Local Government Energy Audit:
Energy Audit Report

Stony Brook School

Branchburg Township School District

136 Cedar Grove Road
Branchburg, NJ 08876

January 4, 2018

Final Report by:
TRC Energy Services

Disclaimer

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

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

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

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

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1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Stony Brook School. The goal of an LGEA report is to provide you with information on how your facility uses energy, identify energy conservation measures (ECMs) that can reduce your energy use, and provide information and assistance to help facilities implement ECMs. The LGEA report also contains valuable information on financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing ECMs.

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

1.1 Facility Summary

Stony Brook School is a 47,368 square foot facility comprised of three wings (A, B, and C) connected by hallways. The single floor building includes a gym, kitchen, band/music room, art room, offices and classrooms. There is also a 125 kW solar photovoltaic (PV) system on the roof of the facility.

Lighting at Stony Brook School consists of primarily first generation T8 fluorescents in the interior and HID on the exterior of the building. Some of the HVAC equipment is aging and in need of replacement. Heating is supplied mostly from split heat pump 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 six (6) measures which together represent an opportunity for Stony Brook School to reduce annual energy costs by $13,818 and annual greenhouse gas emissions by 111,153 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 4.4 years including any applicable estimated incentives. The breakdown of existing and potential utility costs after project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce Stony Brook School's annual energy use by 15%.

Figure 1 – Previous 12 Month Utility Costs

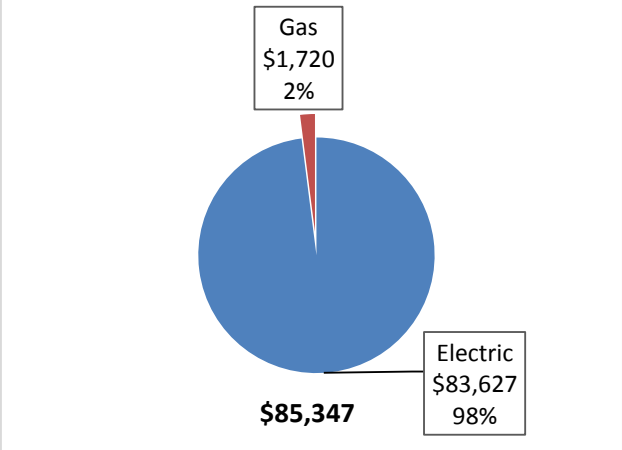
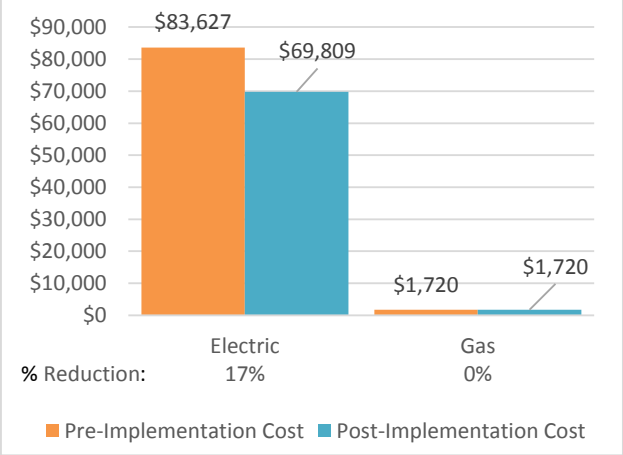


Figure 2 – Potential Post-Implementation Costs



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

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

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**92,622**	**19.9**	**0.0**	**$11,594.78**	**$56,179.52**	**$7,305.00**	**$48,874.52**	**4.2**	**93,269**
ECM 1	Install LED Fixtures	Yes	27,406	3.6	0.0	$3,430.84	$16,184.70	$0.00	$16,184.70	4.7	27,598
ECM 2	Retrofit Fixtures with LED Lamps	Yes	58,022	15.9	0.0	$7,263.50	$37,736.16	$7,305.00	$30,431.16	4.2	58,428
ECM 3	Install LED Exit Signs	Yes	7,193	0.5	0.0	$900.43	$2,258.66	$0.00	$2,258.66	2.5	7,243
Lighting Control Measures			**15,053**	**4.1**	**0.0**	**$1,884.45**	**$8,932.00**	**$1,540.00**	**$7,392.00**	**3.9**	**15,159**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	15,053	4.1	0.0	$1,884.45	$8,932.00	$1,540.00	$7,392.00	3.9	15,159
Electric Unitary HVAC Measures			**751**	**0.4**	**0.0**	**$94.07**	**$3,615.87**	**$222.33**	**$3,393.53**	**36.1**	**757**
ECM 5	Install High Efficiency Electric AC	Yes	751	0.4	0.0	$94.07	$3,615.87	$222.33	$3,393.53	36.1	757
Plug Load Equipment Control - Vending Machine			**1,954**	**0.0**	**0.0**	**$244.65**	**$460.00**	**$0.00**	**$460.00**	**1.9**	**1,968**
ECM 6	Vending Machine Control	Yes	1,954	0.0	0.0	$244.65	$460.00	$0.00	$460.00	1.9	1,968
TOTALS			**110,381**	**24.5**	**0.0**	**$13,817.95**	**$69,187.38**	**$9,067.33**	**$60,120.05**	**4.4**	**111,153**

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

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

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

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

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

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

Energy Efficient Practices

TRC also identified 9 low cost (or no cost) energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral or operational adjustments and by performing better routine maintenance on building systems. These practices can extend equipment lifetime, improve occupant comfort, provide better health and safety, as well as reduce annual energy and O&M costs. Potential opportunities identified at Stony Brook School include:

- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Ensure Economizers are Functioning Properly

- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Check for and Seal Duct Leakage
- Perform Proper Water Heater Maintenance
- Water Conservation

For details on these Energy Efficient Practices, please refer to Section 5.

On-Site Generation Measures

TRC evaluated the potential for installing on-site generation for Stony Brook School. Currently there are solar PV panels on the grounds of the school. Based on the thermal configuration and loads there is a low potential for combined heat and power or other power self-generation measures.

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

1.3 Implementation Planning

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

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

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

- SmartStart
- Pay for Performance – Existing Buildings (P4P)
- Energy Savings Improvement Program (ESIP)

For facilities wanting to pursue only selected individual measures (or planning to phase implementation of selected measures over multiple years), incentives are available through the SmartStart program. To participate in this program you may utilize internal resources, or an outside firm or contractor, to do the final design of the ECM(s) and do the installation. Program pre-approval is required for some SmartStart incentives, so only after receiving pre-approval should you proceed with ECM installation. The incentive estimates listed above in Figure 3 are based on the SmartStart program. More details on this program and others are available in Section 7.

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

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the Energy Savings Improvement Program (ESIP). Supported directly by the NJBPU, ESIP provides government agencies with project development, design, and implementation support services, as well as,

attractive financing for implementing ECMs. An LGEA report (or other approved energy audit) is required for participation in ESIP. Please refer to Section 7.3 for additional information on the ESIP Program.

Additional information on relevant incentive programs is located in Section 7 or: www.njcleanenergy.com/ci.

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 4 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Theresa Linskey	Administrator	tlinskey@branchburg.k12.nj.us	908-722-3335 Ext.7440
Designated Representative			
John T. Hindmarch	Supervisor of Buildings and Grounds	jhindmarch@branchburg.k12.nj.us	908-722-3335 Ext.7440
TRC Energy Services			
Moussa Traore	Auditor	MTraore@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On April 6, 2017, TRC performed an energy audit at Stony Brook School located in Branchburg, New Jersey. TRCs' team met with John Hindmarch, Supervisor of Buildings and Grounds, to review the facility operations and help focus our investigation on specific energy-using systems.

Stony Brook School is a 47,368 square foot facility comprised of three wings (A, B, and C) connected by hallways. The single floor building includes a gym, kitchen, band/music room, art room and classrooms. There is also solar PV power generation on the roof of the facility. The building was constructed in 1959 and renovated in 2002.

2.3 Building Occupancy

The school building is open Monday through Friday and closed on the weekends. The typical schedule is presented in the table below. The entire facility is used September through mid-June and closed to students for the summer months (mid-June to beginning of September).

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Stony Brook School	Weekday	8:00am - 5:30pm
Stony Brook School	Weekend	closed

2.4 Building Envelope

The foundation consists of concrete perimeter walls and walls are constructed with concrete bricks and structural steel. It has a flat roof covered with multi-ply bituminous built-up membrane that is in good condition. The building has double pane windows that showed no signs of outside air infiltration and the exterior doors are constructed of metal. Overall, the building's envelope was found to be in good condition.

2.5 On-Site Generation

Stony Brook School has a 125 kW solar photovoltaic (PV) system installed on the roof. The system provides 33% of the electricity required by the facility. Vanguard Energy Capital LLC, a national power-purchase agreement provider, was the financier of the solar energy system. Stony Brook School does not have any other on-site electric generation capacity.

2.6 Energy-Using Systems

Lighting System

Lighting at the facility is provided mostly by fixtures with 32-watt linear fluorescent T8 lamps and electronic ballasts as well as some compact fluorescent lamps (CFL). Most of the fixtures are 2-lamp or 3-lamp, 4-foot long troffers with diffusers. There are LED linear tube fixtures installed in the A, B and C wing corridors as well as the band room. Exit signs throughout the facility are incandescent.

Lighting control in most spaces is provided mainly by manual switches as well as some occupancy sensors. The A, B, C corridors, the custodial area, and the office and closet of the gymnasium have occupancy sensors. The occupancy sensors are either wall or ceiling mounted depending on the space layout.

The facility has minimal exterior lighting which consists of 250-watt metal halide outdoor wall-mounted fixtures and 400-watt metal halide parking lot fixtures. They are controlled with photocells.

Energy savings could be achieved by continuing to retrofit the existing lighting system with LED linear tubes and LED lamps fixtures. Installing occupancy sensors in select areas will yield additional energy savings.

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

Direct Expansion Air Conditioning Systems (DX)

There are 26 (3) ton Airedale air source heat pumps with supplemental electric resistance heating used to condition the classroom spaces. The units are constant air volume with two (2) 1/2 hp supply fans and two (2) 1/3 hp exhaust fans. The system can provide free cooling via the fixed outdoor air damper that can modulate the amount of outside air from 0 to 100%. The units use a scroll compressor and a direct-expansion (DX) coil. The units have 7.5 kW electric resistance supplemental heating that is used as needed – typically when the outside air temperature is below 40°F.

The units are controlled by individual thermostats located in the zones. The heat pumps are connected to the building energy management system (BEMS) and operate based on building occupancy.

A 20 ton Trane package unit with a gas fired-furnace and outside air economizer conditions the gymnasium and provides kitchen make up air. This unit is located on the roof at the south end of the building and provides constant air volume with a single (1) 5 hp supply fan and a (1) 1 hp return fan. The unit has a scroll compressor and a DX coil and an outside air economizer to use free cooling when the outside air temperature is lower than the return air temperature. The gas-fired furnace provides heating as needed.

There are several other package air conditioners ranging in capacity from 1 to 7.5 tons. These condition the band room, library, faculty room, and other similar spaces with spot cooling and heating requirements.

There are two (2) Sanyo split system DX air conditioners serving the main office and the nurse's office that were indicated as being in need of replacement. The Sanyo system serving the Main office and the system serving the Nurse's office are about 18 years old. There are also five (5) window AC units that serve rooms A10, B7, B8, and CST room. They appeared to be in good condition.

Heating System

Two (2) Trane rooftop packaged units equipped with gas-fired furnaces condition the gymnasium and room A1. The units have an output capacity of 50 and 20 MBh respectively with heating efficiency of 81%. Ten (10) cabinet electric heaters are used to heat the corridors. The classrooms are heated with Airedale heat pumps supplemental electric resistance.

Building Energy Management System (BEMS)

The majority of the facility is monitored and controlled with a Metasys Building Energy Management System (BEMS). The BEMS system mainly provides schedule and setpoint controls for the building's HVAC systems.

Domestic Hot Water Heating System

The domestic hot water (DHW) system consists of two (2) electric and one (1) gas water heater. The gas water heater serves the kitchen while the electric water heaters serve the restrooms. The kitchen DHW has an input capacity of 42 kBtu/hr and has a 50 gallon storage tank, while the other two (2) electric DHW have input capacities of 4.5 kW and 9 kW and 40 and 80 gallon storage tanks respectively. They all appeared to be in good condition.

Food Service

The school has a small non-commercial kitchen that is used to prepare approximately 400 lunches per day for the students. Most of the lunch preparation is done using the convection ovens and warmers which appear to already be energy efficient.

Refrigeration

The kitchen has a (1) cooler, three (3) freezers and three (3) stand up refrigerators used to store food prepared for school lunches. The kitchen also has a free standing commercial size freezer.

Building Plug Load

There are approximately 161 desktop computers throughout the facility. There is a 11.5 kW kiln in the Art Room. The facility has one refrigerated beverage vending machine.

2.7 Water-Using Systems

There are 17 restrooms at this facility. A sampling of restrooms found that 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 school has a girls and boys locker rooms. There are no showerheads.

3 SITE ENERGY USE AND COSTS

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

3.1 Total Cost of Energy

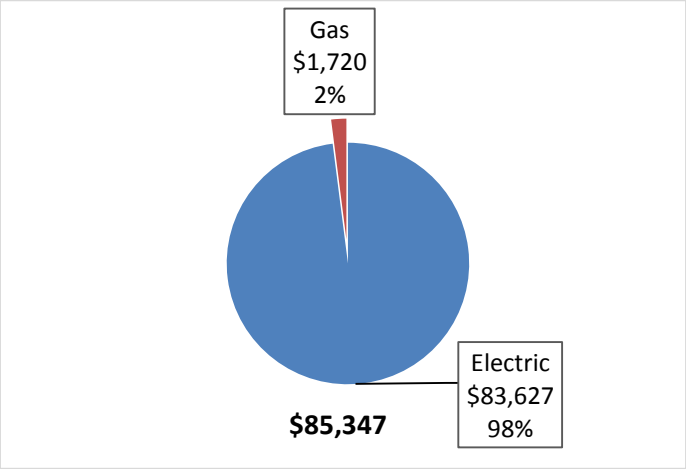
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 6 - Utility Summary

Utility Summary for Stony Brook School		
Fuel	**Usage**	**Cost**
Electricity	668,031 kWh	$83,627
Natural Gas	1,949 Therms	$1,720
Total		**$85,347**

The current annual energy cost for this facility is $85,347 as shown in the chart below.

Figure 7 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by JCP&L and Vanguard Capital (Solar). The average electric cost over the past 12 months was $0.125/kWh, which is the blended rate (grid electric and solar) that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. There are significant demand charges for the school. The demand should be further investigated as the base kW does not appear to go below 300kW for most months. Analysis of the energy and demand profile indicates that there is a higher energy and demand in the winter months with respect to the summer which makes sense as the majority of the space heating is electric. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 8 - Electric Usage & Demand

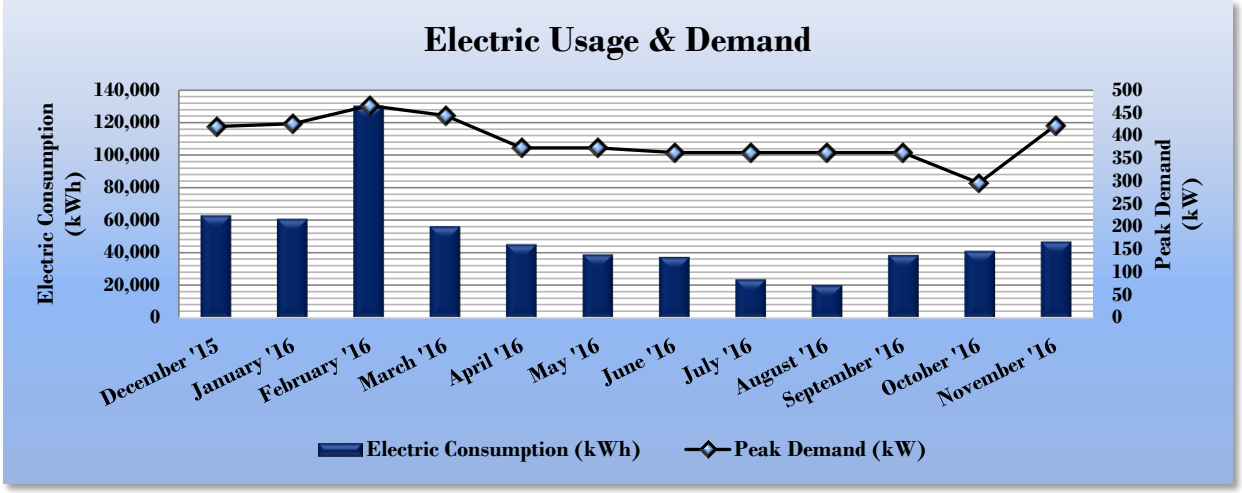


Figure 9 - Electric Usage & Demand

Electric Billing Data for Stony Brook School					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
1/7/16	31	63,091	420	$2,299	$8,312
2/6/16	31	60,826	426	$2,331	$8,318
3/4/16	28	130,097	466	$2,556	$15,536
4/6/16	34	56,304	444	$2,437	$9,341
5/4/16	29	45,414	373	$2,038	$5,509
6/3/16	31	39,148	373	$2,183	$5,481
7/6/16	34	37,604	363	$992	$3,473
8/3/16	29	23,963	363	$992	$2,337
8/31/16	29	20,401	363	$992	$1,975
9/30/16	30	38,704	363	$992	$3,831
11/2/16	34	41,312	296	$1,603	$5,018
12/2/16	31	47,109	422	$2,310	$6,477
Totals	**330**	**603,973**	**466**	**$21,725**	**$75,608**
Annual	**365**	**668,031**	**466**	**$24,029**	**$83,627**

3.3 Natural Gas Usage

Natural gas is provided by PSE&G. The average gas cost for the past 12 months is $0.882/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below. This profile is consistent with natural gas being used primarily for limited space heating.

Figure 10 - Natural Gas Usage

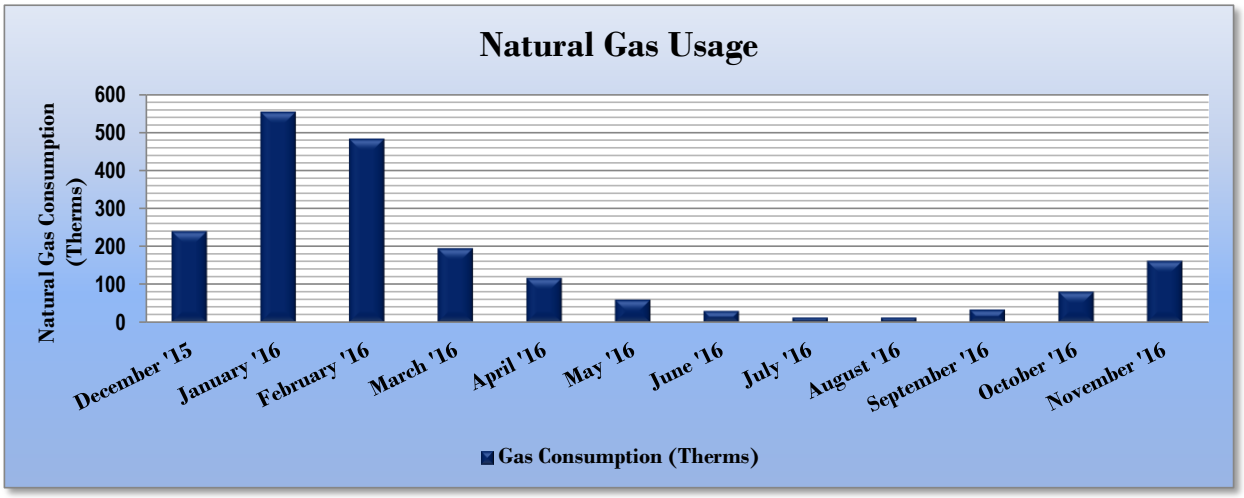


Figure 11 - Natural Gas Usage

Gas Billing Data for Stony Brook School			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
12/29/15	35	240	$208
1/29/16	31	554	$470
3/2/16	33	483	$399
4/1/16	30	195	$159
4/29/16	28	117	$96
5/27/16	28	60	$55
6/29/16	33	30	$34
7/29/16	30	13	$22
8/29/16	31	13	$22
9/29/16	31	34	$40
10/28/16	29	81	$81
11/29/16	32	162	$162
Totals	**371**	**1,982**	**$1,748**
Annual	**365**	**1,949**	**$1,720**

3.4 Benchmarking

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

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

Figure 12 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Stony Brook School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	155.4	141.4
Site Energy Use Intensity (kBtu/ft^2)	52.2	58.2

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

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

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Stony Brook School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	130.5	141.4
Site Energy Use Intensity (kBtu/ft^2)	44.3	58.2

Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. Your building is one of the building categories that are eligible to receive a score. This facility has a current score of 97.

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

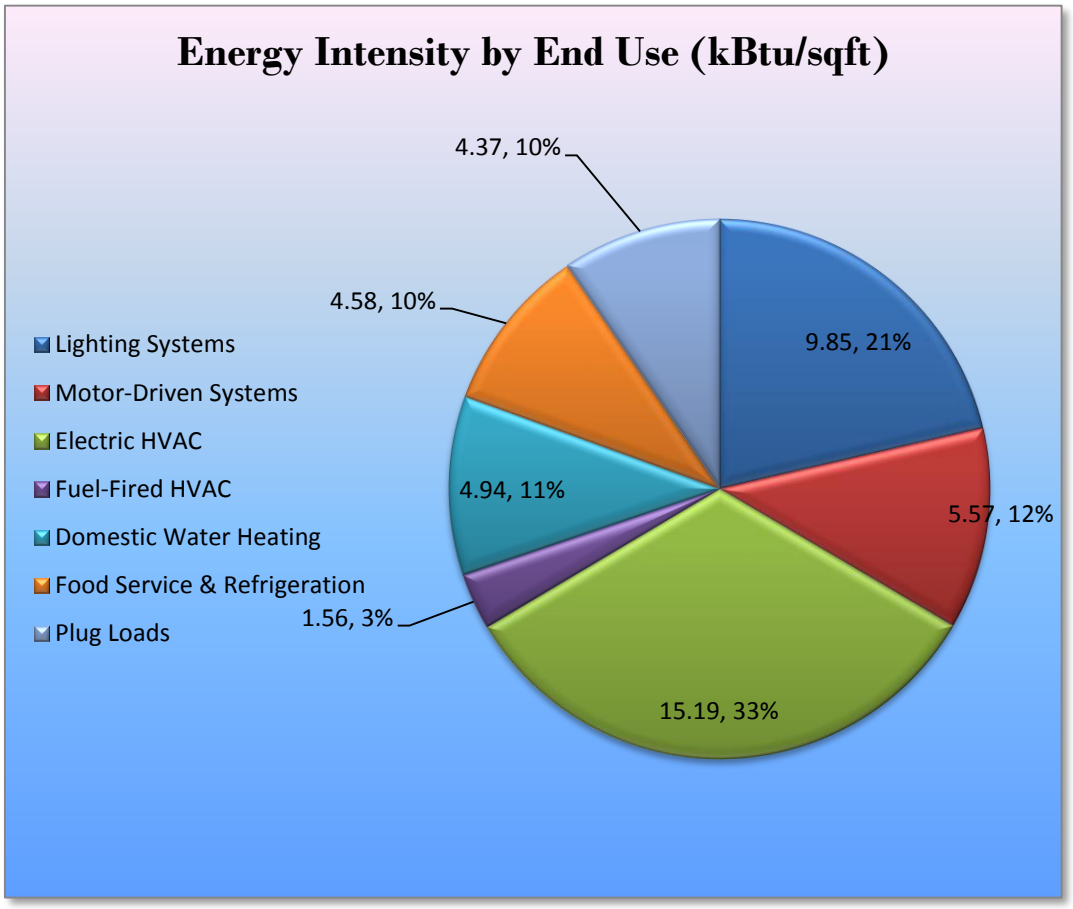
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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

3.5 Energy End-Use Breakdown

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

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



4 ENERGY CONSERVATION MEASURES

Level of Analysis

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information to the Stony Brook School regarding financial incentives for which they may qualify to implement the recommended measures. For this audit report, most measures have received only a preliminary analysis of feasibility which identifies expected ranges of savings and costs. This level of analysis is usually considered sufficient to demonstrate project cost-effectiveness and help prioritize energy measures. Savings are based on the New Jersey Clean Energy Program Protocols to Measure Resource Savings dated June 29, 2016, approved by the New Jersey Board of Public Utilities. Further analysis or investigation may be required to calculate more precise savings based on specific circumstances. A higher level of investigation may be necessary to support any custom SmartStart or Pay for Performance, or Direct Install incentive applications. Financial incentives for the ECMs identified in this report have been calculated based the NJCEP prescriptive SmartStart program. Some measures and proposed upgrade projects may be eligible for higher incentives than those shown below through other NJCEP programs as described in Section 7.

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		**92,622**	**19.9**	**0.0**	**$11,594.78**	**$56,179.52**	**$7,305.00**	**$48,874.52**	**4.2**	**93,269**
ECM 1	Install LED Fixtures	27,406	3.6	0.0	$3,430.84	$16,184.70	$0.00	$16,184.70	4.7	27,598
ECM 2	Retrofit Fixtures with LED Lamps	58,022	15.9	0.0	$7,263.50	$37,736.16	$7,305.00	$30,431.16	4.2	58,428
ECM 3	Install LED Exit Signs	7,193	0.5	0.0	$900.43	$2,258.66	$0.00	$2,258.66	2.5	7,243
Lighting Control Measures		**15,053**	**4.1**	**0.0**	**$1,884.45**	**$8,932.00**	**$1,540.00**	**$7,392.00**	**3.9**	**15,159**
ECM 4	Install Occupancy Sensor Lighting Controls	15,053	4.1	0.0	$1,884.45	$8,932.00	$1,540.00	$7,392.00	3.9	15,159
Electric Unitary HVAC Measures		**751**	**0.4**	**0.0**	**$94.07**	**$3,615.87**	**$222.33**	**$3,393.53**	**36.1**	**757**
ECM 5	Install High Efficiency Electric AC	751	0.4	0.0	$94.07	$3,615.87	$222.33	$3,393.53	36.1	757
Plug Load Equipment Control - Vending Machine		**1,954**	**0.0**	**0.0**	**$244.65**	**$460.00**	**$0.00**	**$460.00**	**1.9**	**1,968**
ECM 6	Vending Machine Control	1,954	0.0	0.0	$244.65	$460.00	$0.00	$460.00	1.9	1,968
TOTALS		**110,381**	**24.5**	**0.0**	**$13,817.95**	**$69,187.38**	**$9,067.33**	**$60,120.05**	**4.4**	**111,153**

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

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

4.1.1 Lighting Upgrades

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

Figure 16 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**92,622**	**19.9**	**0.0**	**$11,594.78**	**$56,179.52**	**$7,305.00**	**$48,874.52**	**4.2**	**93,269**
ECM 1	Install LED Fixtures	27,406	3.6	0.0	$3,430.84	$16,184.70	$0.00	$16,184.70	4.7	27,598
ECM 2	Retrofit Fixtures with LED Lamps	58,022	15.9	0.0	$7,263.50	$37,736.16	$7,305.00	$30,431.16	4.2	58,428
ECM 3	Install LED Exit Signs	7,193	0.5	0.0	$900.43	$2,258.66	$0.00	$2,258.66	2.5	7,243

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

ECM 1: Install LED Fixtures

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0
Exterior	27,406	3.6	0.0	$3,430.84	$16,184.70	$0.00	$16,184.70	4.7	27,598

Measure Description

We recommend replacing existing exterior fixtures containing metal halide lamps with new high performance light emitting diode (LED) light fixtures. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

ECM 2: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	57,670	15.9	0.0	$7,219.36	$37,592.56	$7,285.00	$30,307.56	4.2	58,073
Exterior	353	0.0	0.0	$44.14	$143.60	$20.00	$123.60	2.8	355

Measure Description

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

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

ECM 3: Install LED Exit Signs

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	7,193	0.5	0.0	$900.43	$2,258.66	$0.00	$2,258.66	2.5	7,243

Measure Description

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

4.1.2 Lighting Control Measures

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		**15,053**	**4.1**	**0.0**	**$1,884.45**	**$8,932.00**	**$1,540.00**	**$7,392.00**	**3.9**	**15,159**
ECM 4	Install Occupancy Sensor Lighting Controls	15,053	4.1	0.0	$1,884.45	$8,932.00	$1,540.00	$7,392.00	3.9	15,159

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

ECM 4: Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
15,053	4.1	0.0	$1,884.45	$8,932.00	$1,540.00	$7,392.00	3.9	15,159

Measure Description

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

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

4.1.3 Electric Unitary HVAC Measures

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

Figure 18 - Summary of Unitary HVAC ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Electric Unitary HVAC Measures		**751**	**0.4**	**0.0**	**$94.07**	**$3,615.87**	**$222.33**	**$3,393.53**	**36.1**	**757**
ECM 5	Install High Efficiency Electric AC	751	0.4	0.0	$94.07	$3,615.87	$222.33	$3,393.53	36.1	757

ECM 5: Install High Efficiency Air Conditioning Units

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
751	0.4	0.0	$94.07	$3,615.87	$222.33	$3,393.53	36.1	757

Measure Description

During the site visit the site requested that the air conditioners serving the main office and nurse's office be evaluated for replacement. The simple payback, based strictly on energy savings, is much longer than we generally consider for recommending energy measures. If the site decides to replace the units, we recommend installing air conditioning units with high efficiency ratings. There are several other air conditioners that have surpassed their typical rated life that this would also apply to. The typical service life of packaged HVAC equipment is about 15 years. There have been significant improvements in both compressor and fan motor efficiencies over the past several years. Therefore, electricity savings can be achieved by replacing older units with new high efficiency units. A higher EER or SEER rating indicates a more efficient cooling system. The magnitude of energy savings for this measure depends on the relative efficiency of the older unit versus the new high efficiency unit, the average cooling load, and the estimated annual operating hours.

4.1.4 Plug Load Equipment Control - Vending Machines

ECM 6: Vending Machine Control

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,954	0.0	0.0	$244.65	$460.00	$0.00	$460.00	1.9	1,968

Measure Description

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

5 ENERGY EFFICIENT PRACTICES

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

Perform Proper Lighting Maintenance

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

Develop a Lighting Maintenance Schedule

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

Ensure Lighting Controls Are Operating Properly

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

Ensure Economizers are Functioning Properly

Economizers, when properly configured, can be used to significantly reduce mechanical cooling. However, if the outdoor thermostat or enthalpy control is malfunctioning or the damper is stuck or improperly adjusted, benefits from the economizer may not be fully realized. As such, periodic inspection and maintenance is required to ensure proper operation. This maintenance should be scheduled with maintenance of the facility's air conditioning system and should include proper setting of the outdoor thermostat/enthalpy control, inspection of control and damper operation, lubrication of damper connections, and adjustment of minimum damper position. A malfunctioning economizer can significantly increase the amount of heating and mechanical cooling required by introducing excess amounts of cold or hot outside air.

Clean Evaporator/Condenser Coils on AC Systems

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

Clean and/or Replace HVAC Filters

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

Check for and Seal Duct Leakage

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

Perform 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.

Water Conservation

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

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

6 On-Site Generation Measures

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

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

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

6.1 Photovoltaic

Stony Brook School has a 125 kW solar photovoltaic (PV) system installed on the roof. The system provides 33% of the electricity required by the facility. 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 an additional PV array.

In order to be cost-effective, a solar PV array needs certain minimum criteria, such as 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.

6.2 Combined Heat and Power

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

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

A preliminary screening based on heating and electrical demand, siting, and interconnection shows that the facility has a low potential for installing a cost-effective CHP system. Low and infrequent thermal load are the most significant factors contributing to the potential for CHP at the site. In our opinion, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation.

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

7 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 19 for a list of the eligible programs identified for each recommended ECM.

Figure 19 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings
ECM 1	Install LED Fixtures	x			x
ECM 2	Retrofit Fixtures with LED Lamps	x			x
ECM 3	Install LED Exit Signs				x
ECM 4	Install Occupancy Sensor Lighting Controls	x			x
ECM 5	Install High Efficiency Electric AC	x			x
ECM 6	Vending Machine Control				x

SmartStart is generally well-suited for implementation of individual measures or small group of measures. It provides flexibility to install measures at your own pace using in-house staff or a preferred contractor. The Pay for Performance (P4P) program is a "whole-building" energy improvement program designed for larger facilities. It requires implementation of multiple measures meeting minimum savings thresholds, as well as use of pre-approved consultants.

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

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

7.1 SmartStart

Overview

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

Equipment with Prescriptive Incentives Currently Available:

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

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

Incentives

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

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

How to Participate

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

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

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

Incentives

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

How to Participate

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

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

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

7.3 Energy Savings Improvement Program

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

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

(1) Use an Energy Services Company or "ESCO."

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

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

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

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

7.4 Retail Electric Supply Options

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

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

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

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

7.5 Retail Natural Gas Supply Options

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

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

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

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

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.57	2,105	0.0	$263.48	$1,168.80	$230.00	3.56
Kitchen	3	Exit Signs: Incandescent	None	40	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.07	1,028	0.0	$128.63	$322.67	$0.00	2.51
Kitchen	3	Compact Fluorescent: screw-in	Wall Switch	23	2,090	None	Yes	3	Compact Fluorescent: screw-in	Occupancy Sensor	23	1,463	0.01	50	0.0	$6.23	$116.00	$20.00	15.41
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,090	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,463	0.03	100	0.0	$12.55	$174.50	$30.00	11.52
Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,090	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,463	0.03	100	0.0	$12.55	$174.50	$30.00	11.52
Electric Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,090	Relamp	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,463	0.03	105	0.0	$13.15	$187.80	$30.00	12.00
Electric Control Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,090	Relamp	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,463	0.01	53	0.0	$6.57	$151.90	$25.00	19.30
Electric Control Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,090	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,463	0.03	100	0.0	$12.55	$174.50	$30.00	11.52
Electric Control Room	1	Exit Signs: Incandescent	None	40	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.02	343	0.0	$42.88	$107.56	$0.00	2.51
Electrical Closet	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,090	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,463	0.11	401	0.0	$50.19	$350.00	$60.00	5.78
A-Corridor	4	Exit Signs: Incandescent	None	40	8,760	Fixture Replacement	No	4	LED Exit Signs: 2 W Lamp	None	6	8,760	0.09	1,370	0.0	$171.51	$430.22	$0.00	2.51
A-Corridor	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,463	None	No	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,463	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
B-Corridor	22	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,463	None	No	22	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,463	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
B-Corridor	7	Exit Signs: Incandescent	None	40	8,760	Fixture Replacement	No	7	LED Exit Signs: 2 W Lamp	None	6	8,760	0.16	2,398	0.0	$300.14	$752.89	$0.00	2.51
C-Corridor	2	Exit Signs: Incandescent	None	40	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.04	685	0.0	$85.76	$215.11	$0.00	2.51
C-Corridor	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,463	None	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,463	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm- A13	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.53	1,954	0.0	$244.66	$1,093.60	$215.00	3.59
Rm- A13	5	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,090	Relamp	Yes	5	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,463	0.07	254	0.0	$31.74	$357.00	$70.00	9.04
Rm- A12	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.53	1,954	0.0	$244.66	$1,093.60	$215.00	3.59
Rm- A12	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,090	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,463	0.01	51	0.0	$6.35	$164.20	$30.00	21.14
Rm- A12	1	Compact Fluorescent: screw-in	Wall Switch	23	2,090	None	Yes	1	Compact Fluorescent: screw-in	Occupancy Sensor	23	1,463	0.00	17	0.0	$2.08	$116.00	$20.00	46.24
Faculty Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,090	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,463	0.01	51	0.0	$6.35	$164.20	$30.00	21.14
Rm- A11	17	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	17	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.70	2,556	0.0	$319.94	$1,394.40	$275.00	3.50
Rm- A10	25	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	25	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	1.03	3,758	0.0	$470.50	$1,996.00	$395.00	3.40
Rm- A9	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.49	1,804	0.0	$225.84	$1,018.40	$200.00	3.62

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Rm- A8	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.29	1,052	0.0	$131.74	$642.40	$125.00	3.93
Rm- A7	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.49	1,804	0.0	$225.84	$1,018.40	$200.00	3.62
Rm- A6	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.49	1,804	0.0	$225.84	$1,018.40	$200.00	3.62
Rm- A5	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.49	1,804	0.0	$225.84	$1,018.40	$200.00	3.62
Rm- A4	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.37	1,353	0.0	$169.38	$792.80	$155.00	3.77
Rm- A3	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.49	1,804	0.0	$225.84	$1,018.40	$200.00	3.62
Rm- A2	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.49	1,804	0.0	$225.84	$1,018.40	$200.00	3.62
Custodial Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.12	451	0.0	$56.46	$341.60	$65.00	4.90
Rm- A1	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.62	2,255	0.0	$282.30	$1,244.00	$245.00	3.54
Custodial Area	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	1,463	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,463	0.03	81	0.0	$10.11	$144.60	$30.00	11.34
Custodial Area	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,463	Relamp	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,463	0.22	555	0.0	$69.50	$585.00	$100.00	6.98
Garage	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,090	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,463	0.14	501	0.0	$62.73	$408.50	$70.00	5.40
Gym Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,463	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,463	0.09	222	0.0	$27.80	$234.00	$40.00	6.98
Gym Closet	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,463	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.13	333	0.0	$41.70	$300.80	$60.00	5.77
Rm- A0	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.21	752	0.0	$94.10	$492.00	$95.00	4.22
Boys Restrm	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,090	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,463	0.08	301	0.0	$37.64	$291.50	$50.00	6.42
Girls Restrm	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,090	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,463	0.03	100	0.0	$12.55	$174.50	$30.00	11.52
Girls Restrm	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,090	Relamp	Yes	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,463	0.03	101	0.0	$12.70	$212.40	$40.00	13.58
Main Office	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.45	1,654	0.0	$207.02	$943.20	$185.00	3.66
Main Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,090	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,463	0.03	100	0.0	$12.55	$174.50	$30.00	11.52
Main Office	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,090	Relamp	Yes	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,463	0.03	101	0.0	$12.70	$212.40	$40.00	13.58
Server Rm	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,090	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,463	0.10	353	0.0	$44.17	$306.27	$60.00	5.58
Faculty Rm	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,090	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,463	0.16	601	0.0	$75.28	$467.00	$80.00	5.14
Faculty Rm	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,090	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,463	0.01	51	0.0	$6.35	$164.20	$30.00	21.14
Faculty Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,090	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,463	0.01	51	0.0	$6.35	$164.20	$30.00	21.14

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
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Rm- B2	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.49	1,804	0.0	$225.84	$1,018.40	$200.00	3.62
Nurse Room	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.21	752	0.0	$94.10	$492.00	$95.00	4.22
Rm- B3	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.49	1,804	0.0	$225.84	$1,018.40	$200.00	3.62
Rm- B4	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.49	1,804	0.0	$225.84	$1,018.40	$200.00	3.62
Rm- B5	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.49	1,804	0.0	$225.84	$1,018.40	$200.00	3.62
Rm- B6	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.49	1,804	0.0	$225.84	$1,018.40	$200.00	3.62
Rm- B7	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.49	1,804	0.0	$225.84	$1,018.40	$200.00	3.62
Rm- B7	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,090	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,463	0.10	374	0.0	$46.82	$368.80	$20.00	7.45
Rm- B8	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.49	1,804	0.0	$225.84	$1,018.40	$200.00	3.62
Rm- B8	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,090	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,463	0.10	374	0.0	$46.82	$368.80	$20.00	7.45
Faculty Rm2	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.16	601	0.0	$75.28	$416.80	$80.00	4.47
Band Rm	11	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,090	None	No	11	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,090	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Band Rm	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,090	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,463	0.08	301	0.0	$37.64	$291.50	$50.00	6.42
Closet band Rm	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,090	Relamp	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,463	0.03	105	0.0	$13.15	$187.80	$30.00	12.00
Closet band Rm	2	Exit Signs: Incandescent	None	40	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.04	685	0.0	$85.76	$215.11	$0.00	2.51
Custodial Closet	1	Compact Fluorescent: screw-in	Wall Switch	23	2,090	None	Yes	1	Compact Fluorescent: screw-in	Occupancy Sensor	23	1,463	0.00	17	0.0	$2.08	$116.00	$20.00	46.24
Custodial Closet	1	Compact Fluorescent: 2pin	Wall Switch	13	2,090	None	Yes	1	Compact Fluorescent: 2pin	Occupancy Sensor	13	1,463	0.00	9	0.0	$1.17	$116.00	$20.00	81.81
Faculty Restroom	1	Compact Fluorescent: screw-in	Wall Switch	14	2,090	None	Yes	1	Compact Fluorescent: screw-in	Occupancy Sensor	14	1,463	0.00	10	0.0	$1.26	$116.00	$20.00	75.97
Rm- B10	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,090	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,463	0.19	706	0.0	$88.34	$496.53	$100.00	4.49
Rm- B10	2	Compact Fluorescent: screw-in	Wall Switch	23	2,090	None	Yes	2	Compact Fluorescent: screw-in	Occupancy Sensor	23	1,463	0.01	33	0.0	$4.15	$116.00	$20.00	23.12
Rm- B11	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,090	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,463	0.19	706	0.0	$88.34	$496.53	$100.00	4.49
Library	23	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	23	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.94	3,458	0.0	$432.86	$1,845.60	$365.00	3.42
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,090	Relamp	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,463	0.01	53	0.0	$6.57	$151.90	$25.00	19.30
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,090	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,463	0.03	100	0.0	$12.55	$174.50	$30.00	11.52
Library Office 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.08	301	0.0	$37.64	$266.40	$50.00	5.75

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Library Office 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.08	301	0.0	$37.64	$266.40	$50.00	5.75
Library Office 3	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.08	301	0.0	$37.64	$266.40	$50.00	5.75
Boys Restrm	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,090	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,463	0.05	200	0.0	$25.09	$233.00	$40.00	7.69
Girls Restrm	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,090	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,463	0.05	200	0.0	$25.09	$233.00	$40.00	7.69
Rm- C1	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.37	1,353	0.0	$169.38	$792.80	$155.00	3.77
Rm- C2	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.37	1,353	0.0	$169.38	$792.80	$155.00	3.77
Rm- C3	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.37	1,353	0.0	$169.38	$792.80	$155.00	3.77
Rm- C4	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.37	1,353	0.0	$169.38	$792.80	$155.00	3.77
Rm- C5	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.37	1,353	0.0	$169.38	$792.80	$155.00	3.77
Rm- C6	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.37	1,353	0.0	$169.38	$792.80	$155.00	3.77
Rm- C7	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.37	1,353	0.0	$169.38	$792.80	$155.00	3.77
Rm- C8	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.37	1,353	0.0	$169.38	$792.80	$155.00	3.77
Rm- C9	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,090	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,463	0.37	1,353	0.0	$169.38	$792.80	$155.00	3.77
Gym	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,090	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,463	0.58	2,117	0.0	$265.02	$1,257.60	$260.00	3.76
Gym Closet	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,090	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,463	0.11	401	0.0	$50.19	$350.00	$60.00	5.78
Stage	6	Halogen Incandescent: screw-in	Wall Switch	90	2,090	Relamp	No	6	LED Screw-In Lamps: 20W led lamp	Wall Switch	20	2,090	0.28	1,009	0.0	$126.37	$233.73	$0.00	1.85
Gym	2	Exit Signs: Incandescent	None	40	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.04	685	0.0	$85.76	$215.11	$0.00	2.51
Exterior Perimeter	13	Metal Halide: (1) 250W Lamp	Daylight Dimming	295	4,380	Fixture Replacement	No	13	LED - Fixtures: Outdoor Porch Wall Mount	Daylight Dimming	46	4,380	2.12	16,305	0.0	$2,041.10	$9,746.10	$0.00	4.77
Exterior Perimeter	4	Metal Halide: (1) 100W Lamp	Daylight Dimming	128	4,380	Fixture Replacement	No	4	LED - Fixtures: Outdoor Porch Wall Mount	Daylight Dimming	45	4,380	0.22	1,672	0.0	$209.34	$2,998.80	$0.00	14.32
Front Entrance	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Daylight Dimming	32	4,380	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,066	0.06	440	0.0	$55.11	$259.60	$40.00	3.98
Parking Lot	6	Metal Halide: (1) 400W Lamp	Daylight Dimming	458	4,380	Fixture Replacement	No	6	LED - Fixtures: Outdoor Post-Mount	Daylight Dimming	146	4,380	1.23	9,429	0.0	$1,180.40	$3,439.80	$0.00	2.91

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
Classrooms	Classrooms	26	Supply Fan	1.0	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classrooms	Classrooms	6	Supply Fan	0.7	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
RoofTop	Gym	1	Supply Fan	0.3	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
RoofTop	Faculty and Speech Rm	1	Supply Fan	5.0	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
RoofTop	Band Room	1	Supply Fan	1.0	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
RoofTop	Band Room	1	Supply Fan	2.0	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
RoofTop	Library	1	Supply Fan	2.0	60.0%	No	2,745	No	60.0%	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
Classrooms	Classrooms	26	Split-System Air-Source HP	3.00	34.80	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classrooms	Classrooms	7	Electric Forced Air Furnace		5.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
RoofTop	Rm A1	1	Packaged AC	20.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
RoofTop	Faculty and Speech Rm	1	Packaged Air-Source HP	3.00	32.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
RoofTop	Band Room	1	Packaged AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
RoofTop	Library	1	Packaged AC	7.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
RoofTop	Principals Office	1	Packaged AC	7.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
RoofTop	Main Office	1	Split-System AC	1.00		Yes	1	Split-System AC	1.00		14.00		No	0.18	311	0.0	$38.93	$1,496.22	$92.00	36.07
RoofTop	Nurse Office	1	Split-System AC	1.42		Yes	1	Split-System AC	1.42		14.00		No	0.26	441	0.0	$55.15	$2,119.65	$130.33	36.07
RoofTop	Server Room	1	Split-System AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
RoofTop	Rm A10	1	Split-System AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm A10	Rm A10	1	Window AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm A10	Rm A10	1	Window AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cst Room	Cst Room	1	Window AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm B7	Rm B7	1	Window AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm B8	Rm B8	1	Window AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
RoofTop	Gym	1	Furnace	40.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
RoofTop	Rm A1	1	Furnace	20.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

DHW Inventory & Recommendations

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

Reach-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 Energy Efficient Doors?	Install Door Heater Control?	Install Aluminum Night Covers?	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	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Medium Temp Freezer (0F to 30F)	No	No	No	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	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Medium Temp Freezer (0F to 30F)	No	No	No	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 (16 - 30 cu. ft.)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	2	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Cooking Equipment Inventory & Recommendations

	Existing Conditions			Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	High Efficiency Equipement?	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	4	Insulated Food Holding Cabinet (1/2 Size)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Insulated Food Holding Cabinet (1/2 Size)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Gas Combination Oven/Steam Cooker (<15 Pans)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	0	Gas Combination Oven/Steam Cooker (<15 Pans)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Insulated Food Holding Cabinet (Full Size)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Dishwasher Inventory & Recommendations

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

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
School	161	Desktop Computers	110.0	Yes
School	4	Copy machines	1,400.0	Yes
School	15	printers	460.0	Yes
School	4	microwave	1,000.0	Yes
School	2	water fountain	275.0	Yes
School	5	refridgerator	265.0	Yes
Rm A12	1	Kiln	11,520.0	No

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Faculty Room	1	Refrigerated	Yes	0.00	1,612	0.0	$201.78	$230.00	$0.00	1.14
Faculty Room	1	Non-Refrigerated	Yes	0.00	343	0.0	$42.88	$230.00	$0.00	5.36

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Stony Brook School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 47,368
Built: 1959

For Year Ending: November 30, 2016
Date Generated: May 23, 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
Stony Brook School 136 Cedar Grove Rd. Branchburg, New Jersey 08876	_____ , (___)___-_____	___ _____ , (___)___-_____ _____

Property ID: 5894947

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
45.8 kBtu/ft²

Source EUI
104.6 kBtu/ft²

Annual Energy by Fuel

Natural Gas (kBtu)	196,236 (9%)
Electric - Solar (kBtu)	674,392 (31%)
Electric - Grid (kBtu)	1,297,794 (60%)

National Median Comparison

National Median Site EUI (kBtu/ft²)	96.8
National Median Source EUI (kBtu/ft²)	221.3
% Diff from National Median Source EUI	-53%

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO2e/year)	159

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)