Local Government Energy Audit:
Energy Audit Report

Branchburg Central Middle School

Branchburg Township School District

220 Baird Road
Branchburg, NJ 08876

January 16, 2018

Final Report by:
TRC Energy Services

Disclaimer

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

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

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

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

Table of Contents

Table of Figures

1 EXECUTIVE SUMMARY

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

This study was conducted by TRC Energy Services (TRC), as part of a comprehensive effort to assist New Jersey 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

Branchburg Central Middle School is a 141,310 square foot facility comprised of five wings (100, 200, 300, 400 and 500) connected by hallways. This single story building includes a gym, kitchen, cafeteria media center, art room, garage, offices, classrooms and a performance stage (auxiliary gym). The school was constructed in 1965 and renovated in 2003. There is also a 404 kW solar photovoltaic (PV) system on the roof of the facility.

Lighting at Branchburg Central Middle School consists of primarily first generation T8 fluorescents in the interior and high intensity discharge (HID) lighting on the exterior of the building. Cooling is supplied mostly from packaged rooftop AC units. Some of the package units have gas-fired furnaces. The balance of the heating is mostly supplied from hot water coils and fan powered convectors. Some of the HVAC equipment is aging and in need of replacement. 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 seven (7) measures which together represent an opportunity for Branchburg Central Middle School to reduce annual energy costs by $29,566 and annual greenhouse gas emissions by 315,738 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 9.0 years. The breakdown of existing and potential utility costs after project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce Branchburg Central Middle School's annual energy use by 13%.

Figure 1 – Previous 12 Month Utility Costs

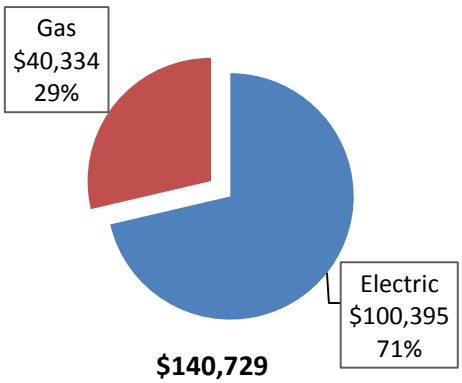
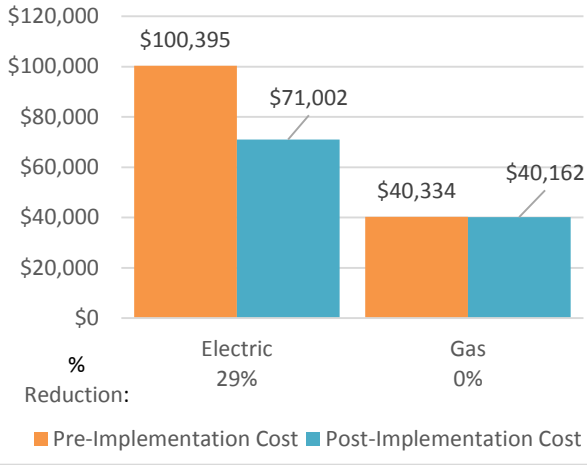


Figure 2 – Potential Post-Implementation Costs



A detailed description of Branchburg Central Middle School's existing energy use can be found in Section 3.

Estimates of the total cost, energy savings, and financial incentives for the proposed energy efficient upgrades are summarized below in Figure 3. 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			**241,812**	**66.8**	**0.0**	**$22,835.71**	**$152,110.09**	**$28,140.00**	**$123,970.09**	**5.4**	**243,503**
ECM 1	Install LED Fixtures	Yes	16,075	5.5	0.0	$1,518.06	$10,157.60	$2,600.00	$7,557.60	5.0	16,187
ECM 2	Retrofit Fixtures with LED Lamps	Yes	209,639	60.3	0.0	$19,797.40	$136,897.41	$25,540.00	$111,357.41	5.6	211,105
ECM 3	Install LED Exit Signs	Yes	16,098	1.0	0.0	$1,520.25	$5,055.09	$0.00	$5,055.09	3.3	16,211
Lighting Control Measures			**42,517**	**12.1**	**0.0**	**$4,015.10**	**$31,330.00**	**$4,235.00**	**$27,095.00**	**6.7**	**42,814**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	42,517	12.1	0.0	$4,015.10	$31,330.00	$4,235.00	$27,095.00	6.7	42,814
Motor Upgrades			**429**	**0.1**	**0.0**	**$40.48**	**$2,401.11**	**$0.00**	**$2,401.11**	**59.3**	**432**
	Premium Efficiency Motors	No	429	0.1	0.0	$40.48	$2,401.11	$0.00	$2,401.11	59.3	432
Variable Frequency Drive (VFD) Measures			**21,396**	**3.0**	**0.0**	**$2,020.57**	**$10,388.90**	**$0.00**	**$10,388.90**	**5.1**	**21,546**
ECM 5	Install VFDs on Hot Water Pumps	Yes	21,396	3.0	0.0	$2,020.57	$10,388.90	$0.00	$10,388.90	5.1	21,546
Electric Unitary HVAC Measures			**1,907**	**3.1**	**0.0**	**$180.09**	**$76,408.33**	**$4,177.00**	**$72,231.33**	**401.1**	**1,920**
	Install High Efficiency Electric AC	No	1,907	3.1	0.0	$180.09	$76,408.33	$4,177.00	$72,231.33	401.1	1,920
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**8.8**	**$77.26**	**$4,531.47**	**$1,600.00**	**$2,931.47**	**37.9**	**1,033**
	Install High Efficiency Furnaces	No	0	0.0	8.8	$77.26	$4,531.47	$1,600.00	$2,931.47	37.9	1,033
Domestic Water Heating Upgrade			**0**	**0.0**	**10.9**	**$95.32**	**$24,675.50**	**$850.00**	**$23,825.50**	**250.0**	**1,274**
	Install High Efficiency Gas Water Heater	No	0	0.0	10.9	$95.32	$24,675.50	$850.00	$23,825.50	250.0	1,274
Food Service Equipment & Refrigeration Measures			**1,581**	**0.2**	**0.0**	**$149.32**	**$1,819.80**	**$240.00**	**$1,579.80**	**10.6**	**1,592**
ECM 6	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	1,581	0.2	0.0	$149.32	$1,819.80	$240.00	$1,579.80	10.6	1,592
Plug Load Equipment Control - Vending Machine			**1,612**	**0.0**	**0.0**	**$152.22**	**$230.00**	**$0.00**	**$230.00**	**1.5**	**1,623**
ECM 7	Vending Machine Control	Yes	1,612	0.0	0.0	$152.22	$230.00	$0.00	$230.00	1.5	1,623
TOTALS (Recommended and Not Recommended Measures)			**311,254**	**85.3**	**19.7**	**$29,566.07**	**$303,895.20**	**$39,242.00**	**$264,653.20**	**9.0**	**315,738**

* - 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).

TOTALS (Recommended Measures)	308,918	82.1	0.0	$29,172.92	$195,878.79	$32,615.00	$163,263.79	5.6	311,078

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

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

Motor Upgrades generally involve replacing older standard efficiency motors with high efficiency standard (IHP 2014). Motors replacements generally assume the same size motors, just higher efficiency. Although occasionally additional savings can be achieved by downsizing motors to better meet current load requirements. This measure saves energy by reducing the power used by the motors, due to improved electrical efficiency.

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

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

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

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

Food Service Equipment & Refrigeration measures generally involve improvements in the efficiency of cooking, food service, dishwashing, and food storage equipment. These measures may include more efficient convection ovens, steamers, ice machines, or refrigeration. These measures save energy by reducing the energy usage with more energy efficient equipment.

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 17 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 Branchburg Central Middle School include:

- Close Doors and Windows
- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Perform Routine Motor Maintenance
- Use Fans to Reduce Cooling Load
- 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 Boiler Maintenance
- Perform Proper Furnace Maintenance
- Perform Proper Water Heater Maintenance
- Perform Maintenance on Compressed Air Systems
- Install Plug Load Controls
- Replace Computer Monitors
- Water Conservation

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

On-Site Generation Measures

TRC evaluated the potential for installing additional on-site generation for Branchburg Central Middle School. Based on the configuration of the site and its loads there is a moderate potential for expanding the existing photovoltaic (PV) array.

Figure 4 – Photovoltaic Potential

Potential	Medium	
System Potential	80	kW DC STC
Electric Generation	95,310	kWh/yr
Displaced Cost	$8,290	/yr
Installed Cost	$291,200	

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

1.3 Implementation Planning

To realize the energy savings from the ECMs listed in this report, a project implementation plan must be developed. Available capital must be considered and decisions need to be made whether it is best to

pursue individual ECMs separately, groups of ECMs, or a comprehensive approach where all ECMs are implemented together, possibly in conjunction with other facility upgrades or improvements.

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

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

- SmartStart
- Pay for Performance - Existing Building (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 7.4 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

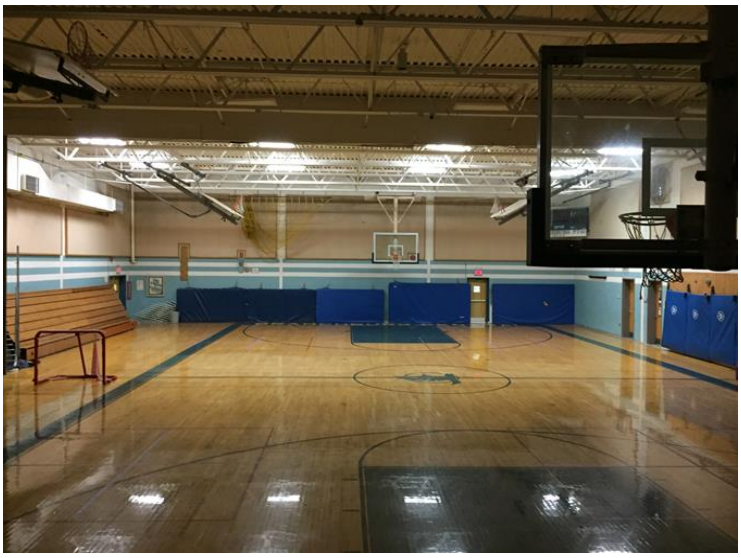
2.1 Project Contacts

Figure 5 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Theresa Linskey	Business Administrator	Tlinskey@Branchburg.k12.nj.us	908-722-3335 Ext. 4740
Designated Representative			
John T. Hindmarch	Supervisor of Buildings and Grounds at Branchburg Township School District	jhindmarch@branchburg.k12.nj.us	908-722-3335 0x1630
TRC Energy Services			
Moussa Traore	Auditor	MTraore@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On April 5, 2017, TRC performed an energy audit at Branchburg Central Middle 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.



The 141,310 square foot school building is a one-story facility, constructed in 1965 and renovated in 2003, comprised of five (5) wings (100, 200, 300, 400, and 500) connected by hallways. It includes a gymnasium, classrooms, Board of Education office, cafeteria, library or media center, locker rooms, and art room.

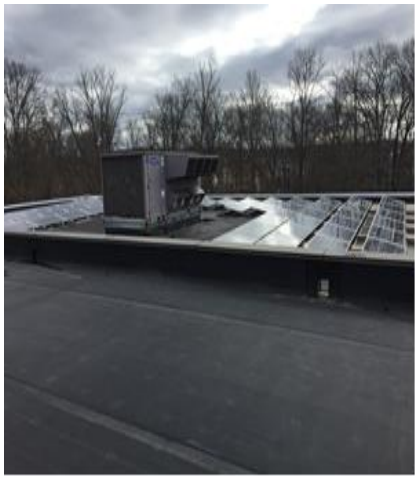
2.3 Building Occupancy

The school operates on a ten (10) month schedule. 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 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Branchburg Central Middle School	Weekday	8:00 am - 5:30 pm
Branchburg Central Middle School	Weekend	closed

2.4 Building Envelope



The foundation consists of cast-in-place concrete perimeter wall footings with concrete walls. Exterior walls are finished with cement brick and concrete block.

The building has a flat roof covered with a multi-ply bituminous built-up membrane as well as a black membrane. The roof appears to be in good condition.

The windows throughout the facility are double pane operable windows. They are glazed with insulated panes set in metal frames and appear to be in good condition with no signs of uncontrolled moisture, air-leakage and other energy-compromising issues. Part of the front-entry area windows are metal-framed storefront system. The entry doors are fully glazed and metal framed. Emergency exit doors are constructed of metal and are in good condition. Overall the building envelope appears to be in good condition with no signs of outside air infiltration.

2.5 On-Site Generation

Branchburg Central Middle School has a 404 kW solar photovoltaic (PV) system installed on the roof. The system provides 46% 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. Branchburg Central Middle School does not have any other on-site electric generation capacity.

2.6 Energy-Using Systems

Lighting System

Interior lighting consists of a combination of 32-watt linear fluorescent T8 fixtures and lamps, and 17-watt LED linear tubes. Most of the fixtures are 2-lamp or 3-lamp, 4-foot long troffers with diffusers. The Board of Education office (which is part of the building) lighting has been retrofitted to LED linear tubes and has occupancy sensors as lighting control system. The library is lit with a combination of 32-watt linear T8 and 26-watt compact fluorescent lamps (CFL) in recessed cans with electronic ballasts. The remaining building spaces (gymnasium, the kitchen, corridors, restrooms, classrooms) are lit with 32-watt linear T8 fixtures and lamps. Lighting control is provided by both occupancy sensors and manual wall switches. Exterior lighting system consists of parking lot LED and metal halide outdoor wall-mounted fixtures.

Significant 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.

Hot Water Heating System

The hot water system consists of five (5) Aerco Benchmark 2.0 condensing boilers. The boilers are ten (10) years old, and have an output capacity of 1,800 kBtu/hr each with an estimated efficiency of 88%. They operate in lead/lag with 3 or 4 operating at a time depending the outside weather conditions.

The heating hot water generated by the boilers are circulated to unit ventilators and the air handlers with two (2) 15 hp hot water supply pumps equipped with variable frequency drive. The boilers are configured in a variable flow distribution, and they have a full modulation sequencing control system. The unit ventilators are equipped with hot water coils, and direct-expansion (DX) coils for cooling and dehumidification in the classrooms. The boilers are in good condition and are well maintained.

Direct Expansion Air Conditioning System (DX)

There are twenty-six (26) DX package units, seven (7) DX split-system units and (1) DX split-system heat pump located on the roof of the building. The rooftop packaged units vary in size between 6 to 27 tons and provide heating and air conditioning to various spaces of the facility. The split-systems mostly serve the server rooms and a few small rooms while the package units serve all other conditioned areas. All of the AC units are constant air volume. The unit ventilators serving the classrooms are equipped with hot water coils for space heating and DX coils for cooling and dehumidification.

Domestic Hot Water Heating System

The domestic hot water (DHW) system for the facility consists of three (3) gas water heaters with storage tanks. The storage tanks are 100, 75 and 100 gallons respectively. The gas water heaters serve the kitchen and restrooms and have an input capacity of 200, 75 and 150 kBtu/hr.

Food Service

The school has a kitchen that is used to prepare approximately 650 lunches per day for the students and staff. Most of the lunch preparation is done using the natural gas-fired convection ovens and warmers which appear to be energy efficient.

Refrigeration

The kitchen has three (3) commercial refrigerators, one (1) walk-in cooler, two (2) walk-in freezers, and eight (8) reach in 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 238 desktop computers, 34 small printers, nine (9) copy machines, 12 refrigerators, three (3) water fountains and several small electronic items located throughout the facility. There is also an 11.5 kW kiln in the Art Room. The facility also has one (1) refrigerated beverage vending machine without energy-savings controls.

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 faucets in the student's restrooms are motion sensing controlled.

3 SITE ENERGY USE AND COSTS

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

3.1 Total Cost of Energy

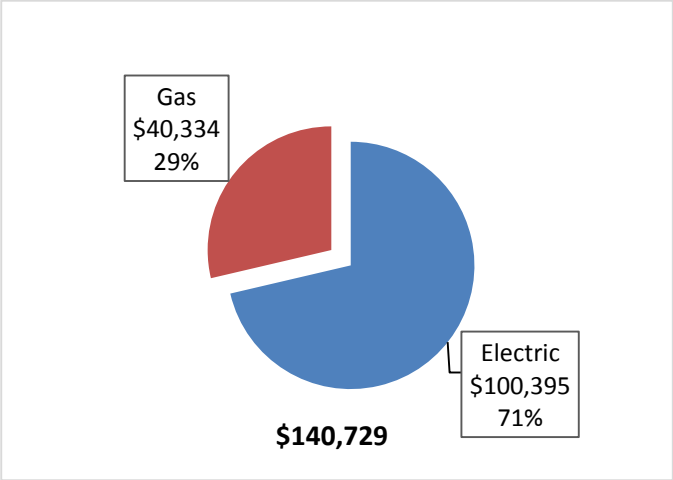
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 7 - Utility Summary

Utility Summary for Branchburg Central Middle School		
Fuel	**Usage**	**Cost**
Electricity	1,063,105 kWh	$100,395
Natural Gas	46,056 Therms	$40,334
Total		**$140,729**

The current annual energy cost for this facility is $140,729 as shown in the chart below.

Figure 8 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by JCP&L. The average electric cost over the past 12 months was $0.118/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. There are significant demand charges for the school. Analysis of the energy and demand profile indicates that there is not much of a seasonal variation with respect to usage (mostly flat). This would indicate that there is not much of a cooling load. But also the building is less used during the summer months when there is the greatest cooling demand. **The demand should be further investigated with JCP&L as the base kW does not appear to go below 250 kW for most months.** The monthly electricity consumption and peak demand are shown in the chart below.

Figure 9 - Electric Usage & Demand

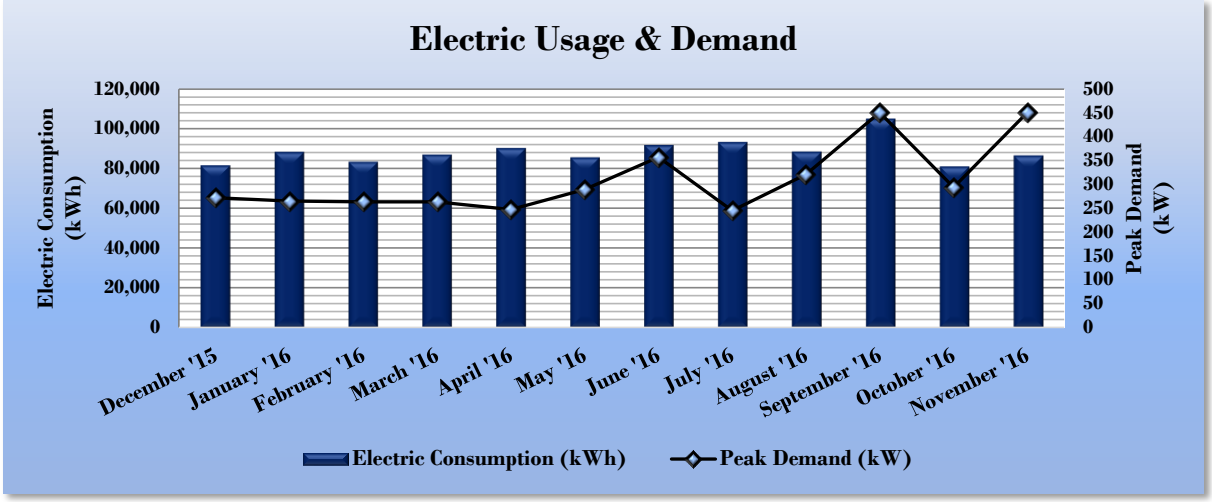


Figure 10 - Electric Usage & Demand

Electric Billing Data for Branchburg Central Middle School					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
1/7/16	31	81,383	272	$1,591	$8,491
2/4/16	28	88,234	265	$1,470	$9,028
3/4/16	29	83,186	263	$1,430	$9,764
4/4/16	31	86,746	263	$1,430	$7,936
5/3/16	29	90,044	247	$1,420	$10,109
6/2/16	30	85,435	289	$1,331	$7,633
6/30/16	28	91,569	357	$1,676	$8,613
8/2/16	33	93,120	245	$2,147	$8,228
8/31/16	29	88,376	321	$1,411	$5,219
9/30/16	30	104,847	451	$1,868	$4,940
11/1/16	32	80,819	294	$2,475	$12,400
12/5/16	34	86,433	451	$1,591	$7,759
Totals	**364**	**1,060,192**	**451**	**$19,840**	**$100,120**
Annual	**365**	**1,063,105**	**451**	**$19,895**	**$100,395**

3.3 Natural Gas Usage

Natural Gas is provided by PSE&G. The average gas cost for the past 12 months is $0.876/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below.

Figure 11 -Natural Gas Usage

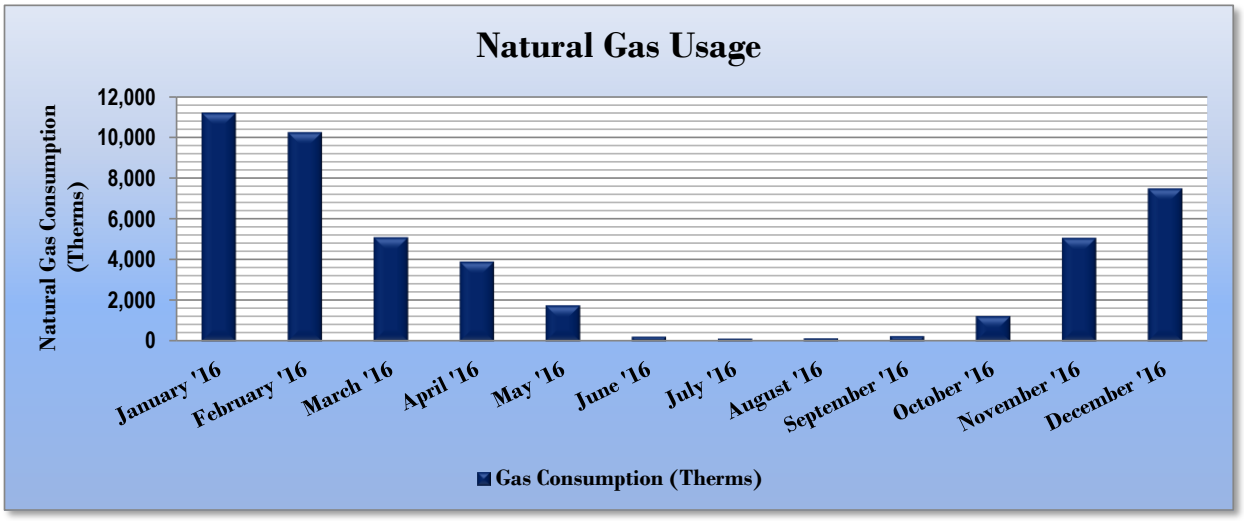


Figure 12 -Natural Gas Usage

Gas Billing Data for Branchburg Central Middle School			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
1/29/16	34	11,180	$9,807
3/2/16	31	10,225	$8,465
4/1/16	33	5,088	$4,923
4/29/16	30	3,896	$2,519
5/27/16	28	1,765	$1,202
6/29/16	28	233	$252
7/29/16	32	133	$189
8/29/16	30	144	$196
9/29/16	31	255	$266
10/27/16	31	1,233	$882
11/30/16	28	5,057	$5,198
12/27/16	34	7,478	$6,988
Totals	**370**	**46,687**	**$40,887**
Annual	**365**	**46,056**	**$40,334**

3.4 Benchmarking

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

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

Figure 13 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Branchburg Central Middle School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	114.8	141.4
Site Energy Use Intensity (kBtu/ft^2)	58.3	58.2

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

Figure 14 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Branchburg Central Middle School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	91.4	141.4
Site Energy Use Intensity (kBtu/ft^2)	50.8	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 eligible to receive a score. This facility has a current score of 87.

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

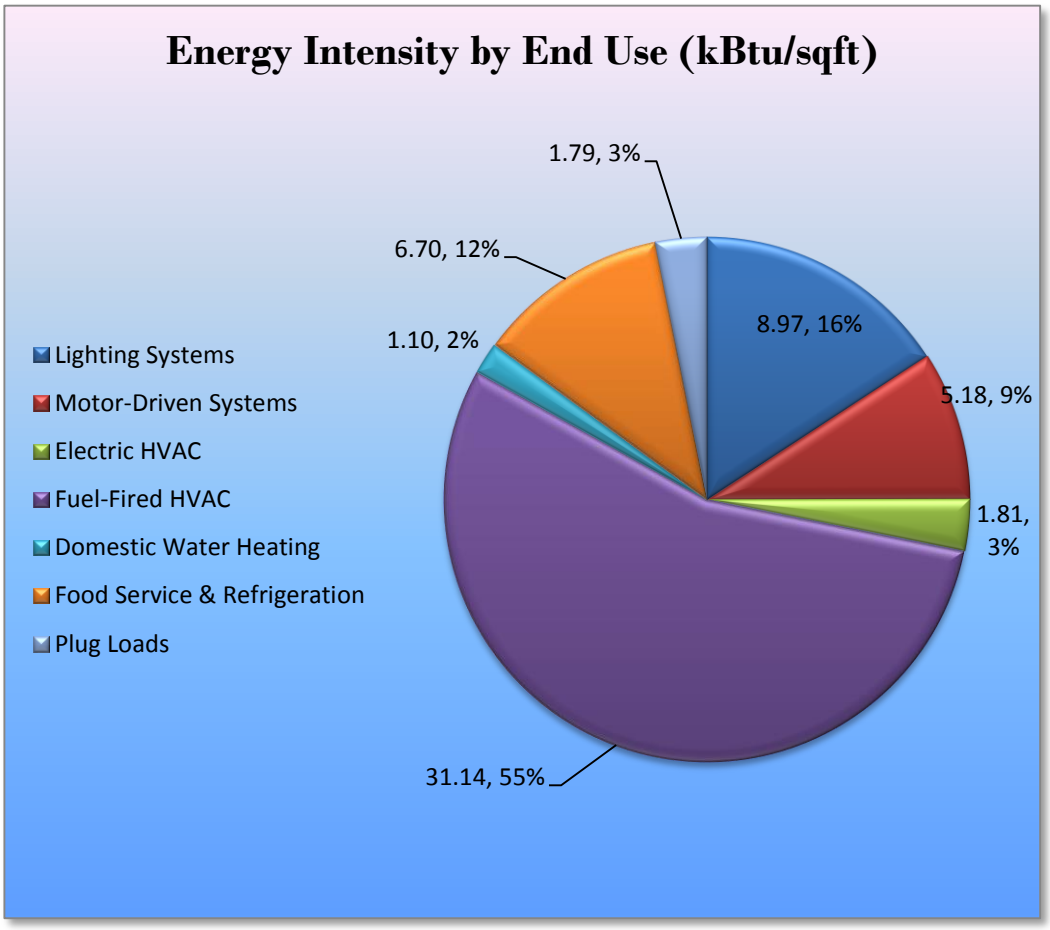
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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

3.5 Energy End-Use Breakdown

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

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



4 ENERGY CONSERVATION MEASURES

Level of Analysis

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information to the Branchburg Central Middle School regarding financial incentives for which they may qualify to implement the recommended measures. For this audit report, most measures have received only a preliminary analysis of feasibility which identifies expected ranges of savings and costs. This level of analysis is usually considered sufficient to demonstrate project cost-effectiveness and help prioritize energy measures. Savings are based on the New Jersey Clean Energy Program Protocols to Measure Resource Savings dated June 29, 2016, approved by the New Jersey Board of Public Utilities. Further analysis or investigation may be required to calculate more precise savings based on specific circumstances. A higher level of investigation may be necessary to support any custom SmartStart or Pay for Performance, or Direct Install incentive applications. Financial incentives for the ECMs identified in this report have been calculated based the NJCEP prescriptive SmartStart program. Some measures and proposed upgrade projects may be eligible for higher incentives than those shown below through other NJCEP programs as described in Section 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 16 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**241,812**	**66.8**	**0.0**	**$22,835.71**	**$152,110.09**	**$28,140.00**	**$123,970.09**	**5.4**	**243,503**
ECM 1	Install LED Fixtures	16,075	5.5	0.0	$1,518.06	$10,157.60	$2,600.00	$7,557.60	5.0	16,187
ECM 2	Retrofit Fixtures with LED Lamps	209,639	60.3	0.0	$19,797.40	$136,897.41	$25,540.00	$111,357.41	5.6	211,105
ECM 3	Install LED Exit Signs	16,098	1.0	0.0	$1,520.25	$5,055.09	$0.00	$5,055.09	3.3	16,211
Lighting Control Measures		**42,517**	**12.1**	**0.0**	**$4,015.10**	**$31,330.00**	**$4,235.00**	**$27,095.00**	**6.7**	**42,814**
ECM 4	Install Occupancy Sensor Lighting Controls	42,517	12.1	0.0	$4,015.10	$31,330.00	$4,235.00	$27,095.00	6.7	42,814
Variable Frequency Drive (VFD) Measures		**21,396**	**3.0**	**0.0**	**$2,020.57**	**$10,388.90**	**$0.00**	**$10,388.90**	**5.1**	**21,546**
ECM 5	Install VFDs on Hot Water Pumps	21,396	3.0	0.0	$2,020.57	$10,388.90	$0.00	$10,388.90	5.1	21,546
Food Service Equipment & Refrigeration Measures		**1,581**	**0.2**	**0.0**	**$149.32**	**$1,819.80**	**$240.00**	**$1,579.80**	**10.6**	**1,592**
ECM 6	Refrigerator/Freezer Case Electrically Commutated Motors	1,581	0.2	0.0	$149.32	$1,819.80	$240.00	$1,579.80	10.6	1,592
Plug Load Equipment Control - Vending Machine		**1,612**	**0.0**	**0.0**	**$152.22**	**$230.00**	**$0.00**	**$230.00**	**1.5**	**1,623**
ECM 7	Vending Machine Control	1,612	0.0	0.0	$152.22	$230.00	$0.00	$230.00	1.5	1,623
TOTALS		**308,918**	**82.1**	**0.0**	**$29,172.92**	**$195,878.79**	**$32,615.00**	**$163,263.79**	**5.6**	**311,078**

* - 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 17 below.

Figure 17 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**241,812**	**66.8**	**0.0**	**$22,835.71**	**$152,110.09**	**$28,140.00**	**$123,970.09**	**5.4**	**243,503**
ECM 1	Install LED Fixtures	16,075	5.5	0.0	$1,518.06	$10,157.60	$2,600.00	$7,557.60	5.0	16,187
ECM 2	Retrofit Fixtures with LED Lamps	209,639	60.3	0.0	$19,797.40	$136,897.41	$25,540.00	$111,357.41	5.6	211,105
ECM 3	Install LED Exit Signs	16,098	1.0	0.0	$1,520.25	$5,055.09	$0.00	$5,055.09	3.3	16,211

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	16,075	5.5	0.0	$1,518.06	$10,157.60	$2,600.00	$7,557.60	5.0	16,187

Measure Description

We recommend replacing existing exterior fixtures containing high pressure sodium vapor and 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	209,639	60.3	0.0	$19,797.40	$136,897.41	$25,540.00	$111,357.41	5.6	211,105
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

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	16,098	1.0	0.0	$1,520.25	$5,055.09	$0.00	$5,055.09	3.3	16,211
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

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

4.1.2 Lighting Control Measures

Figure 18 – Summary of Lighting Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**42,517**	**12.1**	**0.0**	**$4,015.10**	**$31,330.00**	**$4,235.00**	**$27,095.00**	**6.7**	**42,814**
ECM 4	Install Occupancy Sensor Lighting Controls	42,517	12.1	0.0	$4,015.10	$31,330.00	$4,235.00	$27,095.00	6.7	42,814

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)
42,517	12.1	0.0	$4,015.10	$31,330.00	$4,235.00	$27,095.00	6.7	42,814

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 Variable Frequency Drive Measures

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

Figure 19 – Summary of Variable Frequency Drive ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**21,396**	**3.0**	**0.0**	**$2,020.57**	**$10,388.90**	**$0.00**	**$10,388.90**	**5.1**	**21,546**
ECM 5	Install VFDs on Hot Water Pumps	21,396	3.0	0.0	$2,020.57	$10,388.90	$0.00	$10,388.90	5.1	21,546

ECM 5: Install VFDs on Hot Water Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
21,396	3.0	0.0	$2,020.57	$10,388.90	$0.00	$10,388.90	5.1	21,546

Measure Description

We recommend installing a variable frequency drives (VFD) to control the hot water pumps. This measure requires that a majority of the hot water coils be served by 2-way valves and that a differential pressure sensor is installed in the hot water loop. As the hot water valves close, the differential pressure increases. The VFD modulates pump speed to maintain a differential pressure setpoint. Energy savings results from reducing pump motor speed (and power) as hot water valves close. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load. If 3-way valves are not currently present, additional work (and cost) will be required to reconfigure the system.

4.1.4 Food Service Equipment & Refrigeration Measures

Food service and refrigeration measures recommendations are summarized in Figure 20 below.

Figure 20 - Summary of Food Service Equipment & Refrigeration 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)
Food Service Equipment & Refrigeration Measures		**1,581**	**0.2**	**0.0**	**$149.32**	**$1,819.80**	**$240.00**	**$1,579.80**	**10.6**	**1,592**
ECM 6	Refrigerator/Freezer Case Electrically Commutated Motors	1,581	0.2	0.0	$149.32	$1,819.80	$240.00	$1,579.80	10.6	1,592

ECM 6: Refrigerator/Freezer Case Electrically Commutated Motors

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,581	0.2	0.0	$149.32	$1,819.80	$240.00	$1,579.80	10.6	1,592

Measure Description

We recommend replacing shaded pole or permanent split capacitor (PSC) motors with electronically commutated (EC) motors in existing walk-in, multi-deck and free standing coolers and freezers. These fractional horsepower EC motors are significantly more efficient than mechanically commutated, brushed motors, particularly at low speeds or partial load. By employing variable-speed technology, EC motors are able to optimize fan usage. Because these motors are brushless and utilize DC power, losses due to friction and phase shifting are eliminated. Savings for this measure take into account both the increased efficiency of the motor as well as the reduction in refrigeration load due to motor heat loss.

4.1.5 Plug Load Equipment Control - Vending Machines

ECM 7: 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)
1,612	0.0	0.0	$152.22	$230.00	$0.00	$230.00	1.5	1,623

Measure Description

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

4.2 ECMs Evaluated But Not Recommended

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

Figure 21 – Summary of Measures Evaluated, But Not Recommended

Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Motor Upgrades	**429**	**0.1**	**0.0**	**$40.48**	**$2,401.11**	**$0.00**	**$2,401.11**	**59.3**	**432**
Premium Efficiency Motors	429	0.1	0.0	$40.48	$2,401.11	$0.00	$2,401.11	59.3	432
Electric Unitary HVAC Measures	**1,907**	**5.8**	**0.0**	**$180.09**	**$76,408.33**	**$4,177.00**	**$72,231.33**	**401.1**	**1,920**
Install High Efficiency Electric AC	1,907	5.8	0.0	$180.09	$76,408.33	$4,177.00	$72,231.33	401.1	1,920
Gas Heating (HVAC/Process) Replacement	**0**	**0.0**	**8.8**	**$77.26**	**$4,531.47**	**$1,600.00**	**$2,931.47**	**37.9**	**1,033**
Install High Efficiency Furnaces	0	0.0	8.8	$77.26	$4,531.47	$1,600.00	$2,931.47	37.9	1,033
Domestic Water Heating Upgrade	**0**	**0.0**	**10.9**	**$95.32**	**$24,675.50**	**$850.00**	**$23,825.50**	**250.0**	**1,274**
Install High Efficiency Gas Water Heater	0	0.0	10.9	$95.32	$24,675.50	$850.00	$23,825.50	250.0	1,274
TOTALS	**2,336**	**5.9**	**19.7**	**$393.15**	**$108,016.40**	**$6,627.00**	**$101,389.40**	**257.9**	**4,659**

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

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

Premium Efficiency Motors

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
429	0.1	0.0	$40.48	$2,401.11	$0.00	$2,401.11	59.3	432

Measure Description

We evaluated replacing standard efficiency motors with IHP 2014 efficiency motors. Our evaluation assumes that existing motors will be replaced with motors of equivalent size and type. Although occasionally additional savings can be achieved by downsizing motors to better meet the motor's current load requirements. The base case motor efficiencies are estimated from nameplate information and our best estimates of motor run hours. Efficiencies of proposed motor upgrades are obtained from the *New Jersey's Clean Energy Program Protocols to Measure Resource Savings (2016)*. Savings are based on the difference between baseline and proposed efficiencies and the assumed annual operating hours.

Reasons for not Recommending

Although there is energy savings with replacing the motors we identified, the installation costs outweigh the cost savings. The economics of replacing the units to save energy cannot be justified on energy savings alone and therefore are not currently recommended.

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)
1,907	5.8	0.0	$180.09	$76,408.33	$4,177.00	$72,231.33	401.1	1,920

Measure Description

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

Reasons for not Recommending

Although there is energy savings with replacing the air conditioning units we identified, the installation costs outweigh the cost savings. The economics of replacing the units to save energy cannot be justified on energy savings alone and therefore are not currently recommended.

Install High Efficiency Furnaces

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	8.8	$77.26	$4,531.47	$1,600.00	$2,931.47	37.9	1,033

Measure Description

We evaluated replacing existing standard efficiency furnaces with condensing furnaces. Improved combustion technology and heat exchanger design optimize heat recovery from the combustion gases which can significantly improve furnace efficiency. Savings result from improved system efficiency.

Reasons for not Recommending

There was little to no savings for replacing.

Install High Efficiency Gas Water Heater

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	10.9	$95.32	$24,675.50	$850.00	$23,825.50	250.0	1,274

Measure Description

We evaluated replacing the existing tank water heater with a high efficiency tank water heater. Improvements in combustion efficiency and reductions in heat losses have improved the overall efficiency of storage water heaters. Energy savings results from using less gas to heat water, due to higher unit efficiency, and fewer run hours to maintain the tank water temperature.

Reasons for not Recommending

There was little if any savings for replacing.

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.

Close Doors and Windows

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

Perform Proper Lighting Maintenance

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

Develop a Lighting Maintenance Schedule

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

Ensure Lighting Controls Are Operating Properly

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

Perform Routine Motor Maintenance

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

Use Fans to Reduce Cooling Load

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

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 Boiler Maintenance

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

Perform Proper Furnace Maintenance

Preventative furnace maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. Following the manufacturer's instructions, a yearly tune-up should include tasks such as checking for gas / carbon monoxide leaks; changing the air and fuel filters; checking components for cracks, corrosion, dirt, or debris build-up; ensuring the ignition system is working properly; testing and adjusting operation and safety controls; inspecting the electrical connections; and ensuring proper lubrication for motors and bearings.

Perform Proper Water Heater Maintenance

At least once a year, drain a few gallons out of the water heater using the drain valve. If there is a lot of sediment or debris, then a full flush is recommended. Turn the temperature down and then completely drain the tank. Once a year check for any leaks or heavy corrosion on the pipes and valves. For gas water heaters, check the draft hood and make sure it is placed properly, with a few inches of air space between the tank and where it connects to the vent. Look for any corrosion or wear on the gas line and on the piping. If you noticed any black residue, soot or charred metal, this is a sign you may be having combustion issues and you should have the unit serviced by a professional. For electric water heaters, look for any signs of leaking such as rust streaks or residue around the upper and lower panels covering the electrical components on the tank. For water heaters over three to four years old have a technician inspect the sacrificial anode annually.

Perform Maintenance on Compressed Air Systems

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

Plug Load Controls

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

Replace Computer Monitors

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

Water Conservation

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

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

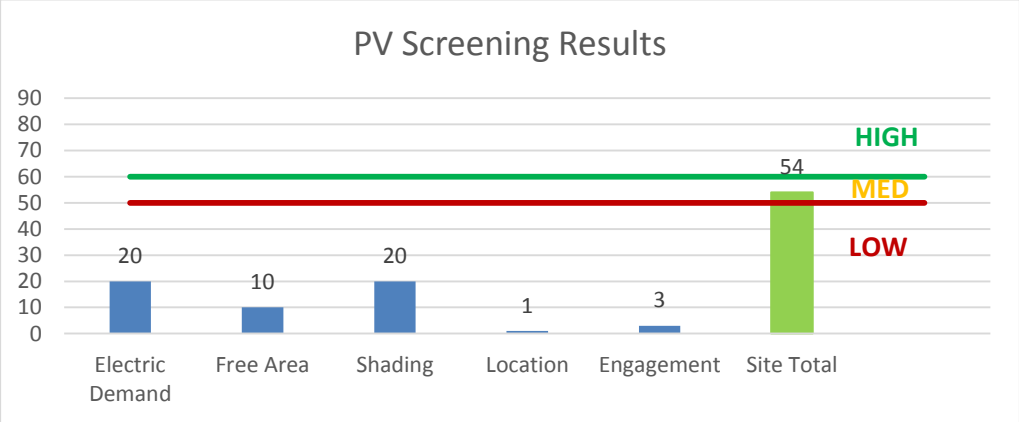
The State of New Jersey's Energy Master Plan (EMP) encourages new distributed generation of all forms and specifically focuses on expanding use of combined heat and power (CHP) by reducing financial, regulatory and technical barriers and identifying opportunities for new entries. The EMP also outlines 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

Branchburg Central Middle School has a 404 kW solar photovoltaic (PV) system installed on the roof. The systems provides about 46% 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 medium potential for installing an additional PV array.

Figure 22 - Photovoltaic Screening



Potential	Medium	
System Potential	80	kW DC STC
Electric Generation	95,310	kWh/yr
Displaced Cost	$8,290	/yr
Installed Cost	$291,200	

Solar projects must register their projects in the SREC Registration Program prior to the start of construction in order to establish the project's eligibility to earn SRECs. Registration of the intent to participate in New Jersey's solar marketplace provides market participants with information about developed new solar projects and insight into future SREC pricing. Refer to Section 7.3 for additional information.

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

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

6.2 Combined Heat and Power

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

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

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

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

Figure 23 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings
ECM 1	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 VFDs on Hot Water Pumps				x
ECM 6	Refrigerator/Freezer Case Electrically Commutated Motors	x			x
ECM 7	Vending Machine Control				x

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

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

Incentives

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

How to Participate

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

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

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

7.3 SREC Registration Program

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

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

7.4 Energy Savings Improvement Program

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

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

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

7.5 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.

7.6 Retail Natural Gas Supply Options

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

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

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

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

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Rm	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.26	911	0.0	$86.01	$702.00	$120.00	6.77
Main Gym	48	Linear Fluorescent - T8: 4' T8 (32W) - 6L	Occupancy Sensor	176	2,000	Relamp	No	48	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,000	3.71	13,027	0.0	$1,230.23	$4,566.40	$960.00	2.93
Main Gym	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	$226.42	$752.89	$0.00	3.33
Gym Closet	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,400	0.55	1,918	0.0	$181.15	$1,710.00	$270.00	7.95
Electric Closet	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	540	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	540	0.09	82	0.0	$7.74	$234.00	$40.00	25.06
Boys Locker Rm	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.62	2,158	0.0	$203.79	$1,668.00	$295.00	6.74
Boys Locker Rm	3	Incandescent: screw in	Wall Switch	60	2,000	Relamp	Yes	3	LED Screw-In Lamps: A19	Occupancy Sensor	9	1,400	0.11	371	0.0	$34.99	$161.26	$15.00	4.18
Gym Office -Boys	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.16	575	0.0	$54.34	$416.80	$80.00	6.20
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,000	0.03	114	0.0	$10.75	$75.20	$15.00	5.60
Gym Office -Girls	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.16	575	0.0	$54.34	$416.80	$80.00	6.20
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,000	0.03	114	0.0	$10.75	$75.20	$15.00	5.60
Girls Locker Room	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.62	2,158	0.0	$203.79	$1,668.00	$295.00	6.74
Girls Locker Room	3	Incandescent: screw in	Wall Switch	60	2,000	Relamp	Yes	3	LED Screw-In Lamps: A19	Occupancy Sensor	9	1,400	0.11	371	0.0	$34.99	$161.26	$15.00	4.18
Auxiilary Gym	20	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	114	2,000	Relamp	No	20	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,000	0.73	2,576	0.0	$243.27	$1,902.67	$400.00	6.18
Auxiilary Gym	6	Exit Signs: Incandescent	None	40	8,760	Fixture Replacement	No	6	LED Exit Signs: 2 W Lamp	None	6	8,760	0.13	2,055	0.0	$194.07	$645.33	$0.00	3.33
Girls Locker Room	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,400	0.49	1,726	0.0	$163.03	$1,593.00	$250.00	8.24
Boys Locker Room	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,400	0.49	1,726	0.0	$163.03	$1,593.00	$250.00	8.24
Gym Storage	7	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,000	Relamp	Yes	7	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,400	0.10	352	0.0	$33.22	$367.30	$55.00	9.40
Gym Storage	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,400	0.19	671	0.0	$63.40	$525.50	$90.00	6.87
Gym Storage	48	Incandescent: screw in	Wall Switch	60	2,000	Relamp	Yes	48	LED Screw-In Lamps: A19	Occupancy Sensor	9	1,400	1.69	5,928	0.0	$559.86	$3,120.14	$310.00	5.02
Gym Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,000	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,000	0.01	40	0.0	$3.80	$35.90	$5.00	8.13
Garage	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,400	0.49	1,726	0.0	$163.03	$1,593.00	$250.00	8.24
Kitchen Storage	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.21	719	0.0	$67.93	$492.00	$95.00	5.84
Kitchen	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	$32.35	$107.56	$0.00	3.33
Kitchen	35	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	Yes	35	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,400	0.96	3,357	0.0	$317.01	$3,127.50	$490.00	8.32

	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	6	Compact Fluorescent: screw in	Wall Switch	32	2,000	Relamp	Yes	6	LED Screw-In Lamps: LED A19 bulb	Occupancy Sensor	15	1,400	0.08	297	0.0	$28.02	$160.50	$0.00	5.73
Kitchen Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	0.02	76	0.0	$7.17	$58.50	$10.00	6.77
Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.02	76	0.0	$7.17	$58.50	$10.00	6.77
Kitchen Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,000	0.03	114	0.0	$10.75	$75.20	$15.00	5.60
Walk In	4	Compact Fluorescent: screw in	Wall Switch	32	2,000	Relamp	No	4	LED Screw-In Lamps: LED A19 bulb	Wall Switch	15	2,000	0.04	156	0.0	$14.77	$107.00	$0.00	7.24
Cafeteria	93	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	93	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	3.81	13,379	0.0	$1,263.50	$8,613.60	$1,605.00	5.55
Cafeteria	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	$129.38	$430.22	$0.00	3.33
Faculty Room	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.33	1,151	0.0	$108.69	$717.60	$140.00	5.31
Faculty Room	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,400	0.27	959	0.0	$90.57	$701.00	$120.00	6.41
Faculty Room	7	Compact Fluorescent: 4 pin /2 lamp	Wall Switch	26	2,000	None	Yes	7	Compact Fluorescent: 4 pin /2 lamp	Occupancy Sensor	26	1,400	0.04	126	0.0	$11.86	$116.00	$20.00	8.09
Mens Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,000	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,000	0.03	114	0.0	$10.75	$75.20	$15.00	5.60
Womens Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,000	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,000	0.03	114	0.0	$10.75	$75.20	$15.00	5.60
Closet Library	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	$64.69	$215.11	$0.00	3.33
Library	11	Compact Fluorescent: 4 pin /2 lamp	Wall Switch	26	2,000	None	Yes	11	Compact Fluorescent: 4 pin /2 lamp	Occupancy Sensor	26	1,400	0.06	197	0.0	$18.64	$0.00	$0.00	0.00
Library	44	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	44	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	1.80	6,330	0.0	$597.78	$4,388.80	$800.00	6.00
Library	48	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,000	Relamp	Yes	48	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,400	0.69	2,412	0.0	$227.80	$2,803.20	$380.00	10.64
Library Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.16	575	0.0	$54.34	$416.80	$80.00	6.20
Storage	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.25	863	0.0	$81.52	$567.20	$110.00	5.61
Library	25	Incandescent: screw in	Wall Switch	100	2,000	Relamp	Yes	25	LED Screw-In Lamps: A19	Occupancy Sensor	15	1,400	1.47	5,146	0.0	$485.99	$1,613.83	$160.00	2.99
500 corridor	37	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	No	37	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.80	2,808	0.0	$265.20	$2,164.50	$370.00	6.77
500 corridor	5	Exit Signs: Incandescent	None	40	8,760	Fixture Replacement	No	5	LED Exit Signs: 2 W Lamp	None	6	8,760	0.11	1,713	0.0	$161.73	$537.78	$0.00	3.33
400 corridor	45	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	No	45	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.97	3,416	0.0	$322.55	$2,632.50	$450.00	6.77
400 corridor	6	Exit Signs: Incandescent	None	40	8,760	Fixture Replacement	No	6	LED Exit Signs: 2 W Lamp	None	6	8,760	0.13	2,055	0.0	$194.07	$645.33	$0.00	3.33
Rm 127	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Main Lobby (BO)	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	None	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Main Lobby (BO)	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,000	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,000	0.32	1,139	0.0	$107.52	$752.00	$150.00	5.60
Copy Room	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm 126	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm124	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
B.O. Entrance	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,000	None	No	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,000	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
B.O. Entrance	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Tech Office 1	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Tech Office 2	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Tech Maint. Office	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Small Office	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm 121A	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
B.O. corridor	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Office (students)	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Office (instructors)	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Conference Room	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm 131 (Lunch Rm)	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,000	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,000	0.06	228	0.0	$21.50	$150.40	$30.00	5.60
Rm 150	35	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,000	Relamp	No	35	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,000	1.14	3,985	0.0	$376.30	$2,632.00	$525.00	5.60
Storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,400	0.08	288	0.0	$27.17	$291.50	$50.00	8.89
Rm151	22	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	22	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.90	3,165	0.0	$298.89	$2,194.40	$400.00	6.00
Rm143(Nurse)	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.53	1,870	0.0	$176.62	$1,517.60	$265.00	7.09
Rm143(Nurse)	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,400	0.10	358	0.0	$33.80	$252.80	$0.00	7.48
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,000	0.03	114	0.0	$10.75	$75.20	$15.00	5.60
100-Corridor	28	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	No	28	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.61	2,125	0.0	$200.69	$1,638.00	$280.00	6.77
100-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	$129.38	$430.22	$0.00	3.33

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
100-Corridor	4	Incandescent: screw in	Wall Switch	60	2,000	Relamp	No	4	LED Screw-In Lamps: A19	Wall Switch	9	2,000	0.13	469	0.0	$44.31	$215.01	$20.00	4.40
Main office lobby	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.62	2,158	0.0	$203.79	$1,668.00	$295.00	6.74
Main office lobby	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	$32.35	$107.56	$0.00	3.33
Vice Principal	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.12	432	0.0	$40.76	$341.60	$65.00	6.79
Principal	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.16	575	0.0	$54.34	$416.80	$80.00	6.20
Rm104	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.12	432	0.0	$40.76	$225.60	$45.00	4.43
Rm104	12	Compact Fluorescent: 4 pin /2 lamp	Wall Switch	26	2,000	None	Yes	12	Compact Fluorescent: 4 pin /2 lamp	Occupancy Sensor	26	1,400	0.06	215	0.0	$20.33	$116.00	$20.00	4.72
Rm 105	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.08	288	0.0	$27.17	$266.40	$50.00	7.96
Rm106	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.08	288	0.0	$27.17	$266.40	$50.00	7.96
Women Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.02	76	0.0	$7.17	$58.50	$10.00	6.77
Men Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.02	76	0.0	$7.17	$58.50	$10.00	6.77
Rm107	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.08	288	0.0	$27.17	$266.40	$50.00	7.96
Rm108	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.08	288	0.0	$27.17	$266.40	$50.00	7.96
Rm109	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.08	288	0.0	$27.17	$266.40	$50.00	7.96
Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.04	152	0.0	$14.34	$117.00	$20.00	6.77
Rm110	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.25	863	0.0	$81.52	$567.20	$110.00	5.61
Rm111	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.49	1,726	0.0	$163.03	$1,018.40	$200.00	5.02
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.02	76	0.0	$7.17	$58.50	$10.00	6.77
Rm114	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.16	575	0.0	$54.34	$416.80	$80.00	6.20
Rm153	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.29	1,007	0.0	$95.10	$642.40	$125.00	5.44
Fire Alarm Rm	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	540	Relamp	No	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	540	0.19	184	0.0	$17.42	$526.50	$90.00	25.06
Rm 154	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.82	2,877	0.0	$271.72	$2,044.00	$370.00	6.16
Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.04	152	0.0	$14.34	$117.00	$20.00	6.77
Rm 152	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.66	2,302	0.0	$217.38	$1,743.20	$310.00	6.59
Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	540	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	540	0.04	41	0.0	$3.87	$117.00	$20.00	25.06

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Boys Restroom	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,000	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	0.11	380	0.0	$35.84	$292.50	$50.00	6.77
Staff Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	0.02	76	0.0	$7.17	$58.50	$10.00	6.77
Custodian Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	540	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	540	0.02	20	0.0	$1.94	$58.50	$10.00	25.06
300-Corridor	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	No	20	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.43	1,518	0.0	$143.35	$1,170.00	$200.00	6.77
300-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	$129.38	$430.22	$0.00	3.33
Rm501	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.41	1,439	0.0	$135.86	$868.00	$170.00	5.14
Rm502	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.41	1,439	0.0	$135.86	$868.00	$170.00	5.14
Boys Restroom	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,000	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	0.11	380	0.0	$35.84	$292.50	$50.00	6.77
Custodian Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	540	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	540	0.02	20	0.0	$1.94	$58.50	$10.00	25.06
Girls Restroom	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,400	0.14	480	0.0	$45.29	$562.50	$85.00	10.54
Staff Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.02	76	0.0	$7.17	$58.50	$10.00	6.77
Server Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.04	152	0.0	$14.34	$117.00	$20.00	6.77
500-Corridor	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	No	7	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.15	531	0.0	$50.17	$409.50	$70.00	6.77
200-Corridor	21	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	No	21	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.45	1,594	0.0	$150.52	$1,228.50	$210.00	6.77
200-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	$64.69	$215.11	$0.00	3.33
Cafeteria Corridor	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.13	455	0.0	$43.01	$351.00	$60.00	6.77
Cafeteria Corridor	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	$32.35	$107.56	$0.00	3.33
100-Corridor	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	No	24	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.52	1,822	0.0	$172.02	$1,404.00	$240.00	6.77
Custodian Closet	1	Incandescent: screw in	Wall Switch	60	2,000	Relamp	No	1	LED Screw-In Lamps: A19	Wall Switch	9	2,000	0.03	117	0.0	$11.08	$53.75	$5.00	4.40
Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	540	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	540	0.02	20	0.0	$1.94	$58.50	$10.00	25.06
Rm157	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.82	2,877	0.0	$271.72	$2,044.00	$370.00	6.16
Storage	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	540	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	540	0.13	123	0.0	$11.61	$351.00	$60.00	25.06
Rm159	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.82	2,877	0.0	$271.72	$2,044.00	$370.00	6.16
Rm159	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,400	0.05	192	0.0	$18.11	$117.00	$20.00	5.35
Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	540	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	540	0.09	82	0.0	$7.74	$234.00	$40.00	25.06

	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
Server Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	540	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	540	0.02	20	0.0	$1.94	$58.50	$10.00	25.06
Mens Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.02	76	0.0	$7.17	$58.50	$10.00	6.77
Womens Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.02	76	0.0	$7.17	$58.50	$10.00	6.77
Custodial Office	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,400	0.14	480	0.0	$45.29	$408.50	$70.00	7.47
Rm201A	26	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	Yes	26	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,400	0.71	2,494	0.0	$235.49	$2,061.00	$330.00	7.35
Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	540	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	540	0.04	41	0.0	$3.87	$117.00	$20.00	25.06
Rm201	17	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	17	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.70	2,446	0.0	$230.96	$1,818.40	$325.00	6.47
Rm170	22	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	22	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.90	3,165	0.0	$298.89	$2,194.40	$400.00	6.00
Rm171	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,400	0.08	288	0.0	$27.17	$175.50	$30.00	5.35
Rm171	41	Compact Fluorescent: screw in	Wall Switch	32	2,000	Relamp	Yes	41	LED Screw-In Lamps: LED A19 bulb	Occupancy Sensor	15	1,400	0.58	2,027	0.0	$191.46	$1,906.75	$105.00	9.41
Rm171	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	$64.69	$215.11	$0.00	3.33
Office	3	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,000	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,400	0.13	467	0.0	$44.11	$291.50	$20.00	6.15
closet	1	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	540	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	540	0.08	73	0.0	$6.92	$95.13	$0.00	13.75
Closet_Roof-Access	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.02	76	0.0	$7.17	$58.50	$10.00	6.77
Rm200	25	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	25	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	1.03	3,597	0.0	$339.65	$2,150.00	$410.00	5.12
Rm200	19	Compact Fluorescent: screw in	Wall Switch	32	2,000	Relamp	Yes	19	LED Screw-In Lamps: LED A19 bulb	Occupancy Sensor	15	1,400	0.27	940	0.0	$88.73	$778.25	$35.00	8.38
Rm200	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	$64.69	$215.11	$0.00	3.33
Rm200 Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.12	432	0.0	$40.76	$341.60	$65.00	6.79
Rm200 Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,400	0.11	384	0.0	$36.23	$350.00	$60.00	8.00
Boys Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.04	152	0.0	$14.34	$117.00	$20.00	6.77
custodial closet	1	Incandescent: screw in	Occupancy Sensor	60	540	Relamp	No	1	LED Screw-In Lamps: A19	Occupancy Sensor	9	540	0.03	32	0.0	$2.99	$53.75	$5.00	16.30
Girls Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.04	152	0.0	$14.34	$117.00	$20.00	6.77
Rm202	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.62	2,158	0.0	$203.79	$1,398.00	$260.00	5.58
Rm202	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,000	None	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,000	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm204	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.62	2,158	0.0	$203.79	$1,398.00	$260.00	5.58

	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
Rm203	17	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	17	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.70	2,446	0.0	$230.96	$1,548.40	$290.00	5.45
Rm206	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.62	2,158	0.0	$203.79	$1,398.00	$260.00	5.58
Rm205	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.53	1,870	0.0	$176.62	$1,247.60	$230.00	5.76
Rm208	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.62	2,158	0.0	$203.79	$1,398.00	$260.00	5.58
Rm207	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.62	2,158	0.0	$203.79	$1,398.00	$260.00	5.58
Rm210	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.62	2,158	0.0	$203.79	$1,398.00	$260.00	5.58
Rm209	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.62	2,158	0.0	$203.79	$1,398.00	$260.00	5.58
Rm212	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.62	2,158	0.0	$203.79	$1,398.00	$260.00	5.58
Rm211	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.62	2,158	0.0	$203.79	$1,398.00	$260.00	5.58
Rm213	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.37	1,295	0.0	$122.27	$792.80	$155.00	5.22
Rm214	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.62	2,158	0.0	$203.79	$1,398.00	$260.00	5.58
Rm215	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.37	1,295	0.0	$122.27	$946.80	$170.00	6.35
Rm513	30	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	30	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	1.23	4,316	0.0	$407.58	$2,796.00	$520.00	5.58
Rm510	18	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	18	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.74	2,590	0.0	$244.55	$1,623.60	$305.00	5.39
Rm511	18	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	18	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.74	2,590	0.0	$244.55	$1,623.60	$305.00	5.39
Rm509	18	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	18	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.74	2,590	0.0	$244.55	$1,623.60	$305.00	5.39
Rm508	18	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	18	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.74	2,590	0.0	$244.55	$1,623.60	$305.00	5.39
Rm507	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.49	1,726	0.0	$163.03	$1,018.40	$200.00	5.02
Rm505	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.49	1,726	0.0	$163.03	$1,018.40	$200.00	5.02
Rm312	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.82	2,877	0.0	$271.72	$1,774.00	$335.00	5.30
Rm309	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.82	2,877	0.0	$271.72	$1,774.00	$335.00	5.30
Rm307	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.62	2,158	0.0	$203.79	$1,398.00	$260.00	5.58
Rm310	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.62	2,158	0.0	$203.79	$1,398.00	$260.00	5.58
Rm308	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.62	2,158	0.0	$203.79	$1,398.00	$260.00	5.58
Rm305	26	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	26	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	1.07	3,740	0.0	$353.24	$2,495.20	$460.00	5.76

	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
Rm305	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,400	0.08	288	0.0	$27.17	$175.50	$30.00	5.35
Rm306	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.62	2,158	0.0	$203.79	$1,398.00	$260.00	5.58
Rm304	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.62	2,158	0.0	$203.79	$1,398.00	$260.00	5.58
Rm303	25	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	25	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	1.03	3,597	0.0	$339.65	$2,150.00	$410.00	5.12
Rm302	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.62	2,158	0.0	$203.79	$1,398.00	$260.00	5.58
Rm301	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.25	863	0.0	$81.52	$567.20	$110.00	5.61
Rm401	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.82	2,877	0.0	$271.72	$1,774.00	$335.00	5.30
Rm403	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.82	2,877	0.0	$271.72	$1,774.00	$335.00	5.30
Rm405	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.82	2,877	0.0	$271.72	$1,774.00	$335.00	5.30
Rm406	17	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	17	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.70	2,446	0.0	$230.96	$1,548.40	$290.00	5.45
Rm407	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.49	1,726	0.0	$163.03	$1,018.40	$200.00	5.02
Rm408	30	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	30	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	1.23	4,316	0.0	$407.58	$2,796.00	$520.00	5.58
Rm409	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.49	1,726	0.0	$163.03	$1,018.40	$200.00	5.02
Rm411	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.82	2,877	0.0	$271.72	$1,774.00	$335.00	5.30
Rm413	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.82	2,877	0.0	$271.72	$1,774.00	$335.00	5.30
Rm410	30	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	30	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	1.23	4,316	0.0	$407.58	$2,526.00	$485.00	5.01
Rm415	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.82	2,877	0.0	$271.72	$1,774.00	$335.00	5.30
Rm417	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.82	2,877	0.0	$271.72	$1,774.00	$335.00	5.30
Girls Restroom	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,000	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	0.09	304	0.0	$28.67	$234.00	$40.00	6.77
Boys Restroom	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,000	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,000	0.09	304	0.0	$28.67	$234.00	$40.00	6.77
Staff Restroom	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,400	0.11	384	0.0	$36.23	$504.00	$75.00	11.84
Parking Lot	10	LED Screw-In Lamps: screw in	Daylight Dimming	75	1,671	None	No	10	LED Screw-In Lamps: screw in	Daylight Dimming	75	1,671	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Perimeter (wall pack)	15	Compact Fluorescent: 4 pin /2 lamp	Daylight Dimming	26	1,671	None	No	15	Compact Fluorescent: 4 pin /2 lamp	Daylight Dimming	26	1,671	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Perimeter (wall pack)	15	High-Pressure Sodium: (1) 400W Lamp	Daylight Dimming	465	1,671	Fixture Replacement	No	15	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	90	1,671	3.69	10,811	0.0	$1,020.94	$5,860.16	$1,500.00	4.27
Perimeter (wall pack)	11	Metal Halide: (1) 250W Lamp	Daylight Dimming	295	1,671	Fixture Replacement	No	11	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	46	1,671	1.80	5,264	0.0	$497.13	$4,297.45	$1,100.00	6.43

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
Roof Top	NoID//Cafeteria	1	Supply Fan	5.0	87.5%	No	2,500	Yes	89.5%	No		0.04	143	0.0	$13.49	$800.37	$0.00	59.31
Roof Top	NoID//Cafeteria	1	Supply Fan	5.0	87.5%	No	2,500	Yes	89.5%	No		0.04	143	0.0	$13.49	$800.37	$0.00	59.31
Roof Top	NoID//Band Rm	1	Supply Fan	5.0	87.5%	No	2,500	Yes	89.5%	No		0.04	143	0.0	$13.49	$800.37	$0.00	59.31
Roof Top	NoID//Rm 201	1	Supply Fan	1.0	82.5%	No	2,500	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU3//faculty room	1	Supply Fan	4.0	82.5%	No	2,500	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU2//Kitchen	1	Supply Fan	7.5	89.5%	No	2,500	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU1//Cafeteria	1	Supply Fan	7.5	89.5%	No	2,500	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU4//200 Wing	1	Supply Fan	7.5	89.5%	No	2,500	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU5//200 Wing	1	Supply Fan	7.5	89.5%	No	2,500	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU5//500 Wing Classrooms	1	Supply Fan	10.0	89.5%	No	2,500	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	AHU7//500 Wing Classrooms	1	Supply Fan	3.0	87.5%	No	2,500	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU18//Gym	1	Supply Fan	10.0	89.5%	No	2,500	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU17//Gym	1	Supply Fan	10.0	89.5%	No	2,500	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU15//300 Wing Classrooms & Corridor	1	Supply Fan	7.5	89.5%	No	2,500	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU16//300 Wing Classrooms & Corridor	1	Supply Fan	7.5	89.5%	No	2,500	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU19//Rm 159	1	Supply Fan	1.0	82.5%	No	2,500	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU20//Rm 157	1	Supply Fan	1.0	82.5%	No	2,500	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU8//Main Office	1	Supply Fan	4.0	82.5%	No	2,500	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU7//Main Office	1	Supply Fan	1.0	82.5%	No	2,500	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU10//Rm152	1	Supply Fan	1.0	82.5%	No	2,500	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof Top	RTU11//Board Office	1	Supply Fan	7.5	89.5%	No	2,500	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU12//100 Wing Corridor	1	Supply Fan	1.0	82.5%	No	2,500	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU9//Media Center	1	Supply Fan	7.5	89.5%	No	2,500	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU13//400 Wing Classroom	1	Supply Fan	10.0	89.5%	No	2,500	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU14//400 Wing Classroom	1	Supply Fan	7.5	89.5%	No	2,500	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	NoID//Rm 508	1	Supply Fan	1.0	82.5%	No	2,500	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	HHW Loop	1	Heating Hot Water Pump	15.0	91.0%	No	2,500	No	91.0%	Yes	1	1.48	10,698	0.0	$1,010.29	$5,194.45	$0.00	5.14
Boiler Room	HHW Loop	1	Heating Hot Water Pump	15.0	91.0%	No	2,500	No	91.0%	Yes	1	1.48	10,698	0.0	$1,010.29	$5,194.45	$0.00	5.14

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof Top	NoID//Rm 171	1	Split-System AC	2.00		Yes	1	Split-System AC	2.00		14.00		No	0.24	151	0.0	$13.95	$2,992.44	$184.00	201.30
Roof Top	NoID//Cafeteria	1	Packaged AC	15.00		Yes	1	Packaged AC	15.00		11.50		No	0.84	517	0.0	$47.77	$20,907.75	$1,185.00	412.88
Roof Top	NoID//Cafeteria	1	Packaged AC	15.00		Yes	1	Packaged AC	15.00		11.50		No	0.84	517	0.0	$47.77	$20,907.75	$1,185.00	412.88
Roof Top	NoID//Band Rm	1	Packaged AC	15.00		Yes	1	Packaged AC	15.00		11.50		No	0.84	517	0.0	$47.77	$20,907.75	$1,185.00	412.88
Roof Top	NoID//Rm 201	1	Packaged AC	6.00		Yes	1	Packaged AC	6.00		11.50		No	0.34	207	0.0	$19.11	$10,692.63	$438.00	536.68
Roof Top	RTU3//faculty room	1	Packaged AC	10.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU2//Kitchen	1	Packaged AC	20.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU1//Cafeteria	1	Packaged AC	20.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU1//Cafeteria	1	Split-System AC	2.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU4//200 Wing	1	Packaged AC	20.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU5//200 Wing	1	Packaged AC	20.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU5//500 Wing Classrooms	1	Packaged AC	25.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	NoID//Server Room	1	Split-System Air-Source HP	1.00	10.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	AHU7//500 Wing Classrooms	1	Packaged AC	6.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU18//Gym	1	Packaged AC	27.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU17//Gym	1	Packaged AC	27.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU15//300 Wing Classrooms & Corridor	1	Packaged AC	20.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU16//300 Wing Classrooms & Corridor	1	Packaged AC	20.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	NoID//Server Room	1	Split-System AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	NoID//Rm ?	2	Split-System AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof Top	RTU19//Rm 159	1	Packaged AC	5.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU20//Rm 157	1	Packaged AC	5.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU8//Main Office	1	Packaged AC	8.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU7//Main Office	1	Packaged AC	6.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU10//Rm152	1	Packaged AC	6.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU11//Board Office	1	Packaged AC	20.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU12//100 Wing Corridor	1	Packaged AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU9//Media Center	1	Packaged AC	20.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU13//400 Wing Classroom	1	Packaged AC	27.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU14//400 Wing Classroom	1	Packaged AC	20.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	NoID//Server Room	1	Split-System AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	NoID//Rm 510	1	Split-System AC	3.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	NoID//Rm 508	1	Packaged AC	3.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	School	5	Condensing Hot Water Boiler	1,800.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	RTU7//MainOffice	1	Furnace	400.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	UV10//Rm 154	1	Furnace	50.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	NoID//Cafeteria	1	Furnace	50.00	Yes	1	Furnace	50.00	95.00%	AFUE	0.00	0	2.2	$19.32	$1,132.87	$400.00	37.94
Roof Top	NoID//Cafeteria	1	Furnace	50.00	Yes	1	Furnace	50.00	95.00%	AFUE	0.00	0	2.2	$19.32	$1,132.87	$400.00	37.94
Roof Top	NoID//Band Rm	1	Furnace	50.00	Yes	1	Furnace	50.00	95.00%	AFUE	0.00	0	2.2	$19.32	$1,132.87	$400.00	37.94
Roof Top	NoID//Rm 201	1	Furnace	50.00	Yes	1	Furnace	50.00	95.00%	AFUE	0.00	0	2.2	$19.32	$1,132.87	$400.00	37.94

DHW Inventory & Recommendations

		Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	School	1	Storage Tank Water Heater (> 50 Gal)	Yes	1	Storage Tank Water Heater (> 50 Gal)	Natural Gas	86.00%	Et	0.00	0	3.6	$31.77	$11,558.00	$400.00	351.19
Gym Storage	School	1	Storage Tank Water Heater (> 50 Gal)	Yes	1	Storage Tank Water Heater (> 50 Gal)	Natural Gas	86.00%	EF	0.00	0	3.6	$31.77	$4,449.00	$150.00	135.31
Garage	Kitchen	1	Storage Tank Water Heater (> 50 Gal)	Yes	1	Storage Tank Water Heater (> 50 Gal)	Natural Gas	86.00%	Et	0.00	0	3.6	$31.77	$8,668.50	$300.00	263.39

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	2	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	Cooler (35F to 55F)	No	No	No	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
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	3	Cooler (35F to 55F)	No	No	No	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Cooler (35F to 55F)	No	No	No	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions		Proposed Conditions			Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Evaporator Fan Control?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Cooler (35F to 55F)	Yes	No	No	0.07	527	0.0	$49.77	$606.60	$80.00	10.58
Kitchen	1	Medium Temp Freezer (0F to 30F)	Yes	No	No	0.07	527	0.0	$49.77	$606.60	$80.00	10.58
Kitchen	1	Low Temp Freezer (-35F to -5F)	Yes	No	No	0.07	527	0.0	$49.77	$606.60	$80.00	10.58

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions			Proposed Conditions	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	2	Stand-Up Refrigerator, Solid Door (>50 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Refrigerator Chest	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Commercial Ice Maker Inventory & Recommendations

	Existing Conditions			Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Ice Maker Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Self-Contained Unit (<175 lbs/day), Continuous	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Cooking Equipment Inventory & Recommendations

	Existing Conditions			Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	High Efficiency Equipement?	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Electric Combination Oven/Steam Cooker (<15 Pans)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Electric Combination Oven/Steam Cooker (<15 Pans)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Electric Combination Oven/Steam Cooker (<15 Pans)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Electric Combination Oven/Steam Cooker (<15 Pans)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	4	Insulated Food Holding Cabinet (3/4 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	Single Tank Conveyor (Low Temp)	Electric	N/A	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
School	238	Desktop Computers	110.0	Yes
School	6	Desktop Computers (non LCD)	144.0	No
School	9	Microwave	1,000.0	No
Rm202	1	Electric range	1,500.0	No
School	9	copy machine	1,450.0	Yes
School	12	printer	460.0	Yes
School	34	small printer	46.0	Yes
School	12	refrigerator	265.0	Yes
School	7	coffee machine	950.0	Yes
School	5	small freezer	65.0	Yes
Art Classroom	1	Kiln	11,520.0	No
School	3	Water Fountain	275.0	Yes

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Faculty Room	1	Refrigerated	Yes	0.00	1,612	0.0	$152.22	$230.00	$0.00	1.51

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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87

ENERGY STAR® Score[1]

Branchburg Central Middle School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 141,310
Built: 1965

For Year Ending: November 30, 2016
Date Generated: May 26, 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
Branchburg Central Middle School 220 Baird Rd. Branchburg, New Jersey 08876	_____ . (___)___-_____	____ _____ . (___)___-_____ _____

Property ID: 5894948

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
56 kBtu/ft²

Source EUI
85.1 kBtu/ft²

Annual Energy by Fuel		National Median Comparison	
Electric - Solar (kBtu)	1,676,629 (21%)	National Median Site EUI (kBtu/ft²)	86.4
Natural Gas (kBtu)	4,413,876 (56%)	National Median Source EUI (kBtu/ft²)	131.4
Electric - Grid (kBtu)	1,821,446 (23%)	% Diff from National Median Source EUI	-35%
		Annual Emissions	
		Greenhouse Gas Emissions (Metric Tons CO2e/year)	443

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)