Local Government Energy Audit:
Energy Audit Report

NuView Academy Annex

Educational Services Commission of New Jersey
1690 Stelton Road
Piscataway, NJ 08854

March 21, 2018

Final Report by:
TRC Energy Services

Disclaimer

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

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

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

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

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1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for NuView Academy Annex. 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

NuView Academy Annex is a single story, 54,200 square foot facility comprised of various space types. These space types include classrooms, offices, restrooms, break rooms, mechanical spaces, a gym, kitchen and cafeteria.

Lighting consists of aging and inefficient fluorescent fixtures containing 32-Watt linear and U-tube T8 lamps. Space conditioning for the offices, gym, corridors and cafeteria areas is provided by multiple roof top air handler units (AHUs) with chilled water and hot water coils. Air conditioning for the classrooms is provided by unit ventilators with DX cooling coils and hot water coils for heating. Hot water is provided from two (2) heating hot water (HHW) boilers. A thorough description of the facility and our observations are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated six (6) measures which together represent an opportunity for NuView Academy Annex to reduce annual energy costs by $22,173 and annual greenhouse gas emissions by 202,296 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 15 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 NuView Academy Annex's annual energy use by 15%.

Figure 1 – Previous 12 Month Utility Costs

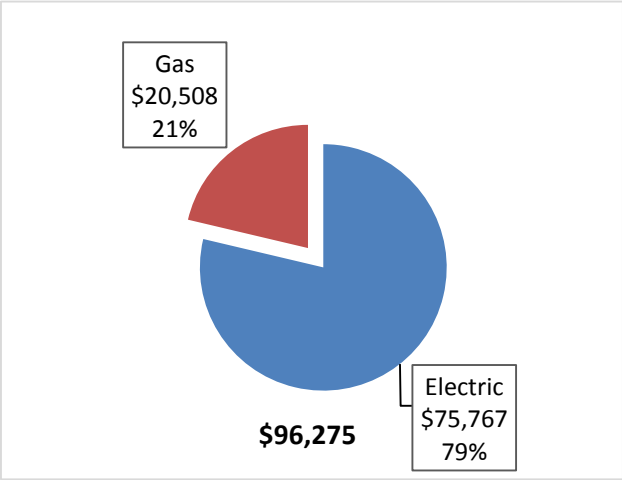
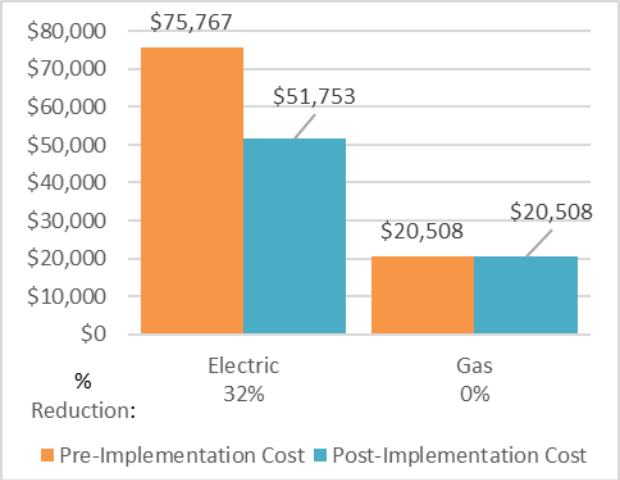


Figure 2 – Potential Post-Implementation Costs



A detailed description of NuView Academy Annex'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 Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**75,312**	**22.0**	**$8,312.46**	**$93,552.17**	**$5,155.00**	**$88,397.17**	**10.6**	**75,838**
ECM 1	Install LED Fixtures	Yes	15,952	5.9	$1,760.65	$47,688.96	$385.00	$47,303.96	26.9	16,063
ECM 2	Retrofit Fixtures with LED Lamps	Yes	59,360	16.1	$6,551.81	$45,863.22	$4,770.00	$41,093.22	6.3	59,775
Lighting Control Measures			**17,429**	**4.6**	**$1,923.71**	**$22,466.00**	**$4,075.00**	**$18,391.00**	**9.6**	**17,551**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	17,429	4.6	$1,923.71	$22,350.00	$4,055.00	$18,295.00	9.5	17,551
Variable Frequency Drive (VFD) Measures			**2,345**	**1.9**	**$258.81**	**$5,194.45**	**$0.00**	**$5,194.45**	**20.1**	**2,361**
ECM 4	Install VFDs on Hot Water Pumps	Yes	2,345	1.9	$258.81	$5,194.45	$0.00	$5,194.45	20.1	2,361
Electric Unitary HVAC Measures			**16,676**	**24.1**	**$1,840.65**	**$86,166.45**	**$2,925.00**	**$83,241.45**	**45.2**	**16,793**
	Install High Efficiency Packaged Terminal AC/HP	No	16,676	24.1	$1,840.65	$86,166.45	$2,925.00	$83,241.45	45.2	16,793
Electric Chiller Replacement			**102,920**	**91.5**	**$11,359.66**	**$193,772.57**	**$18,400.00**	**$175,372.57**	**15.4**	**103,639**
ECM 5	Install High Efficiency Chillers	Yes	102,920	91.5	$11,359.66	$193,772.57	$18,400.00	$175,372.57	15.4	103,639
Food Service Equipment & Refrigeration Measures			**2,886**	**0.2**	**$318.52**	**$909.90**	**$120.00**	**$789.90**	**2.5**	**2,906**
ECM 6	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	2,886	0.2	$318.52	$909.90	$120.00	$789.90	2.5	2,906
TOTALS (only Recommended Measures)			**200,891**	**120.2**	**$22,173.17**	**$315,779.09**	**$27,730.00**	**$288,049.09**	**13.0**	**202,296**
TOTALS (All)			**217,568**	**144.3**	**$24,013.82**	**$402,061.54**	**$30,675.00**	**$371,386.54**	**15.5**	**219,089**

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

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

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

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

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 conditioning 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.

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.

Energy Efficient Practices

TRC also identified 11 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 NuView Academy Annex include:

- Close Doors and Windows
- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Use Fans to Reduce Cooling Load
- Assess Chillers & Request Tune-Ups
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Perform Proper Boiler Maintenance
- Perform Proper Water Heater Maintenance
- Water Conservation

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

On-Site Generation Measures

TRC evaluated the potential for installing on-site generation for NuView Academy Annex. Based on the configuration of the site and its loads there is a moderate potential for installing a photovoltaic (PV) array. For details on our evaluation and on-site generation potential, please refer to Section 6.

Figure 4 – Photovoltaic Potential

Potential	Medium	
System Potential	100	kW DC STC
Electric Generation	119,137	kWh/yr
Displaced Cost	$10,360	/yr
Installed Cost	$390,000	

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
- 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 SS incentives, so only after receiving pre-approval should you proceed with ECM installation. The incentive estimates listed above in Figure 3 are based on the SmartStart program. More details on this program and others are available in Section 8.

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

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

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 5 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Patrick M. Moran	Buisiness Manager	pmoran@escnj.k12.nj.us	732-777-9848
TRC Energy Services			
Moussa Traore	Auditor	MTraore@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On March 21, 2017, TRC performed an energy audit at NuView Academy Annex located in Piscataway, NJ. TRC's auditor met with Patrick Moran, Business Manager to review the facility operations and help focus our investigation on specific energy-using systems.

NuView Academy Annex is a single story, 54,200 square foot facility comprised of various space types. These space types include classrooms, offices, restrooms, break rooms, mechanical spaces, a gym, kitchen and cafeteria. The building was constructed in 1995.

2.3 Building Occupancy

The school building is occupied Monday through Friday all year round. During a typical day, the facility is occupied by approximately 125 students. The typical schedule is presented in the table below.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
NuView Academy Annex	Weekday	7:30 am - 5:30 pm
NuView Academy Annex	Weekend	Closed

2.4 Building Envelope

The building is constructed of concrete masonry with a brick facade and has a pitched roof with composite shingles. It has double pane windows and exterior doors are constructed of aluminum, all of which showed little signs of excessive air infiltration. Overall, the building envelope was found to be in good condition.

2.5 On-Site Generation

NuView Academy Annex does not have any on-site electric generation capacity.

2.6 Energy-Using Systems

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

Lighting System

Lighting is provided mostly by 32-Watt linear and U-tube fluorescent T8 lamps with electronic ballasts. Most of the fixtures are 2-lamp or 3-lamp, 4-foot long troffers with diffusers. A few areas of the building have 13-Watt CFL lamps. LED tube lamps were also found in the cafeteria, corridor E, Room E5, and the Counselor's office.

Lighting control in most spaces is provided by manual switches. Only a few occupancy sensors were found.

Exterior lighting primarily consists of wall-mounted and pole-mounted 100 Watt metal halide parking lot fixtures. The exterior fixtures are controlled by photocells.

Chilled Water (CHW) System

The chiller plant consists of a single (1) 200 ton, Trane, R-22, helical-rotary chiller. The chiller is configured in a constant flow primary distribution loop with a single 15 hp chilled water pump (CHWP-4). There is a standby pump (SBP-3) that can be used in place of CHWP-4. SBP-3 can also be used for the HHW loop system; the chilled water and hot water systems are isolated by a series of valves. The chiller plant supplies chilled water to air handlers (AHUs) 1 to 8. The chiller is 21 years old and is recommended for replacement as it is approaching the end of its useful life.

Heating Hot Water (HHW) System

The heating hot water system consists of two (2) Thermal Solutions 2,150 kBtu/hr output forced draft boilers (B-1 & B-2). The boilers have a nominal combustion efficiency of 87% and are configured in a constant flow primary distribution loop with a single hot water pump (HHWP-1). There is a standby pump (SBP-3) that can be used in place of HHWP1. SBP-3 can also be used for the CHW loop system; the chilled

water and hot water systems are isolated by a series of valves. The boilers are fairly new and in good condition.

Air Handler Units (AHUs)

There are (8) eight air handling units (AHU1 to 8). The AHUs are constant air volume systems. Each AHU has one (1) supply fan with chilled water and heating hot water coils. The AHUs serve the following spaces:

AHU-1 serves Cafeteria (Fan hp: 10 hp)

AHU-2 serves Business Offices (Fan hp: 7.5 hp)

AHU-3 serves Gymnasium (Fan hp: 40 hp)

AHU-4 serves Counseling & Halls (Fan hp: 30 hp)

AHU-5 serves Principal & Secretary (Fan hp: 5 hp)

AHU-6 serves Resource Room (Fan hp: 7.5 hp)

AHU-7 serves Counseling Ed (Fan hp: 7.5 hp)

AHU-8 serves Old Woodshop (Fan hp: 7.5 hp)

Temperature setpoints and schedules for the AHUs are set from the building energy management system (BEMS). The AHUs are 21 years old.

Direct Expansion Air Conditioning System (DX)

There are 18 2.5-ton DX unit ventilators with fractional horsepower fans serving the classrooms (one in each classroom). The units have a hot water coil which is connected to the HHW loop. There is an economizer on each unit to provide outside air and free cooling.

Building Energy Management System (EMS)

The majority of the facility is controlled with a Building Control Technologies building energy management system (BEMS). The BEMS is capable of setting schedules and temperature setpoints to the HVAC systems as well as set lighting schedules to certain zones.

Domestic Hot Water Heating System

The domestic hot water (DHW) system consists of one (1) gas water heater with a 100-gallon storage tank. The water heater serves the kitchen and restrooms. The input capacity for the unit is 100 kBtu/hr and it has a nominal efficiency of 86%.

Food Service & Laundry Equipment

The school has a kitchen that is used to prepare approximately 200 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 one (1) commercial refrigerator and one (1) walk-in cooler used to store food that is prepared for school lunches.

Building Plug Load

There are approximately 35 desktop computers, 20 small printers, nine (9) copy machines, and several small electronics items located throughout the facility. The facility also has one (1) refrigerated beverage vending machine without energy-savings controls.

2.7 Water-Using Systems

There are ten (10) 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.

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

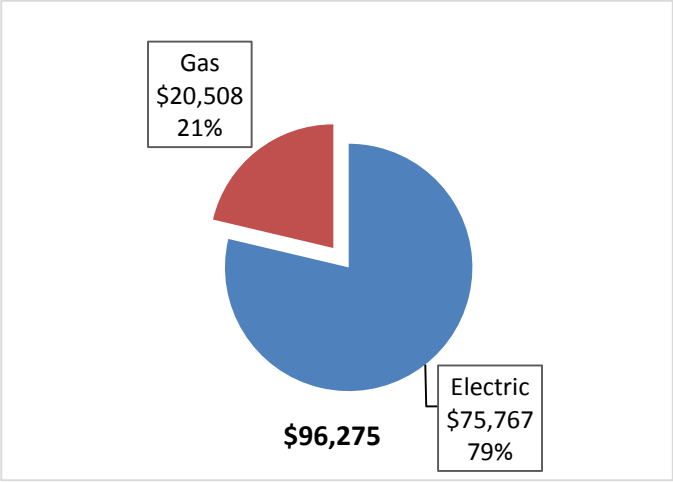
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 7 - Utility Summary

Utility Summary for NuView Academy Annex		
Fuel	**Usage**	**Cost**
Electricity	686,458 kWh	$75,767
Natural Gas	24,782 Therms	$20,508
Total		**$96,275**

The current annual energy cost for this facility is $96,275 as shown in the chart below.

Figure 8 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by PSE&G. The average electric cost over the past 12 months was $0.110/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. Analysis of the usage and demand profile indicates that there is a peak in the summer which can be attributed to the cooling load. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 9 – Electrical Usage& Demand

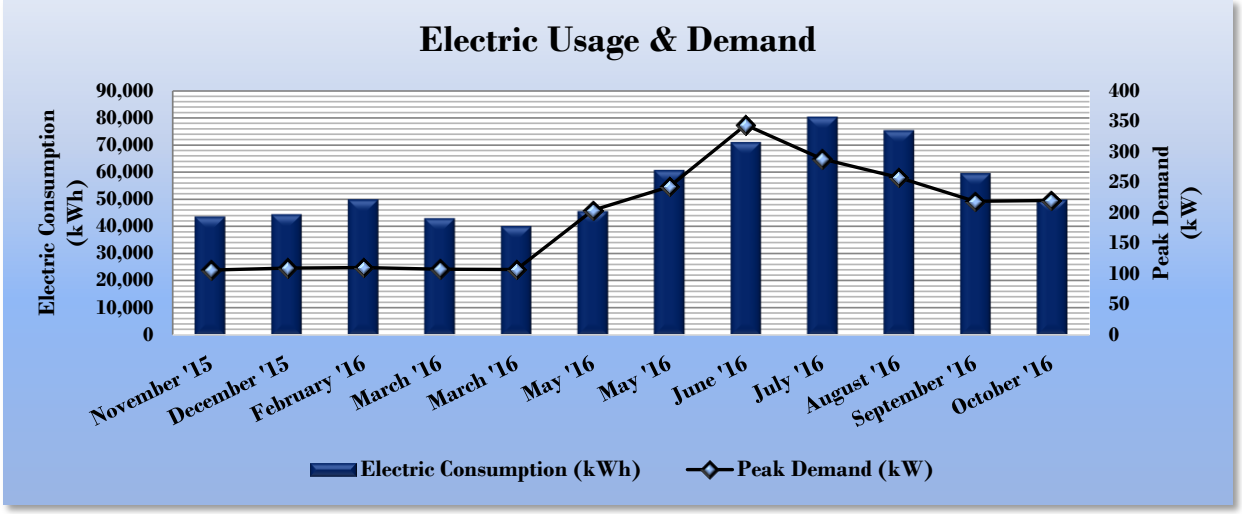


Figure 10 - Electric Usage & Demand

Electric Billing Data for NuView Academy Annex					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
12/15/15	32	43,706	106	$384	$5,258
1/15/16	30	44,499	109	$396	$5,294
2/16/16	31	49,949	111	$401	$5,730
3/16/16	28	43,039	107	$391	$5,569
4/15/16	29	40,157	107	$392	$4,046
5/18/16	32	45,651	204	$749	$5,849
6/15/16	27	60,756	243	$3,009	$9,759
7/15/16	29	71,000	344	$4,259	$11,913
8/15/16	30	80,314	288	$3,571	$12,249
9/14/16	29	75,400	258	$3,218	$4,331
10/13/16	28	59,580	219	$816	$1,718
11/11/16	28	49,839	221	$821	$1,559
Totals	**353**	**663,890**	**344**	**$18,406**	**$73,276**
Annual	**365**	**686,458**	**344**	**$19,031**	**$75,767**

3.3 Natural Gas Usage

Natural gas is provided by PSE&G. The average gas cost for the past 12 months is $0.828/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

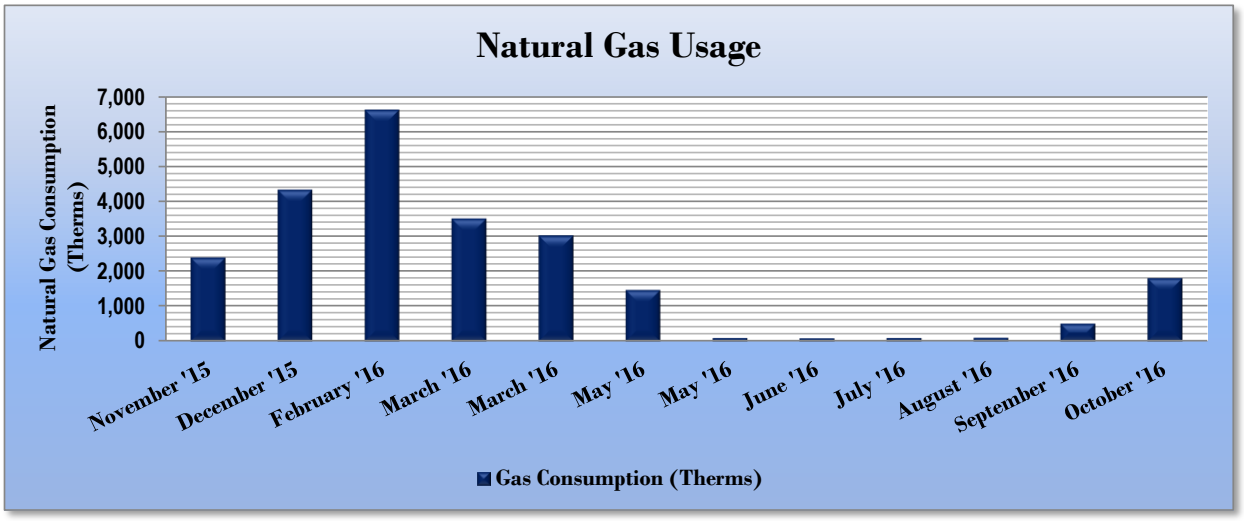


Figure 12 - Natural Gas Usage

Gas Billing Data for NuView Academy Annex			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
12/15/15	32	2,388	$2,350
1/15/16	30	4,324	$3,559
2/16/16	31	6,598	$5,048
3/16/16	28	3,498	$3,020
4/15/16	29	3,020	$1,826
5/18/16	32	1,462	$932
6/15/16	27	91	$159
7/15/16	29	88	$157
8/15/16	30	90	$158
9/14/16	29	103	$165
10/13/16	28	500	$392
11/11/16	28	1,805	$2,069
Totals	**353**	**23,967**	**$19,834**
Annual	**365**	**24,782**	**$20,508**

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		
	NuView Academy Annex	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	183.7	141.4
Site Energy Use Intensity (kBtu/ft^2)	88.9	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		
	NuView Academy Annex	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	144.0	141.4
Site Energy Use Intensity (kBtu/ft^2)	76.3	58.2

Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. This facility produced a score of 29 which seems low for a building of this type and age. The low score will be investigated further by TRC.

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

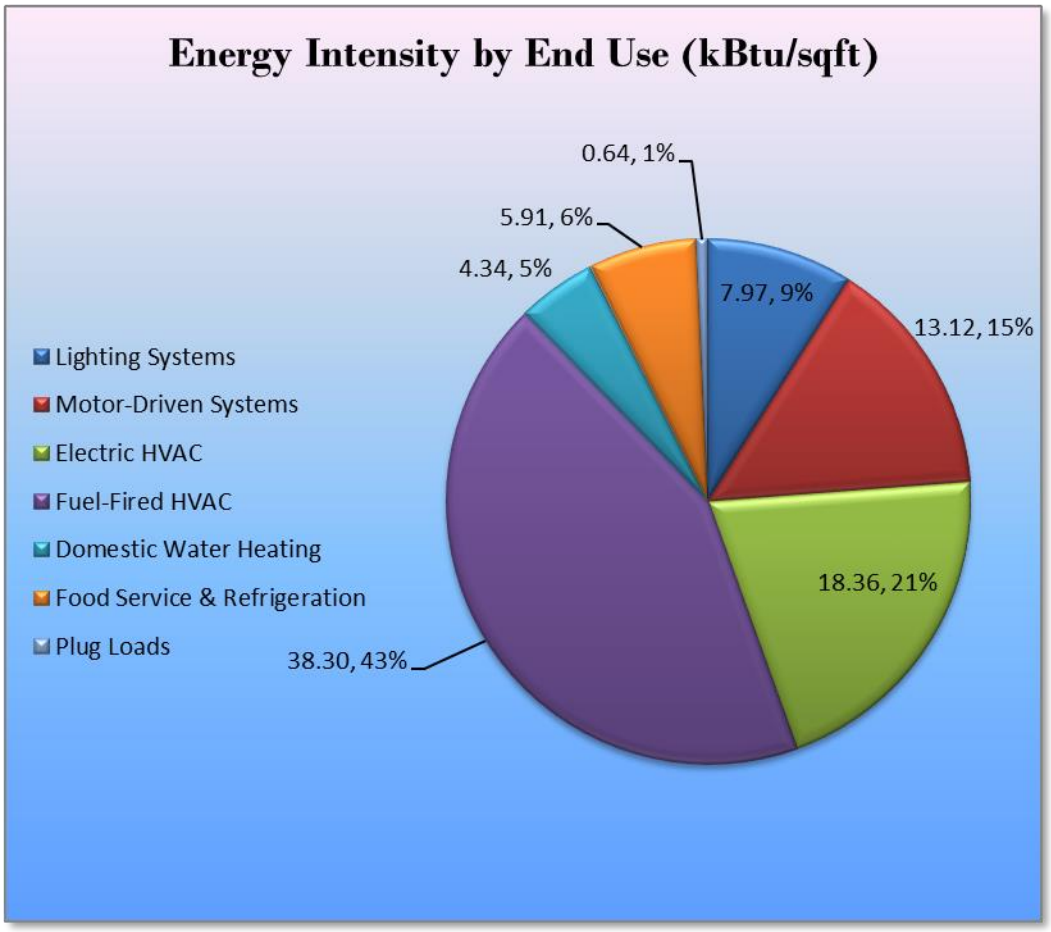
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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

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		**75,312**	**22.0**	**0.0**	**$8,312.46**	**$93,552.17**	**$5,155.00**	**$88,397.17**	**10.6**	**75,838**
ECM 1	Install LED Fixtures	15,952	5.9	0.0	$1,760.65	$47,688.96	$385.00	$47,303.96	26.9	16,063
ECM 2	Retrofit Fixtures with LED Lamps	59,360	16.1	0.0	$6,551.81	$45,863.22	$4,770.00	$41,093.22	6.3	59,775
Lighting Control Measures		**17,429**	**4.6**	**0.0**	**$1,923.71**	**$22,350.00**	**$4,055.00**	**$18,295.00**	**9.5**	**17,551**
ECM 3	Install Occupancy Sensor Lighting Controls	17,429	4.6	0.0	$1,923.71	$22,350.00	$4,055.00	$18,295.00	9.5	17,551
Variable Frequency Drive (VFD) Measures		**2,345**	**1.9**	**0.0**	**$258.81**	**$5,194.45**	**$0.00**	**$5,194.45**	**20.1**	**2,361**
ECM 4	Install VFDs on Hot Water Pumps	2,345	1.9	0.0	$258.81	$5,194.45	$0.00	$5,194.45	20.1	2,361
Electric Chiller Replacement		**102,920**	**91.5**	**0.0**	**$11,359.66**	**$193,772.57**	**$18,400.00**	**$175,372.57**	**15.4**	**103,639**
ECM 5	Install High Efficiency Chillers	102,920	91.5	0.0	$11,359.66	$193,772.57	$18,400.00	$175,372.57	15.4	103,639
Food Service Equipment & Refrigeration Measures		**2,886**	**0.2**	**0.0**	**$318.52**	**$909.90**	**$120.00**	**$789.90**	**2.5**	**2,906**
ECM 6	Refrigerator/Freezer Case Electrically Commutated Motors	2,886	0.2	0.0	$318.52	$909.90	$120.00	$789.90	2.5	2,906
TOTALS		**200,891**	**120.2**	**0.0**	**$22,173.17**	**$315,779.09**	**$27,730.00**	**$288,049.09**	**13.0**	**202,296**

* - 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		**75,312**	**22.0**	**0.0**	**$8,312.46**	**$93,552.17**	**$5,155.00**	**$88,397.17**	**10.6**	**75,838**
ECM 1	Install LED Fixtures	15,952	5.9	0.0	$1,760.65	$47,688.96	$385.00	$47,303.96	26.9	16,063
ECM 2	Retrofit Fixtures with LED Lamps	59,360	16.1	0.0	$6,551.81	$45,863.22	$4,770.00	$41,093.22	6.3	59,775

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	9,209	2.4	0.0	$1,016.46	$4,603.26	$60.00	$4,543.26	4.5	9,274
Exterior	6,742	3.5	0.0	$744.19	$43,085.70	$325.00	$42,760.70	57.5	6,790

Measure Description

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

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

ECM 2: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	59,360	16.1	0.0	$6,551.81	$45,863.22	$4,770.00	$41,093.22	6.3	59,775
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.

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		**17,429**	**4.6**	**0.0**	**$1,923.71**	**$22,350.00**	**$4,055.00**	**$18,295.00**	**9.5**	**17,551**
ECM 3	Install Occupancy Sensor Lighting Controls	17,429	4.6	0.0	$1,923.71	$22,350.00	$4,055.00	$18,295.00	9.5	17,551

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

ECM 3: Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
17,429	4.6	0.0	$1,923.71	$22,350.00	$4,055.00	$18,295.00	9.5	17,551

Measure Description

We recommend installing occupancy sensors to control lighting fixtures for all that are currently controlled by manual switches in all restrooms, storage rooms, classrooms, and offices areas. 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		**2,345**	**1.9**	**0.0**	**$258.81**	**$5,194.45**	**$0.00**	**$5,194.45**	**20.1**	**2,361**
ECM 4	Install VFDs on Hot Water Pumps	2,345	1.9	0.0	$258.81	$5,194.45	$0.00	$5,194.45	20.1	2,361

ECM 4: 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)
2,345	1.9	0.0	$258.81	$5,194.45	$0.00	$5,194.45	20.1	2,361

Measure Description

We recommend installing a variable frequency drives (VFD) to control the 15 hp heating hot water (HHW) pump. 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 2-way valves are not currently present, additional work (and cost) will be required to reconfigure the system.

ECM 5: Install High Efficiency Chiller

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)
102,920	91.5	0.0	$11,359.66	$193,772.57	$18,400.00	$175,372.57	15.4	103,639

Measure Description

We recommend replacing the older inefficient electric chiller with a new high efficiency chiller. The type of chiller to be installed depends on the magnitude of the cooling load and variability of the cooling load profile. Since there is a variation in the cooling load, we recommend replacing the chiller with a variable speed chiller which is more efficient for variable cooling load profiles. In any given size range, variable speed chillers tend to have better partial load efficiency, but worse full load efficiency, than constant speed chillers.

The savings result from the improvement in chiller efficiency and matching the right type of chiller to the cooling load. The energy savings associated with this measure is based on the cooling capacity of the new chiller, the improvement in efficiency compared with the base case equipment, the cooling load profile, and the estimated annual operating hours of the chiller before and after the upgrade. Energy savings are maximized by proper selection of new equipment based on the cooling load profile.

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		**2,886**	**0.2**	**0.0**	**$318.52**	**$909.90**	**$120.00**	**$789.90**	**2.5**	**2,906**
ECM 6	Refrigerator/Freezer Case Electrically Commutated Motors	2,886	0.2	0.0	$318.52	$909.90	$120.00	$789.90	2.5	2,906

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)
2,886	0.2	0.0	$318.52	$909.90	$120.00	$789.90	2.5	2,906

Measure Description

We recommend replacing shaded pole or permanent split capacitor (PSC) motors with electronically commutated (EC) motors in existing walk-in 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.

4.2 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	*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)
Electric Unitary HVAC Measures		**16,676**	**24.1**	**0.0**	**$1,840.65**	**$86,166.45**	**$2,925.00**	**$83,241.45**	**45.2**	**16,793**
Install High Efficiency Packaged Terminal AC/HP	No	16,676	24.1	0.0	$1,840.65	$86,166.45	$2,925.00	$83,241.45	45.2	16,793
TOTALS		**16,676**	**24.1**	**0.0**	**$1,840.65**	**$86,166.45**	**$2,925.00**	**$83,241.45**	**45.2**	**16,793**

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

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

Install High Efficiency PTAC/PTHP

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)
16,676	24.1	0.0	$1,840.65	$86,166.45	$2,925.00	$83,241.45	45.2	16,793

Measure Description

We evaluated replacing the unit ventilators in the classrooms with high efficiency packaged terminal air conditioners and heat pumps (PTAC and PTHP). 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 and a higher HPSF rating indicates more efficient heating mode for heat pumps. 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 heating and cooling loads, and the estimated annual operating hours.

Reasons for not Recommending

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

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.

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.

Assess Chillers & Request Tune-Ups

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

Clean Evaporator/Condenser Coils on AC Systems

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

Clean and/or Replace HVAC Filters

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

Perform Proper Boiler Maintenance

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

Perform Proper Water Heater Maintenance

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

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

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

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

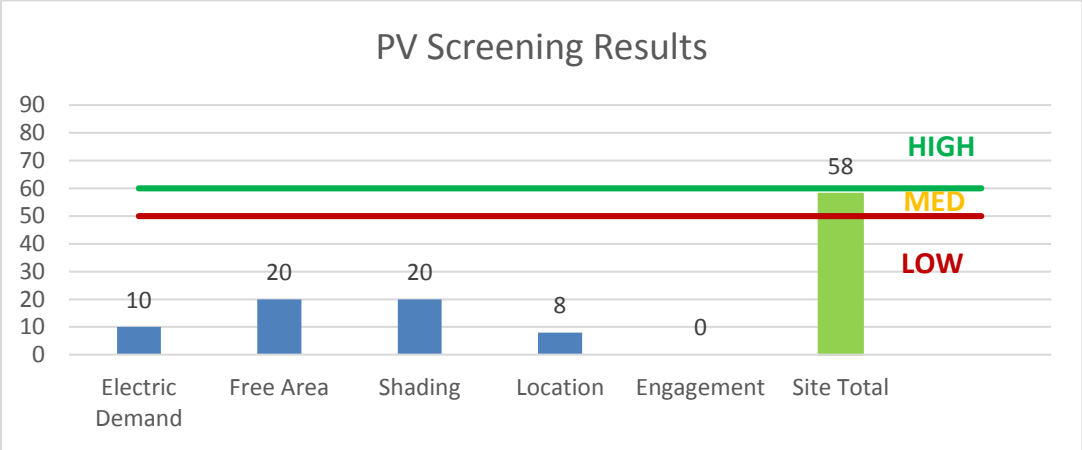
Preliminary screenings were performed to determine the potential that a generation project could provide a cost-effective solution for your facility. Before making a decision to implement, a feasibility study should be conducted that would take a detailed look at existing energy profiles, siting, interconnection,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

6.1 Photovoltaic

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

A preliminary screening based on the facility's electric demand, size and location of free area, and shading elements shows that the facility has a medium potential for installing a PV array. A PV array located on the roof of the main building/ground next to the building/over the main parking lot may be feasible. If NuView Academy Annex is interested in pursuing the installation of PV, we recommended a full feasibility study be conducted.

Figure 22 - Photovoltaic Screening



Potential	Medium	
System Potential	100	kW DC STC
Electric Generation	119,137	kWh/yr
Displaced Cost	$10,360	/yr
Installed Cost	$390,000	

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 8.2 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 DEMAND RESPONSE

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

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

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

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

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

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

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

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 23 for a list of the eligible programs identified for each recommended ECM.

Figure 23 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Install LED Fixtures	x					
ECM 2	Retrofit Fixtures with LED Lamps	x					
ECM 3	Install Occupancy Sensor Lighting Controls	x					
ECM 4	Install VFDs on Chilled Water Pumps	x					
ECM 5	Install VFDs on Hot Water Pumps						
ECM 6	Refrigerator/Freezer Case Electrically Commutated Motors						

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

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

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

8.1 SmartStart

Overview

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

Equipment with Prescriptive Incentives Currently Available:

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

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

Incentives

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

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

How to Participate

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

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

8.2 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).

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

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

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

8.3 Energy Savings Improvement Program

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

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

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

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

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

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

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

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

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

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

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

9.2 Retail Natural Gas Supply Options

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

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

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

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

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
RmD3 Boiler Rm	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	500	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	350	0.49	432	0.0	$47.64	$1,018.40	$200.00	17.18
RmD3 Boiler Rm	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic Floor	12	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,200	Relamp	Yes	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,540	0.17	663	0.0	$73.22	$546.80	$80.00	6.38
Corridor C	8	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	None	No	8	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Corridor C	60	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,200	Relamp	Yes	60	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,540	0.86	3,317	0.0	$366.09	$3,234.00	$440.00	7.63
Rm C1	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.33	1,266	0.0	$139.73	$818.00	$140.00	4.85
Rm C1 - Bath	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,200	Relamp	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,540	0.01	55	0.0	$6.10	$151.90	$25.00	20.80
Rm C2	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.33	1,266	0.0	$139.73	$818.00	$140.00	4.85
Rm C2 - Bath	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,200	Relamp	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,540	0.01	55	0.0	$6.10	$151.90	$25.00	20.80
Rm C3	16	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	16	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,540	0.41	1,575	0.0	$173.80	$1,551.20	$70.00	8.52
Rm C3	2	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	None	No	2	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm C3	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.03	106	0.0	$11.64	$174.50	$30.00	12.41
Rm C5	16	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	16	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,540	0.41	1,575	0.0	$173.80	$1,551.20	$70.00	8.52
Rm C5	2	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	None	No	2	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm C5	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.03	106	0.0	$11.64	$174.50	$30.00	12.41
Rm C6	16	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	16	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,540	0.41	1,575	0.0	$173.80	$1,551.20	$70.00	8.52
Rm C6	2	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	None	No	2	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm C6	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.03	106	0.0	$11.64	$174.50	$30.00	12.41
Rm C8	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,540	0.08	295	0.0	$32.59	#VALUE!	$0.00	#VALUE!
Corridor C	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm C10	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.03	106	0.0	$11.64	$174.50	$30.00	12.41
Rm C9	1	Incandescent: screw in	Wall Switch	60	2,200	Relamp	No	1	LED Screw-In Lamps: A19	Wall Switch	9	2,200	0.03	129	0.0	$14.24	$53.75	$5.00	3.42
Rm C7	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.08	317	0.0	$34.93	$291.50	$50.00	6.91
Rm F7	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.05	211	0.0	$23.29	$233.00	$40.00	8.29
Corridor F	29	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,200	None	Yes	29	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,540	0.08	319	0.0	$35.23	$400.00	$1,015.00	-17.46

	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
Corridor F	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Corridor G	12	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,200	Relamp	Yes	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,540	0.17	663	0.0	$73.22	$546.80	$80.00	6.38
Corridor G	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
TransportOH	26	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	26	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,540	0.66	2,559	0.0	$282.43	$2,183.20	$70.00	7.48
TransportOH	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mens Bath	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mens Bath	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.22	844	0.0	$93.16	$584.00	$100.00	5.20
Womens Bath	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Womens Bath	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.22	844	0.0	$93.16	$584.00	$100.00	5.20
Corridor B	6	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	None	No	6	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Corridor B	23	Linear Fluorescent - T8: 3' T8 (25W) - 1L	Wall Switch	27	2,200	Relamp	Yes	23	LED - Linear Tubes: (1) 3' Lamp	Occupancy Sensor	11	1,540	0.30	1,143	0.0	$126.21	$1,340.40	$70.00	10.07
Corridor B	8	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,200	Relamp	Yes	8	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,540	0.11	442	0.0	$48.81	$403.20	$60.00	7.03
Corridor B	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	500	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	350	0.05	48	0.0	$5.29	$233.00	$40.00	36.46
Rm B1	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.33	1,266	0.0	$139.73	$818.00	$140.00	4.85
Rm B2	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.33	1,266	0.0	$139.73	$818.00	$140.00	4.85
Rm B3	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.33	1,266	0.0	$139.73	$818.00	$140.00	4.85
Rm B4	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.33	1,266	0.0	$139.73	$818.00	$140.00	4.85
Rm B5	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.33	1,266	0.0	$139.73	$818.00	$140.00	4.85
Rm B6	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.33	1,266	0.0	$139.73	$818.00	$140.00	4.85
Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.11	422	0.0	$46.58	$350.00	$60.00	6.23
Quiet Room	2	Incandescent: screw in	Wall Switch	60	2,200	Relamp	No	2	LED Screw-In Lamps: A19	Wall Switch	9	2,200	0.07	258	0.0	$28.48	$107.51	$10.00	3.42
Corridor E	48	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,200	Relamp	Yes	48	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,540	0.69	2,653	0.0	$292.87	$2,533.20	$345.00	7.47
Corridor E	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Corridor E	4	Linear Fluorescent - T8: 3' T8 (25W) - 1L	Wall Switch	27	2,200	Relamp	Yes	4	LED - Linear Tubes: (1) 3' Lamp	Occupancy Sensor	11	1,540	0.05	199	0.0	$21.95	$255.20	$20.00	10.72

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Corridor E	1	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	None	No	1	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Men's Bath	1	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	None	No	1	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Men's Bath	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.14	528	0.0	$58.22	$408.50	$70.00	5.81
Men's Bath	2	Linear Fluorescent - T8: 3' T8 (25W) - 2L	Wall Switch	48	2,200	Relamp	Yes	2	LED - Linear Tubes: (2) 3' Lamps	Occupancy Sensor	21	1,540	0.04	168	0.0	$18.60	$222.80	$20.00	10.90
Women's Bath	1	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	None	No	1	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Women's Bath	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.14	528	0.0	$58.22	$408.50	$70.00	5.81
Women's Bath	2	Linear Fluorescent - T8: 3' T8 (25W) - 2L	Wall Switch	48	2,200	Relamp	Yes	2	LED - Linear Tubes: (2) 3' Lamps	Occupancy Sensor	21	1,540	0.04	168	0.0	$18.60	$222.80	$20.00	10.90
Rm E1	1	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	None	No	1	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm E2	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.08	317	0.0	$34.93	$291.50	$50.00	6.91
Rm E4	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.08	317	0.0	$34.93	$291.50	$50.00	6.91
Conf Room	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	6	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,540	0.15	591	0.0	$65.18	$919.20	$70.00	13.03
Mens Bath	12	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,200	Relamp	Yes	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,540	0.17	663	0.0	$73.22	$546.80	$80.00	6.38
Corridor E	4	LED Screw-In Lamps: screw in lamp	Wall Switch	9	2,200	None	No	4	LED Screw-In Lamps: screw in lamp	Wall Switch	9	2,200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Men's Bath	12	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,200	Relamp	Yes	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,540	0.17	663	0.0	$73.22	$546.80	$80.00	6.38
Media Center	3	Metal Halide: (1) 250W Lamp	Wall Switch	295	2,200	Fixture Replacement	Yes	3	LED - Fixtures: Downlight Recessed	Occupancy Sensor	46	1,540	0.52	1,995	0.0	$220.16	$929.35	$35.00	4.06
Media Center	6	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	None	No	6	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Media Center	5	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	5	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,540	0.13	492	0.0	$54.31	$856.00	$70.00	14.47
Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	500	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	350	0.05	48	0.0	$5.29	$233.00	$40.00	36.46
Conf. Rm	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.11	422	0.0	$46.58	$350.00	$60.00	6.23
Rm. F10	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.05	211	0.0	$23.29	$233.00	$40.00	8.29
OT/PT Rm	15	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	15	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,540	0.38	1,476	0.0	$162.94	$1,488.00	$70.00	8.70
Corridor F	35	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,200	Relamp	Yes	35	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,540	0.50	1,935	0.0	$213.55	$1,796.50	$245.00	7.27
Corridor F	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Corridor F	5	Metal Halide: (1) 250W Lamp	Wall Switch	295	2,200	Fixture Replacement	Yes	5	LED - Fixtures: Downlight Recessed	Occupancy Sensor	46	1,540	0.86	3,324	0.0	$366.93	$1,471.59	$45.00	3.89
Nurse Rm	11	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	11	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,540	0.28	1,083	0.0	$119.49	$1,235.20	$70.00	9.75

	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
Nurse Bath	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.03	106	0.0	$11.64	$174.50	$30.00	12.41
Corridor F	2	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	None	No	2	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Old Main Office	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.16	633	0.0	$69.87	$467.00	$80.00	5.54
Old Main Office	15	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	15	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,540	0.38	1,476	0.0	$162.94	$1,488.00	$70.00	8.70
Rm 8	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,540	0.05	197	0.0	$21.73	#VALUE!	$0.00	#VALUE!
Rm 5	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	6	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,540	0.15	591	0.0	$65.18	$919.20	$70.00	13.03
Non Public Office	15	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	15	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,540	0.38	1,476	0.0	$162.94	$1,488.00	$70.00	8.70
Testing Office	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	6	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,540	0.15	591	0.0	$65.18	$919.20	$70.00	13.03
Old Office-Supint	6	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	None	No	6	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Old Office-Supint	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Old Office-Supint	8	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,200	Relamp	Yes	8	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,540	0.11	442	0.0	$48.81	$403.20	$60.00	7.03
Directors Office	28	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	28	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,540	0.71	2,756	0.0	$304.15	$2,309.60	$70.00	7.36
Directors Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,200	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,540	0.16	633	0.0	$69.87	$416.80	$80.00	4.82
Directors Office	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Womens Bath	12	Linear Fluorescent - T8: 3' T8 (25W) - 1L	Wall Switch	27	2,200	Relamp	Yes	12	LED - Linear Tubes: (1) 3' Lamp	Occupancy Sensor	11	1,540	0.15	597	0.0	$65.85	$533.60	$20.00	7.80
Womens Bath	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,200	Relamp	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,540	0.03	111	0.0	$12.20	$187.80	$30.00	12.93
Exterior Perimeter	33	Metal Halide: (1) 100W Lamp	Daylight Dimming	128	1,100	Fixture Replacement	No	33	LED - Fixtures: Outdoor Porch Wall Mount	Daylight Dimming	46	1,100	1.77	3,423	0.0	$377.82	$24,740.10	$165.00	65.04
Cafeteria	12	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,200	None	Yes	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,540	0.03	132	0.0	$14.58	#VALUE!	$0.00	#VALUE!
Cafeteria	4	Metal Halide: (1) 400W Lamp	Wall Switch	458	2,200	Fixture Replacement	Yes	4	LED - Fixtures: Downlight Pendant	Occupancy Sensor	46	1,540	1.12	4,309	0.0	$475.61	$2,704.32	$55.00	5.57
Kitchen	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,200	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,540	0.62	2,374	0.0	$262.00	$1,398.00	$260.00	4.34
Kitchen	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.11	422	0.0	$46.58	$350.00	$60.00	6.23
Walk In Cooler	3	Linear Fluorescent - T12: 3' T12 (30W) - 1L	Wall Switch	46	2,200	Relamp	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,200	0.06	239	0.0	$26.39	$223.70	$20.00	7.72
Walk In Cooler	1	Incandescent: screw in	Wall Switch	60	2,200	Relamp	No	1	LED Screw-In Lamps: A19	Wall Switch	9	2,200	0.03	129	0.0	$14.24	$53.75	$5.00	3.42
Kitchen Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.05	211	0.0	$23.29	$233.00	$40.00	8.29
Kitchen Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.03	106	0.0	$11.64	$174.50	$30.00	12.41

	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 Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,200	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,540	0.08	317	0.0	$34.93	$266.40	$50.00	6.19
Rm E7	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.05	211	0.0	$23.29	$233.00	$40.00	8.29
Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	500	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	350	0.05	48	0.0	$5.29	$233.00	$40.00	36.46
Parking Lot	32	Metal Halide: (1) 100W Lamp	Daylight Dimming	128	1,100	Fixture Replacement	No	32	LED - Fixtures: Outdoor Post-Mount	Daylight Dimming	46	1,100	1.72	3,319	0.0	$366.37	$18,345.60	$160.00	49.64
Corridor E	24	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,200	None	Yes	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,540	0.07	264	0.0	$29.15	$400.00	$840.00	-15.09
Corridor E	28	Linear Fluorescent - T8: 3' T8 (25W) - 1L	Wall Switch	27	2,200	Relamp	Yes	28	LED - Linear Tubes: (1) 3' Lamp	Occupancy Sensor	11	1,540	0.36	1,392	0.0	$153.64	$1,514.40	$70.00	9.40
Corridor E	7	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	None	Yes	7	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Occupancy Sensor	26	1,540	0.04	138	0.0	$15.25	$200.00	$245.00	-2.95
Corridor E	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Corridor E	14	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,200	Relamp	Yes	14	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,540	0.20	774	0.0	$85.42	$1,042.60	$140.00	10.57
Men's Bath	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.08	317	0.0	$34.93	$291.50	$50.00	6.91
Men's Bath	3	Linear Fluorescent - T8: 3' T8 (25W) - 2L	Wall Switch	48	2,200	Relamp	Yes	3	LED - Linear Tubes: (2) 3' Lamps	Occupancy Sensor	21	1,540	0.07	253	0.0	$27.90	$276.20	$20.00	9.18
Women's Bath	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.14	528	0.0	$58.22	$408.50	$70.00	5.81
Women's Bath	3	Linear Fluorescent - T8: 3' T8 (25W) - 2L	Wall Switch	48	2,200	Relamp	Yes	3	LED - Linear Tubes: (2) 3' Lamps	Occupancy Sensor	21	1,540	0.07	253	0.0	$27.90	$276.20	$20.00	9.18
Rm BBLC	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,540	Relamp	No	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,540	0.82	2,216	0.0	$244.54	$1,052.80	$210.00	3.45
Womens Restroom	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.14	528	0.0	$58.22	$408.50	$70.00	5.81
Womens Restroom	3	Linear Fluorescent - T8: 3' T8 (25W) - 3L	Wall Switch	68	2,200	Relamp	Yes	3	LED - Linear Tubes: (3) 3' Lamps	Occupancy Sensor	32	1,540	0.09	349	0.0	$38.49	$321.50	$20.00	7.83
Rm BBLC	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	1,540	Relamp	No	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,540	0.08	205	0.0	$22.67	$252.80	$0.00	11.15
Rm D2	12	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	None	Yes	12	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Occupancy Sensor	26	1,540	0.06	237	0.0	$26.14	$116.00	$20.00	3.67
Cafeteria	38	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	None	Yes	38	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Occupancy Sensor	26	1,540	0.19	750	0.0	$82.77	$540.00	$70.00	5.68
Cafeteria	33	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,200	Relamp	Yes	33	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,540	0.47	1,824	0.0	$201.35	$1,724.70	$235.00	7.40
Cafeteria	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm E5	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	None	No	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm E5	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	1,540	Relamp	No	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,540	0.08	205	0.0	$22.67	$252.80	$0.00	11.15
Rm E8	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,200	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,540	0.12	475	0.0	$52.40	$341.60	$65.00	5.28
Rm E10	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.08	317	0.0	$34.93	$291.50	$50.00	6.91

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
IT Room	8	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	1,540	Relamp	No	8	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,540	0.15	411	0.0	$45.35	$505.60	$0.00	11.15
Counselor Office	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,540	None	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,540	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Corridor A	6	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	None	No	6	Compact Fluorescent: CFL 4-pin-2 lamp (13W)	Wall Switch	26	2,200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Corridor A	23	Linear Fluorescent - T8: 3' T8 (25W) - 1L	Wall Switch	27	2,200	Relamp	Yes	23	LED - Linear Tubes: (1) 3' Lamp	Occupancy Sensor	11	1,540	0.30	1,143	0.0	$126.21	$1,340.40	$70.00	10.07
Corridor A	8	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,200	Relamp	Yes	8	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,540	0.11	442	0.0	$48.81	$403.20	$60.00	7.03
Corridor A	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm A1	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.33	1,266	0.0	$139.73	$818.00	$140.00	4.85
Rm A2	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.33	1,266	0.0	$139.73	$818.00	$140.00	4.85
Rm A3	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.33	1,266	0.0	$139.73	$818.00	$140.00	4.85
Rm A4	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.33	1,266	0.0	$139.73	$818.00	$140.00	4.85
Rm A5	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.33	1,266	0.0	$139.73	$818.00	$140.00	4.85
Rm A6	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,200	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,540	0.33	1,266	0.0	$139.73	$818.00	$140.00	4.85
Office	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,200	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,540	0.25	950	0.0	$104.80	$567.20	$110.00	4.36
Quiet Room	2	Incandescent: screw in	Wall Switch	60	2,200	Relamp	No	2	LED Screw-In Lamps: A19	Wall Switch	9	2,200	0.07	258	0.0	$28.48	$107.51	$10.00	3.42

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
Mezzanine	AHU-1 (Cafeteria)	1	Supply Fan	10.0	89.5%	No	2,200	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mezzanine	AHU-2 (Business Offices)	1	Supply Fan	7.5	89.5%	No	2,200	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mezzanine	AHU-3 (Gymnasium)	1	Supply Fan	40.0	93.0%	No	2,200	No	93.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mezzanine	AHU-4 (Counseling & Halls)	1	Supply Fan	30.0	92.4%	No	2,200	No	92.4%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mezzanine	AHU-5 (Principal & Secretary)	1	Supply Fan	5.0	87.5%	No	2,200	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mezzanine	AHU-6 (Resource Room)	1	Supply Fan	7.5	89.5%	No	2,200	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mezzanine	AHU-7 (Counseling Ed)	1	Supply Fan	7.5	89.5%	No	2,200	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mezzanine	AHU-8 (Old Woodshop)	1	Supply Fan	7.5	89.5%	No	2,200	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classrooms	Classrooms	18	Ventilation Fan	0.1	82.5%	No	2,200	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classrooms	Classrooms	18	Exhaust Fan	0.3	82.5%	No	2,200	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	HWP-1	1	Heating Hot Water Pump	15.0	93.0%	No	430	No	93.0%	Yes	1	1.93	2,401	0.0	$264.97	$5,194.45	$0.00	19.60
Mechanical Room	CHWP-4	1	Chilled Water Pump	15.0	93.0%	No	1,144	No	93.0%	Yes	1	1.93	6,387	0.0	$704.95	$5,194.45	$0.00	7.37
Roof	Kitchen	1	Exhaust Fan	2.0	87.5%	No	2,200	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	restrooms	8	Exhaust Fan	1.0	87.5%	No	2,200	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Kitchen	1	Makeup Air Fan	1.0	87.5%	No	2,200	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Mechanical Room	1	Ventilation Fan	0.5	87.5%	No	2,200	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Backup HHW or CHW Pump	1	Heating Hot Water Pump	15.0	93.0%	No	0	No	93.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Classrooms	Classrooms	18	Through-The-Wall AC	2.50		Yes	18	Packaged Terminal AC	2.50		12.00		No	12.00	16,965	0.0	$1,872.49	$86,166.45	$2,925.00	44.45

Electric Chiller Inventory & Recommendations

		Existing Conditions			Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Chiller Quantity	System Type	Cooling Capacity per Unit (Tons)	Install High Efficiency Chillers?	Chiller Quantity	System Type	Constant/ Variable Speed	Cooling Capacity (Tons)	Full Load Efficiency (kW/Ton)	IPLV Efficiency (kW/Ton)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Ground Floor (Outdoor)	Building	1	Air-Cooled Screw Chiller	100.00	No							0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Rm D3 (Boiler Rm)	B-1 (serves building)	1	Non-Condensing Hot Water Boiler	2,150.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm D3 (Boiler Rm)	B-2 (serves building)	1	Non-Condensing Hot Water Boiler	2,150.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

DHW Inventory & Recommendations

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

Reach-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions		Proposed Conditions					Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Energy Efficient Doors?	Install Door Heater Control?	Install Aluminum Night Covers?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Medium Temp Freezer (0F to 30F)	Yes	No	No	No	No	0.00	1,305	0.0	$144.00	$303.30	$40.00	1.83

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	0.20	1,581	0.0	$174.53	$606.60	$80.00	3.02

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)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Gas Griddle (4 Feet Width)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Gas Griddle (4 Feet Width)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
School	35	Desktop Computers	110.0	Yes
School	7	Microwave	850.0	No
School	5	Copy Machines	1,400.0	Yes
School	20	Small Printers	46.0	Yes
School	9	Printers	465.0	Yes
School	4	Coffee Machine	950.0	Yes

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

NuView Academy Annex

Primary Property Type: K-12 School
Gross Floor Area (ft²): 54,200
Built: 1995

For Year Ending: July 31, 2016
Date Generated: May 30, 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
NuView Academy Annex 1690 Stelton Road Piscataway, New Jersey 08854	_____ , (___)___-_____	____ _____ , (___)___-_____ _____

Property ID: 5857455

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
86 kBtu/ft²

Source EUI
177.7 kBtu/ft²

Annual Energy by Fuel

Natural Gas (kBtu)	2,396,695 (51%)
Electric - Grid (kBtu)	2,265,193 (49%)

National Median Comparison

National Median Site EUI (kBtu/ft²)	71.7
National Median Source EUI (kBtu/ft²)	148.1
% Diff from National Median Source EUI	20%

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO2e/year)	387

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)