9,297

ECM 6: Install Dual Enthalpy Outside Economizer 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)
9,233	2.1	0.0	$1,267.34	$1,800.00	$500.00	$1,300.00	1.03	9,297

Measure Description

Dual enthalpy economizers of the packaged units 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 in place of the air handling system's compressor. This reduces the demand on the cooling system, lowering its usage hours, saving energy.

Savings result from using outside air instead of mechanical cooling whenever possible. The retrofit measure is recommended for RTU 1 and RTU 2.

4.1.4 Domestic Water Heating Upgrade

Our recommendations for domestic water heating measures are summarized in Figure 19 below.

Figure 19 - Summary of Domestic Water Heating ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**59.4**	**$537.57**	**$100.38**	**$0.00**	**$100.38**	**0.19**	**6,949**
ECM 7	Install Low-Flow Domestic Hot Water Devices	0	0.0	59.4	$537.57	$100.38	$0.00	$100.38	0.19	6,949

ECM 7: Install Low-Flow DHW Devices

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	59.4	$537.57	$100.38	$0.00	$100.38	0.19	6,949

Measure Description

This measure evaluates the savings from installing low flow domestic water devices to reduce overall water flow in general and hot water flow in particular. Low flow faucet aerators reduce the water flow, relative to standard aerators, from the fixture

All of the low flow devices reduce the overall water flow from the fixture which generally reduces the amount of hot water used resulting in energy and water savings.

4.1.5 Plug Load Equipment Control - Vending Machine

Our recommendations for plug load equipment control measures are summarized in Figure 20 below.

Figure 20 - Summary of Plug Load Equipment Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Natural Gas Savings (MMBtu)	Annual N/A Savings (MMBtu)	Annual N/A Savings (MMBtu)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Plug Load Equipment Control - Vending Machine		**4,836**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**$663.76**	**$2,156.40**	**$0.00**	**$2,156.40**	**3.25**	**4,869**
ECM 8	Vending Machine Control	4,836	0.0	0.0	0.0	0.0	0.0	$663.76	$2,156.40	$0.00	$2,156.40	3.25	4,869

ECM 8: 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)
4,836	0.0	0.0	$663.76	$2,156.40	$0.00	$2,156.40	3.25	4,869

Measure Description

Vending machines operate continuously, even during non-business hours. It is recommended to install occupancy sensor based controls to reduce the energy use. These controls power down the machine when the surrounding area is vacant, then monitor the surrounding temperature and power up the cooling system at regular intervals to keep the product cool. Savings are a function of the activity level around the vending machine.

4.2 ECMs Evaluated but Not Recommended

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

Figure 21 – Summary of Evaluated but Not 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)
Motor Upgrades		**550**	**0.4**	**0.0**	**$75.47**	**$1,596.51**	**$0.00**	**$1,596.51**	**21.15**	**554**
	Premium Efficiency Motors	550	0.4	0.0	$75.47	$1,596.51	$0.00	$1,596.51	21.15	554
Electric Unitary HVAC Measures		**4,957**	**4.2**	**0.0**	**$680.44**	**$44,603.20**	**$2,528.00**	**$42,075.20**	**61.84**	**4,992**
	Install High Efficiency Electric AC	4,957	4.2	0.0	$680.44	$44,603.20	$2,528.00	$42,075.20	61.84	4,992
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**72.5**	**$656.65**	**$158,612.96**	**$8,744.00**	**$149,868.96**	**228.23**	**8,489**
	Install High Efficiency Steam Boilers	0	0.0	59.2	$536.32	$140,215.20	$7,544.00	$132,671.20	247.37	6,933
	Install High Efficiency Furnaces	0	0.0	13.3	$120.32	$18,397.75	$1,200.00	$17,197.75	142.93	1,555
Domestic Water Heating Upgrade		**0**	**0.0**	**9.9**	**$89.59**	**$4,912.15**	**$170.00**	**$4,742.15**	**52.93**	**1,158**
	Install High Efficiency Gas Water Heater	0	0.0	9.9	$89.59	$4,912.15	$170.00	$4,742.15	52.93	1,158
TOTALS		**5,507**	**4.6**	**82.4**	**$1,502.15**	**$209,724.82**	**$11,442.00**	**$198,282.82**	**132.00**	**15,192**

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

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

Premium Efficiency Motors

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
550	0.4	0.0	$75.47	$1,596.51	$0.00	$1,596.51	21.15	554

Measure Description

This measure evaluates replacing standard efficiency condenser water pumps motors with EISA 2007 efficiency motors. The evaluation assumes existing motors will be replaced with the same size motors. It is important that the speed of each new motor match the speed of the motor it replaces as closely as possible. The base case motor efficiencies are obtained from nameplate information. Proposed case premium motor efficiencies 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 annual operating hours.

Reasons for not Recommending

The measure was evaluated for the condenser water pump, partially due to its advanced age. The simple payback of this measure exceeds the expected useful life of the equipment and is therefore not recommended on the basis of energy savings alone.

Install High Efficiency Electric AC

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
4,957	4.2	0.0	$680.44	$44,603.20	$2,528.00	$42,075.20	61.84	4,992

Measure Description

This measure evaluates replacing package air conditioners with high efficiency package air conditioners. There have been significant improvements in both compressor and fan motor efficiencies in the past several years. Therefore, electricity savings can be achieved by replacing old 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 old and new unit, the cooling load, and the annual operating hours.

Reasons for not Recommending

The measure was evaluated for RTU-1 and RTU-2. The simple payback of this measure exceeds the expected useful life of the equipment and is therefore not recommended on the basis of energy savings alone.

Install High Efficiency Steam 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	59.2	$536.32	$140,215.20	$7,544.00	$132,671.20	247.37	6,933

Measure Description

This measure evaluates replacing the two old inefficient steam boilers with high efficiency steam boilers. Significant improvements have been made in combustion technology resulting in increases in overall boiler efficiency. Savings result from improved combustion efficiency and reduced standby losses at low loads. The school should consider re-evaluating the building heating load and installing modular steam boilers when these are replaced.

Reasons for not Recommending

The simple payback of this measure exceeds the expected useful live of the equipment and is therefore not recommended on the basis of energy savings alone.

Install High Efficiency Furnaces

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	13.3	$120.32	$18,397.75	$1,200.00	$17,197.75	142.93	1,555

Measure Description

This measure evaluates replacing existing standard furnaces of the packaged units with condensing furnaces. Improved combustion technology and heat exchanger design optimize the heat recovery from the combustion gases which significantly improves the furnace efficiency. Savings result from improved system efficiency. Condensing furnaces do have acidic condensate that needs to be drained.

Reasons for not Recommending

The measure was evaluated for rooftop air handling units. The simple payback of replacing the furnace section exceeds the expected useful life of the equipment and is therefore not recommended on the basis of energy savings alone. Considering efficient package furnaces when replacing rooftop heating units.

Install High Efficiency Gas Water Heater

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	9.9	$89.59	$4,912.15	$170.00	$4,742.15	52.93	1,158

Measure Description

This measure evaluates the savings from replacing a tank water heater with a high efficiency tank water heater. Improvements in combustion efficiency and reductions in heat loss have improved the overall efficiency of water heaters. Savings result from less gas used during combustion and less time operating during standby to maintain the water tank temperature.

Reasons for not Recommending

The simple payback of this measure exceeds the expected useful life of the equipment and is therefore not recommended on the basis of energy savings alone.

5 ENERGY EFFICIENT PRACTICES

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

Reduce Air Leakage

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

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.

Ensure Lighting Controls Are Operating Properly

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

Practice Proper Use of Thermostat Schedules and Temperature Resets

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

Clean and/or Replace HVAC Filters

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

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.

Plug Load Controls

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

Water Conservation

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

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

Refer to Section 4.1.4 for any low-flow ECM recommendations.

6 SELF-GENERATION MEASURES

Self-generation measures include both renewable (e.g., solar, wind) and non-renewable (e.g., microturbines) 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 deciding to implement, a feasibility study should be conducted that would take a detailed look at existing energy profiles, siting, interconnection, and the costs associated with the generation project including interconnection costs, departing load charges, and any additional special facilities charges.

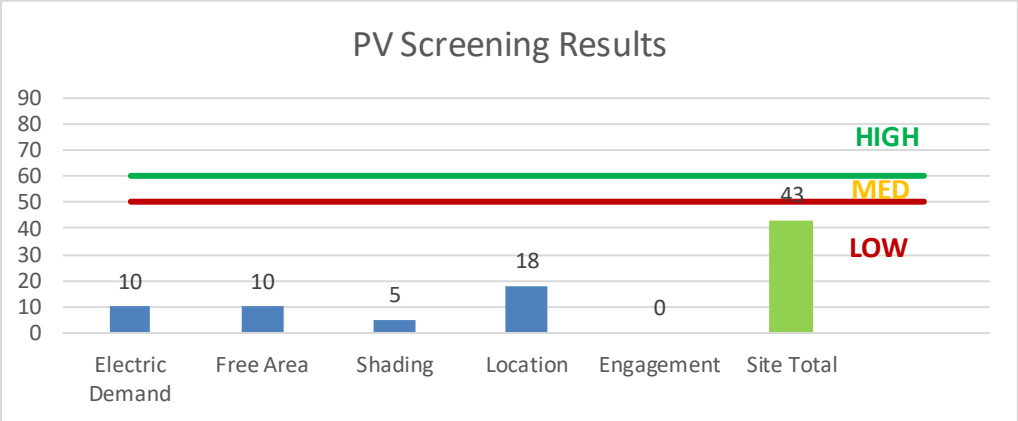
6.1 Photovoltaic

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

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

In order to be cost-effective, a solar PV array generally needs a minimum of 4,000 square feet of flat or south-facing rooftop, or other unshaded space, on which to place the PV panels. In our opinion, the facility does appear not meet these minimum criteria for cost-effective PV installation.

Figure 22 - Photovoltaic Screening



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

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

6.2 Combined Heat and Power

In non-industrial settings, combined heat and power (CHP) is the on-site generation of electricity and recovery of heat which is put to beneficial use. Common prime movers in CHP applications include reciprocating engines, microturbines, fuel cells, and (at large facilities) gas turbines. Electricity is typically interconnected to the sites local distribution system. Heat is recovered from the exhaust stream and the ancillary cooling system and interconnected to the existing hot water (or steam) distribution system.

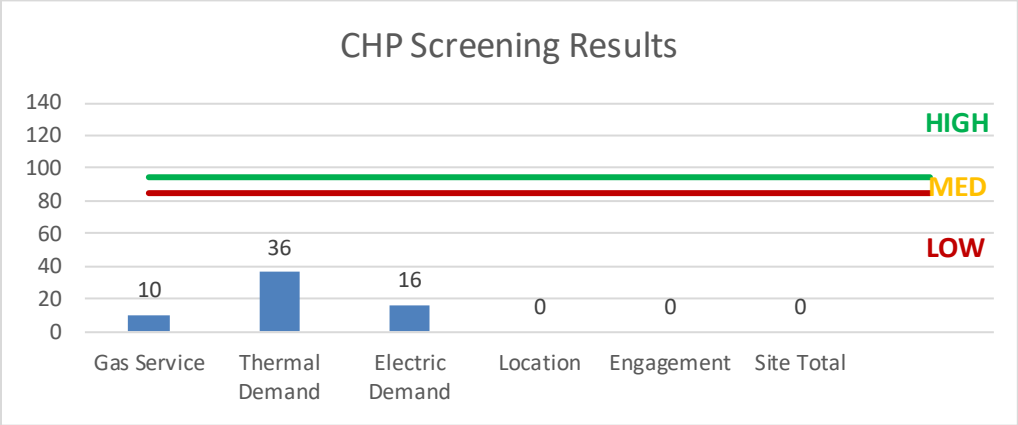
CHP systems are typically used to produce a portion of the electricity needed by a facility, with the balance of electric needs satisfied by purchase from the grid. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste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

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

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

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

Figure 23 - Combined Heat and Power Screening



7 DEMAND RESPONSE

Demand Response (DR) is a program designed to reduce consumer electric load when electric wholesale prices are high or when the reliability of the electric grid is threatened due to peak demand. 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 locally.

By enabling grid operators to call upon Curtailment Service Providers and energy consumers 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 will receive payments whether or not their facility is called upon to curtail their load.

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 program often find it to be a valuable source of revenue for their facility(ies) because the payments can significantly offset annual utility 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 event cycle. DR program participants often have to install smart meters and 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 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.

In our opinion, this facility has a moderate potential for DR curtailment.

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and others, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's 1999 Electricity Restructuring Law which requires all customers of investor-owned electric and gas utilities to pay this charge on their monthly energy bills. As a contributor to the fund you were able to participate in the LGEA program and are also eligible to utilize the equipment incentive programs. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 24 for a list of the eligible programs identified for each recommended ECM.

Figure 24 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Install LED Fixtures	x		x	x		
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	x		x	x		
ECM 3	Retrofit Fixtures with LED Lamps	x		x	x		
ECM 4	Install Occupancy Sensor Lighting Controls	x		x	x		
ECM 5	Install High/Low Lighitng Controls				x		
ECM 6	Install Dual Enthalpy Outside Economizer Control			x	x		
ECM 7	Install Low-Flow Domestic Hot Water Devices			x	x		
ECM 8	Vending Machine Control	x		x	x		

SmartStart is generally well suited for implementation of individual or small sets of measures, with the flexibility to install projects at your own pace using in-house staff or a preferred contractor. Direct Install caters to small to mid-size facilities to bundle measures and simplify participation, 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 and 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; applicants can use in-house staff or preferred contractor.

Generally, the incentive values provided throughout the report assume the SmartStart program is utilized because it provides a consistent comparison of available incentives.

Brief descriptions of all relevant alternative financing and incentive programs are located in the sections below. You may also check the following website for further information, including most current program availability, requirements, and incentive levels: 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.

Prescriptive Equipment Incentives 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

All customer sizes and types may be served by this program. This program provides an effective mechanism for securing incentives for individual projects that may be completed at once or over several years.

Incentives

The prescriptive path provides fixed incentives for specific energy efficiency measures whereas the custom measure path provides incentives for unique or specialized technologies that are not addressed through prescriptive offerings.

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 the lesser of 50% of the total installed incremental project cost, or a buy down to a one year payback. 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 ESIP 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 Direct Install

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

Incentives

The program pays up to 70% of the total installed cost of eligible measures, up to $125,000 per project. Each entity is limited to incentives up to $250,000 per fiscal year.

How to Participate

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

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

8.4 Energy Savings Improvement Program

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

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

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

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

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

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

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

In 1999, New Jersey State Legislature passed the Electric Discount & Energy Competition Act (EDECA) to restructure the electric power industry in New Jersey. This law deregulated the retail electric markets, allowing all consumers to shop for service from competitive electric suppliers. The intent was to create a more competitive market for electric power supply in New Jersey. As a result, utilities 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 year.

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 year.

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
Basement hallway	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,884	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,319	0.49	1,626	0.0	$223.23	$1,653.00	$180.00	6.60
Room 402	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.58	1,908	0.0	$261.95	$1,257.60	$260.00	3.81
Room 402	1	Incandescent: 60W A Lamp	Wall Switch	60	1,884	Relamp	No	1	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	9	1,884	0.03	110	0.0	$15.17	$53.75	$10.00	2.88
Closet	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	1,200	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	1,200	0.01	22	0.0	$3.03	$48.20	$10.00	12.60
Closet	1	Incandescent: 60W A Lamp	Wall Switch	60	1,200	Relamp	No	1	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	9	1,200	0.03	70	0.0	$9.66	$53.75	$10.00	4.53
Girls Locker Room	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,884	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,319	0.55	1,807	0.0	$248.03	$1,286.00	$220.00	4.30
Room 403	15	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.72	2,385	0.0	$327.44	$1,543.00	$320.00	3.74
Room 403	4	Incandescent: 60W A Lamp	Wall Switch	60	1,884	Relamp	No	4	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	9	1,884	0.13	442	0.0	$60.67	$215.01	$40.00	2.88
Room 403A	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.14	477	0.0	$65.49	$401.40	$80.00	4.91
Room 403A	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,884	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,884	0.04	143	0.0	$19.63	$117.00	$20.00	4.94
Room 403A	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,884	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,884	0.01	38	0.0	$5.20	$35.90	$5.00	5.94
Closet	8	Incandescent: 60W A Lamp	Wall Switch	60	1,440	Relamp	Yes	8	LED Screw-In Lamps: Downlight Solid State Retrofit	Occupancy Sensor	9	1,008	0.28	711	0.0	$97.65	$546.02	$80.00	4.77
Boiler Room	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,884	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,319	0.25	813	0.0	$111.61	$642.50	$110.00	4.77
Boiler Room	11	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,884	Relamp & Reballast	No	11	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,884	0.43	1,406	0.0	$193.01	$1,287.00	$110.00	6.10
Boiler Room	3	Incandescent: 150W A Lamp	Wall Switch	150	1,884	Relamp	No	3	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	15	1,884	0.27	877	0.0	$120.45	$161.26	$30.00	1.09
Storage	3	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,440	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,008	0.13	336	0.0	$46.17	$467.00	$30.00	9.47
Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,440	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,440	0.01	29	0.0	$3.98	$35.90	$5.00	7.77
Storage	1	Incandescent: 60W A Lamp	Wall Switch	60	1,440	Relamp	No	1	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	9	1,440	0.03	84	0.0	$11.59	$53.75	$10.00	3.77
Room 413	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.58	1,908	0.0	$261.95	$1,257.60	$260.00	3.81
Boys Locker Room	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,440	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,008	0.49	1,243	0.0	$170.62	$1,169.00	$200.00	5.68
Room 415	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.58	1,908	0.0	$261.95	$1,257.60	$260.00	3.81
Room 400A	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.58	1,908	0.0	$261.95	$1,257.60	$260.00	3.81
Room 400B	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.58	1,908	0.0	$261.95	$1,257.60	$260.00	3.81
Women Bathroom	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,440	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,008	0.14	345	0.0	$47.39	$562.50	$85.00	10.07
Elevator Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,440	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,440	0.04	109	0.0	$15.00	$117.00	$20.00	6.47

	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
Custodian Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,440	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,440	0.02	55	0.0	$7.50	$58.50	$10.00	6.47
Men Bathroom	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,440	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,008	0.14	345	0.0	$47.39	$562.50	$85.00	10.07
Kitchen/Cafeteria	42	Linear Fluorescent - T5: 2' T5 (14W) - 1L	Wall Switch	18	1,440	Relamp	No	42	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	1,440	0.26	661	0.0	$90.70	$1,339.80	$210.00	12.46
Kitchen/Cafeteria	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,440	Relamp	No	6	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,440	0.22	556	0.0	$76.38	$570.80	$120.00	5.90
Kitchen/Cafeteria	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	1,440	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,440	0.04	109	0.0	$15.00	$117.00	$20.00	6.47
East Entrance	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,440	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,440	0.06	164	0.0	$22.50	$175.50	$30.00	6.47
Stairwell 10	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,884	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,884	0.13	429	0.0	$58.89	$300.80	$60.00	4.09
1st Floor Room 500A	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.43	1,431	0.0	$196.46	$972.20	$200.00	3.93
Room 500B	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.43	1,431	0.0	$196.46	$972.20	$200.00	3.93
Room 510A	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.43	1,431	0.0	$196.46	$972.20	$200.00	3.93
East Wing Hallway	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,884	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	1,319	0.41	1,355	0.0	$186.02	$1,152.00	$150.00	5.39
Men Bathroom	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,884	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,319	0.14	452	0.0	$62.01	$408.50	$85.00	5.22
Custodian Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,440	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,440	0.02	55	0.0	$7.50	$58.50	$10.00	6.47
Bathroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,440	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,440	0.02	55	0.0	$7.50	$58.50	$10.00	6.47
CST Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,440	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,008	0.14	365	0.0	$50.05	$401.40	$80.00	6.42
Chemical Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,440	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,440	0.04	109	0.0	$15.00	$117.00	$20.00	6.47
Room 502	15	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,440	Relamp	Yes	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,008	0.72	1,823	0.0	$250.27	$1,543.00	$320.00	4.89
Custodian Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,440	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,440	0.04	109	0.0	$15.00	$117.00	$20.00	6.47
Room 504 (Data Room)	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,440	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,008	0.19	486	0.0	$66.74	$496.53	$100.00	5.94
Bathroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,440	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,008	0.05	138	0.0	$18.96	$233.00	$20.00	11.24
Girls Gymnasium	16	Metal Halide: (1) 350W Lamp	Wall Switch	400	1,884	Fixture Replacement	Yes	16	LED - Fixtures: Downlight Pendant	Occupancy Sensor	125	1,319	3.28	10,833	0.0	$1,487.01	$13,257.28	$640.00	8.49
West Wing Hallway	14	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	14	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	1,319	0.67	2,226	0.0	$305.61	$1,731.87	$280.00	4.75
Closet	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	22	1,200	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	1,200	0.01	19	0.0	$2.56	$31.90	$5.00	10.52
Room 507	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.58	1,908	0.0	$261.95	$1,257.60	$260.00	3.81
Room 508	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.14	477	0.0	$65.49	$401.40	$80.00	4.91

	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
Room 509	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.58	1,908	0.0	$261.95	$1,257.60	$260.00	3.81
Room 510	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.58	1,908	0.0	$261.95	$1,257.60	$260.00	3.81
Teacher Room	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.24	795	0.0	$109.15	$591.67	$120.00	4.32
Front Entrance	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	No	8	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,884	0.29	971	0.0	$133.24	$761.07	$160.00	4.51
Front Entrance	4	Incandescent: Candelabra 40W	Wall Switch	40	1,884	Relamp	No	4	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	7	1,884	0.09	286	0.0	$39.26	$175.81	$40.00	3.46
Principal Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.14	477	0.0	$65.49	$401.40	$80.00	4.91
Closet	2	Incandescent: 60W A Lamp	Wall Switch	60	1,440	Relamp	Yes	2	LED Screw-In Lamps: Downlight Solid State Retrofit	Occupancy Sensor	9	1,008	0.07	178	0.0	$24.41	$223.51	$20.00	8.34
Bathroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,440	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,008	0.05	122	0.0	$16.68	$211.13	$40.00	10.26
Main Office	7	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	7	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.34	1,113	0.0	$152.81	$781.93	$160.00	4.07
Security Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,884	0.04	121	0.0	$16.65	$95.13	$20.00	4.51
Room 525	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.58	1,908	0.0	$261.95	$1,257.60	$260.00	3.81
Storage	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,200	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	840	0.16	345	0.0	$47.39	$467.00	$60.00	8.59
Closet	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	22	1,200	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	1,200	0.01	19	0.0	$2.56	$31.90	$5.00	10.52
Room 527	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.58	1,908	0.0	$261.95	$1,257.60	$260.00	3.81
Room 531	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.14	477	0.0	$65.49	$401.40	$80.00	4.91
Men Bathroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,884	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,319	0.05	181	0.0	$24.80	$233.00	$20.00	8.59
Nurse Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,884	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,884	0.01	38	0.0	$5.20	$35.90	$5.00	5.94
Nurse Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	No	3	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,884	0.11	364	0.0	$49.96	$285.40	$60.00	4.51
Boys Gymnasium	16	Metal Halide: (1) 400W Lamp	Wall Switch	458	1,884	Fixture Replacement	Yes	16	LED - Fixtures: Downlight Pendant	Occupancy Sensor	125	1,319	3.89	12,844	0.0	$1,763.00	$13,257.28	$640.00	7.16
Auditorium	8	Incandescent: Candelabra 40W	Wall Switch	40	1,440	Relamp	No	8	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	7	1,440	0.17	437	0.0	$60.01	$351.62	$80.00	4.53
Auditorium	16	Incandescent: Wall Sconce 100W	Wall Switch	100	1,440	Relamp	No	16	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	11	1,440	0.93	2,358	0.0	$323.69	$860.05	$160.00	2.16
Auditorium	16	Incandescent: Candelabra 55W	Wall Switch	55	1,440	Relamp	No	16	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	7	1,440	0.50	1,272	0.0	$174.58	$703.25	$160.00	3.11
Stage	11	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,440	Relamp & Reballast	No	11	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,440	0.43	1,075	0.0	$147.53	$1,287.00	$110.00	7.98
Stage	58	Halogen Incandescent: 750W Spot Light	Wall Switch	750	1,440	Fixture Replacement	No	58	LED - Fixtures: Track or Mono-Point Directional Lighting Fixtures	Wall Switch	125	1,440	23.76	60,030	0.0	$8,240.12	$34,888.39	$1,740.00	4.02
Storage	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,440	Relamp & Reballast	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,440	0.08	195	0.0	$26.82	$234.00	$0.00	8.72

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,440	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,440	0.04	109	0.0	$15.00	$117.00	$20.00	6.47
Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,440	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,440	0.01	29	0.0	$3.98	$35.90	$5.00	7.77
Fiting Room	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,440	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,008	0.18	448	0.0	$61.56	$584.00	$60.00	8.51
Fiting Room	12	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	1,440	Relamp	No	12	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	1,440	0.13	318	0.0	$43.64	$578.40	$120.00	10.50
Office	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,884	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,319	0.18	587	0.0	$80.54	$584.00	$60.00	6.51
Waiting Room	10	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,884	Relamp & Reballast	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,319	0.44	1,467	0.0	$201.34	$1,286.00	$120.00	5.79
Fitting Room	12	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	1,200	Relamp	Yes	12	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	840	0.17	349	0.0	$47.96	$694.40	$140.00	11.56
Attic Floor	10	Incandescent: 100W A Lamp	Wall Switch	100	1,440	Relamp	No	10	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	11	1,440	0.58	1,474	0.0	$202.31	$537.53	$100.00	2.16
2nd Floor Hallway	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,040	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	1,428	0.57	2,054	0.0	$282.00	$1,452.80	$210.00	4.41
2nd Floor Hallway	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,040	Relamp	Yes	7	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	1,428	0.24	851	0.0	$116.88	$451.30	$35.00	3.56
Room 600A	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.58	1,908	0.0	$261.95	$1,257.60	$260.00	3.81
Room 602A	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,884	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,319	0.49	1,626	0.0	$223.23	$1,018.40	$180.00	3.76
Room 602B	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,884	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,319	0.49	1,626	0.0	$223.23	$1,018.40	$180.00	3.76
Room 600B	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,884	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,319	0.49	1,626	0.0	$223.23	$1,018.40	$180.00	3.76
Women Bathroom	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,440	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,008	0.14	345	0.0	$47.39	$408.50	$70.00	7.14
Custodian Closet	1	Compact Fluorescent: 2x13W CFL 4-pin	Wall Switch	26	1,200	Fixture Replacement	No	1	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	18	1,200	0.01	11	0.0	$1.48	$63.65	$0.00	43.08
Bathroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,884	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,884	0.02	71	0.0	$9.81	$58.50	$10.00	4.94
Teacher Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.14	477	0.0	$65.49	$401.40	$80.00	4.91
Council Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,884	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,319	0.08	271	0.0	$37.20	$266.40	$50.00	5.82
Storage	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	$15.80	$233.00	$20.00	13.48
Room 601	18	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,920	Relamp	Yes	18	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,344	0.87	2,917	0.0	$400.44	$1,828.40	$380.00	3.62
Men Bathroom	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	$15.80	$233.00	$20.00	13.48
Room 603	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.43	1,431	0.0	$196.46	$972.20	$200.00	3.93
Room 602	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.10	318	0.0	$43.66	$306.27	$60.00	5.64
Room 604	15	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.72	2,385	0.0	$327.44	$1,543.00	$320.00	3.74

	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
Room 605	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.43	1,431	0.0	$196.46	$972.20	$200.00	3.93
Room 605A	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,884	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,319	0.37	1,220	0.0	$167.42	$792.80	$155.00	3.81
Closet	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	1,200	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	1,200	0.01	22	0.0	$3.03	$48.20	$10.00	12.60
Room 608	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,884	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,319	0.33	1,084	0.0	$148.82	$818.00	$140.00	4.56
Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,440	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,008	0.05	138	0.0	$18.96	$233.00	$20.00	11.24
Room 607	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,440	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,008	0.25	621	0.0	$85.31	$567.20	$110.00	5.36
Auditorium Control Center	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,440	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,008	0.09	224	0.0	$30.78	$350.00	$40.00	10.07
Auditorium Control Center	1	Incandescent: 60W A Lamp	Wall Switch	60	1,440	Relamp	No	1	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	9	1,440	0.03	84	0.0	$11.59	$53.75	$10.00	3.77
Room 601	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,884	Relamp	Yes	6	LED - Linear Tubes: (4) 3' Lamps	Occupancy Sensor	42	1,319	0.25	827	0.0	$113.49	$631.60	$20.00	5.39
Room 610	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,884	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,319	0.27	903	0.0	$124.02	$701.00	$120.00	4.68
Room 613	15	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.72	2,385	0.0	$327.44	$1,543.00	$320.00	3.74
Room 612	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.58	1,908	0.0	$261.95	$1,257.60	$260.00	3.81
Room 614	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.43	1,431	0.0	$196.46	$972.20	$200.00	3.93
Room 615	15	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.72	2,385	0.0	$327.44	$1,543.00	$320.00	3.74
Closet	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	1,440	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	1,440	0.01	26	0.0	$3.64	$48.20	$10.00	10.50
Room 616	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.10	318	0.0	$43.66	$306.27	$60.00	5.64
Room 617	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,884	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,319	0.14	477	0.0	$65.49	$401.40	$80.00	4.91
Girls Bathroom	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	$15.80	$233.00	$20.00	13.48
Stairwell	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,884	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,319	0.33	1,084	0.0	$148.82	$902.00	$120.00	5.25
Old Stairells	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,884	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	1,319	0.06	189	0.0	$25.99	$343.60	$20.00	12.45
New Stairwells	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,884	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	1,319	0.33	1,084	0.0	$148.82	$801.60	$120.00	4.58
Cafeteria Storage Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,875	Relamp	Yes	4	LED Screw-In Lamps: Downlight Solid State Retrofit	Occupancy Sensor	45	2,013	0.08	403	0.0	$55.37	$331.01	$60.00	4.89
Kitchen Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,200	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,200	0.04	91	0.0	$12.50	$117.00	$20.00	7.76
School	37	Exit Signs: LED - 2 W Lamp	None	6	1,200	None	Yes	37	Exit Signs: LED - 2 W Lamp	Occupancy Sensor	6	840	0.04	92	0.0	$12.62	$116.00	$20.00	7.61
Exterior Light Wallpack	5	Incandescent: 150W Screw-in Lamp	Daylight Dimming	150	4,380	Relamp	No	5	LED Screw-In Lamps: Downlight Solid State Retrofit	Daylight Dimming	23	4,380	0.42	3,198	0.0	$439.05	$489.27	$50.00	1.00

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Exterior Light Wallpack	8	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	45	4,380	None	No	8	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	45	4,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Motor Inventory & Recommendations

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Boiler Room	1	Air Compressor	0.5	72.0%	No	650	No	72.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Boiler Room	2	Other	1.0	82.0%	No	650	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Boiler Room	2	Boiler Feed Water Pump	3.0	86.5%	No	650	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Boiler Room	3	Condenser Water Pump	2.0	78.0%	No	1,300	Yes	86.5%	No		0.42	550	0.0	$75.47	$1,596.51	$0.00	21.15
Boiler Room	DWH	1	Other	0.3	71.0%	No	1,300	No	71.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Elevator Room	Elevator	1	Other	25.0	75.5%	No	1,300	No	75.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Kitchen	2	Supply Fan	5.0	88.5%	Yes	1,300	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Kitchen	2	Exhaust Fan	2.0	86.0%	Yes	1,300	No	86.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Auditorium	2	Supply Fan	7.5	84.0%	No	1,300	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Auditorium	2	Return Fan	3.0	84.0%	No	1,300	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
School	School	13	Other	0.3	71.0%	No	1,300	No	71.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Room 504 - Data Room	Data Room	1	Window AC	0.76		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Teacher Room	Teacher Room	1	Window AC	1.29		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 508	Room 508	1	Window AC	1.91		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Main Office	Main Office	1	Window AC	0.66		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Main Office	Main Office	1	Window AC	1.91		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Nurse Office	Nurse Office	1	Window AC	0.66		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 608	Room 608	2	Window AC	1.02		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 612	Room 612	2	Window AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 613	Room 613	1	Window AC	1.83		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 616	Room 616	1	Window AC	0.91		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Auditorium	1	Split-System AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Cafeteria Office	1	Split-System AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Room 500A	1	Split-System AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Room 602 - RTU2	1	Packaged AC	16.00		Yes	1	Packaged AC	16.00		11.50		Yes	3.12	7,095	0.0	$973.89	$23,201.60	$1,514.00	22.27
Roof Top	Room 600B - RTU1	1	Packaged AC	16.00		Yes	1	Packaged AC	16.00		11.50		Yes	3.12	7,095	0.0	$973.89	$23,201.60	$1,514.00	22.27

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
Roof Top	Cafeteria/Auditorium	2	Air-Cooled Scroll Chiller	60.00	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 room	School	2	Forced Draft Steam Boiler	3,772.00	Yes	2	Forced Draft Steam Boiler	3,772.00	82.40%	Et	0.00	0	59.2	$536.32	$140,215.20	$7,544.00	247.37
Roof Top	Room 602	1	Furnace	316.00	Yes	1	Furnace	316.00	95.00%	AFUE	0.00	0	3.5	$31.31	$7,159.72	$400.00	215.90
Roof Top	Auditorium	1	Furnace	215.00	Yes	1	Furnace	180.00	95.00%	AFUE	0.00	0	6.4	$57.71	$4,078.32	$400.00	63.74
Roof Top	Room 600B	1	Furnace	316.00	Yes	1	Furnace	316.00	95.00%	AFUE	0.00	0	3.5	$31.31	$7,159.72	$400.00	215.90

DHW Inventory & Recommendations

		Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	School	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Custodian Closet	School	1	Storage Tank Water Heater (> 50 Gal)	Yes	1	Storage Tank Water Heater (> 50 Gal)	Natural Gas	92.00%	Et	0.00	0	25.2	$228.48	$4,912.15	$170.00	20.75

Low-Flow Device Recommendations

	Recommedation Inputs				Energy Impact & Financial Analysis						
Location	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
School	10	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	46.9	$424.40	$71.70	$0.00	0.17
Kitchen	4	Faucet Aerator (Kitchen)	3.00	2.20	0.00	0	12.5	$113.17	$28.68	$0.00	0.25

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions		Proposed Conditions			Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Evaporator Fan Control?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Cooler (35F to 55F)	No	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Low Temp Freezer (-35F to -5F)	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
Kitchen	1	Stand-Up Refrigerator, Solid Door (≤15 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Teacher Room	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Nurse Office	1	Stand-Up Refrigerator, Solid Door (≤15 cu. ft.)	Yes	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
Kitchen	1	Ice Making Head (≥450 lbs/day), Batch	Yes	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	Gas Rack Oven (Double)	Yes	No	0.00	0	0.0	$0.00	$18,580.09	$4,000.00	0.00
Kitchen	1	Insulated Food Holding Cabinet (3/4 Size)	Yes	No	0.00	0	0.0	$0.00	$2,553.15	$250.00	0.00

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
School	105	Desktop Computer	191.0	Yes
School	9	Microwave	1,000.0	No
School	3	Copy Machine	800.0	Yes
School	7	Printer	460.0	Yes

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Cafeteria	2	Refrigerated	Yes	0.00	3,224	0.0	$442.50	$1,437.60	$0.00	3.25
Teacher Room	1	Refrigerated	Yes	0.00	1,612	0.0	$221.25	$718.80	$0.00	3.25

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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67

ENERGY STAR® Score[1]

George Inness High School Annex

Primary Property Type: K-12 School
Gross Floor Area (ft²): 89,261
Built: 1925

For Year Ending: April 30, 2016
Date Generated: December 13, 2017

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
George Inness High School Annex 141 Park Street Montclair, New Jersey 07042	_____ , (___)___-_____	___ _____ , (___)___-_____ _____

Property ID: 5724956

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
68 kBtu/ft²

Source EUI
111 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	4,376,478 (72%)
Electric - Grid (kBtu)	1,690,758 (28%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	79.7
National Median Source EUI (kBtu/ft²)	130.1
% Diff from National Median Source EUI	-15%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	420

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)