Local Government Energy Audit:
Energy Audit Report

NuView Academy

Educational Services Commission of New Jersey
1 Park Avenue
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. 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 is a 23,000 square foot facility comprised of various space types within a single building. The building is two (2) stories and includes classrooms, offices, a gymnasium, and a basic cafeteria.

Lighting consists of aging and inefficient fluorescent fixtures containing 32-Watt linear and U-tube T8 lamps. Heating and cooling is supplied by three (3) rooftop package units (RTUs) using electricity for cooling and natural gas for heating. RTU cooling capacities range in size from 15 tons to 36 tons. Variable air volume (VAV) boxes throughout the facility provide additional heating through hot water coils. A 638 MBh natural gas-fired-boiler generates hot water. 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 four (4) measures which together represent an opportunity to reduce annual energy costs by $6,110 and annual greenhouse gas emissions by 43,455 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 8 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's annual energy use by 6%.

Figure 1 – Previous 12 Month Utility Costs

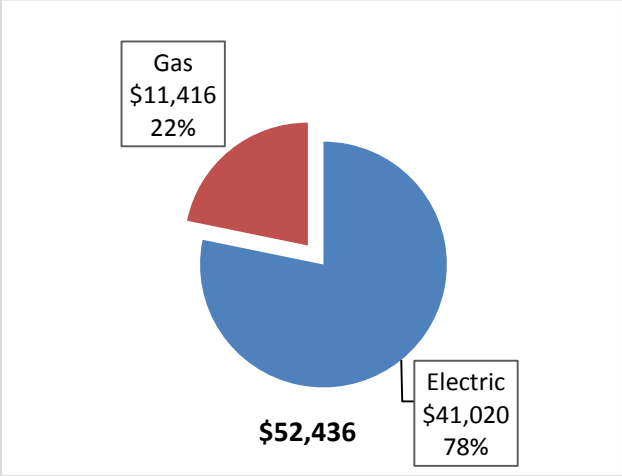
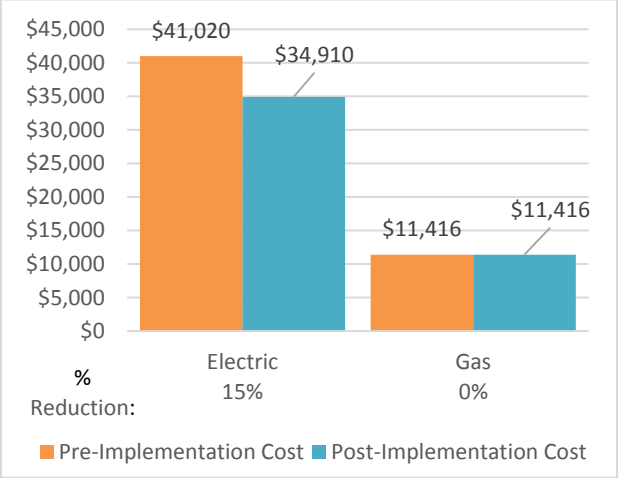


Figure 2 – Potential Post-Implementation Costs



A detailed description of NuView Academy's existing energy use can be found in Section 3.

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

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**17,126**	**6.2**	**0.0**	**$2,424.72**	**$36,905.12**	**$4,015.00**	**$32,890.12**	**13.6**	**17,246**
	Install LED Fixtures	No	1,164	0.6	0.0	$164.77	$21,482.92	$1,100.00	$20,382.92	123.7	1,172
ECM 1	Retrofit Fixtures with LED Lamps	Yes	15,962	5.6	0.0	$2,259.94	$15,422.20	$2,915.00	$12,507.20	5.5	16,074
Lighting Control Measures			**380**	**0.1**	**0.0**	**$53.76**	**$270.00**	**$35.00**	**$235.00**	**4.4**	**382**
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	380	0.1	0.0	$53.76	$270.00	$35.00	$235.00	4.4	382
Variable Frequency Drive (VFD) Measures			**25,648**	**9.4**	**0.0**	**$3,631.33**	**$18,575.46**	**$2,632.00**	**$15,943.46**	**4.4**	**25,828**
ECM 3	Install VFDs on Constant Volume (CV) HVAC	Yes	24,345	9.1	0.0	$3,446.82	$13,117.75	$2,632.00	$10,485.75	3.0	24,515
ECM 4	Install VFDs on Hot Water Pumps	Yes	1,303	0.4	0.0	$184.51	$5,457.71	$0.00	$5,457.71	29.6	1,312
TOTALS (Recommended)			**41,990**	**15.2**	**0.0**	**$5,945.03**	**$34,267.66**	**$5,582.00**	**$28,685.66**	**4.8**	**42,284**
TOTALS (All)			**43,154**	**15.7**	**0.0**	**$6,109.81**	**$55,750.58**	**$6,682.00**	**$49,068.58**	**8.0**	**43,455**

* - 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.

Energy Efficient Practices

TRC also identified 12 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 include:

- Close Doors and Windows
- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Perform Routine Motor Maintenance
- Use Fans to Reduce Cooling Load
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Check for and Seal Duct Leakage
- Perform Proper Boiler Maintenance
- Perform Proper 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. Based on the configuration of the site and its loads there is a low potential for installing PV and combined heat and power self-generation measures. For details on our evaluation and on-site generation potential, please refer to Section 6.

1.3 Implementation Planning

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

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

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

- SmartStart
- Direct Install
- Energy Savings Improvement Program (ESIP)

For facilities wanting to pursue only selected individual measures (or planning to phase implementation of selected measures over multiple years), incentives are available through the SmartStart program. To participate in this program you may utilize internal resources, or an outside firm or contractor, to do the final design of the ECM(s) and do the installation. Program pre-approval is required for some SmartStart

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

This facility may also qualify for the Direct Install program which can provide turnkey installation of multiple measures, through an authorized network of participating contractors. This program can provide substantially higher incentives than SmartStart, up to 70% of the cost of selected measures, although measure eligibility will have to be assessed and be verified by the designated Direct Install contractor and, in most cases, they will perform the installation work.

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 4 – 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	Project Engineer	(732) 855-0033

2.2 General Site Information

On March 22, 2017, TRC performed an energy audit at NuView Academy located in Piscataway, New Jersey. TRC's team met with Patrick Moran, Business Manager to review the facility operations and help focus our investigation on specific energy-using systems.

NuView Academy is a 23,000 square foot facility comprised of various space types within a single building. The building is two (2) stories and includes classrooms, offices, a gymnasium, and a basic cafeteria. The building was constructed in 2007.

2.3 Building Occupancy

The school building is open Monday through Friday. The typical schedule is presented in the table below. The facility is used year round with breaks in the spring and summer. During a typical day, the facility is occupied by approximately 125 staff and students.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
NuView Academy	Weekday	7:30 AM - 5:30 PM
NuView Academy	Weekend	Closed

2.4 Building Envelope

The building is constructed of concrete block, and structural steel with a brick façade. The roof pitched and covered 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 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 at the facility is provided mostly by 32-Watt linear and U-tube fluorescent T8 lamps with electronic ballasts as well as some compact fluorescent lamps (CFL). Most of the fixtures are 2-lamp or 3-lamp, 4-foot long troffers with diffusers.

Supplemental lighting in the corridors and the gym is provided by 32-Watt 4-pin CFLs. Additionally, the gym uses sport fixtures with six (6) CFL lamps in each.

Lighting control in most spaces is provided by occupancy sensors. The occupancy sensors are either wall- or ceiling-mounted depending on the space layout. Fixtures in the entrances, corridors, and gym are manually controlled with wall switches.

Exterior lighting primarily consists of wall-mounted 32-Watt compact florescent fixtures and pole mounted 100 Watt metal halide parking lot fixtures. The exterior fixtures are controlled by photocells.

Hot Water Heating System

The heating hot water system consists of one (1) Laars 638 kBtu/hr output non-condensing forced draft boiler with a nominal combustion efficiency of 84% and a 0.3 hp forced draft fan. The boiler is configured in a constant flow primary distribution with two (2) 2 hp hot water pumps, one (1) of which is redundant. The boiler provides hot water to the variable air volume reheat boxes throughout the building. The boiler is in good condition and is well maintained.

Direct Expansion Air Conditioning System (DX)

Three (3) Carrier direct-expansion (DX) package roof top units (RTU-1, -2, & -3) with gas-fired furnaces and outside air economizers condition the building. RTU-1 provides conditioning to the north end of the building, RTU-2 provides conditioning to the gym, and RTU-3 provides conditioning to the south end of the building. The units are located on the center of the roof.

RTU-1 and RTU-3 provide conditioned air, each with one (1) 15 hp supply fan and four (4) 1 hp exhaust fans. RTU-1 provides 30 tons of cooling and RTU-3 provides 36 tons of cooling. Each unit has four (4) scroll compressors and DX coils that are staged based on building demand. The units have an outside air economizer to utilize free cooling when the outside air temperature is lower than the return air temperature. The gas-fired furnaces provide heating as needed. The units provide conditioned air to variable air volume (VAV) reheat boxes throughout the building, however, the supply air fans operate a constant speed. The VAV boxes condition air as needed to meet space temperature setpoints.

RTU-2 provides constant air volume, with a single 3 hp supply fan. The unit provides 15 tons of cooling, has two (2) scroll compressors and DX coils that are staged based on demand in the gym. The unit has an outside air economizer to utilize free cooling when the outside air temperature is lower than the return air temperature. The gas-fired furnace provides heating as needed.

All of the RTUs are controlled by the building energy management system (BEMS). Thermostats in the zones dictate VAV box function.

A 12 ton Carrier cooling only split system with 100% return air is used to condition the data room. The fan and evaporator are located in the room. The compressor and condensing unit are located on the roof. The unit continuously provides cooling air.

The Carrier unit is manually controlled by a thermostat located in zone. The unit operates on demand to maintain a space temperature setpoint.

Building Energy Management System (EMS)

The majority of the facility is controlled with an Automated Logic building energy management system (BEMS). The BEMS aggregates the DDC points from throughout the building. Nearly all of the building zones are DDC and the remainder are stand-alone and not tied into the BEMS.

Domestic Hot Water Heating System

The domestic hot water heating system consists of one (1) AO Smith gas-fired water heater with an input rating of 305 kBtu/hr and a nominal efficiency of 80%. The water heater has a 65-gallon storage tank. One (1) recirculation pump distributes water throughout the entire building. The recirculation pumps operate continuously.

Food Service & Laundry Equipment

The school has a basic kitchen that is used to warm lunches for the students and staff. The warming is done using the two (2) natural gas convection ovens. The kitchen also has two (2) double door Victory refrigerators that are kept at 35°F.

Building Plug Load

There are 17 desktop computers with LCD monitors throughout the school. There is no centralized PC power management software installed. Additional plug load equipment includes printers, copy machines, coffee machines, and refrigerators.

2.7 Water-Using Systems

There are four (4)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 2.0 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

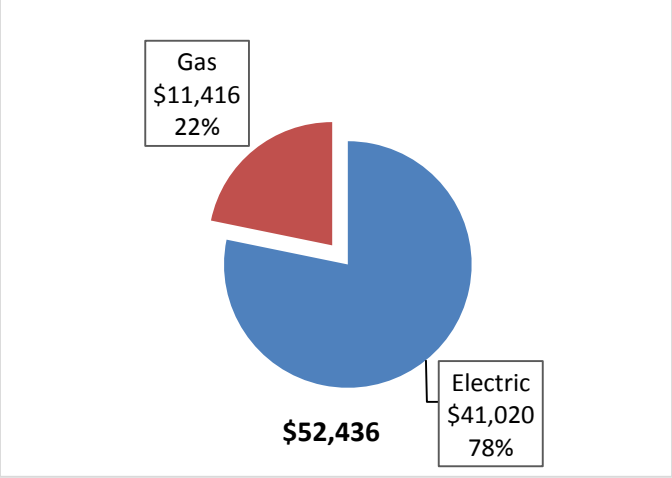
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 6 - Utility Summary

Utility Summary for NuView Academy		
Fuel	**Usage**	**Cost**
Electricity	289,725 kWh	$41,020
Natural Gas	13,581 Therms	$11,416
Total		**$52,436**

The current annual energy cost for this facility is $52,436 as shown in the chart below.

Figure 7 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by PSE&G. The average electric cost over the past 12 months was $0.142/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The monthly electricity consumption and peak demand are shown in the chart below and demonstrate a load profile reflective of electric cooling and gas heating.

Figure 8 - Electric Usage & Demand

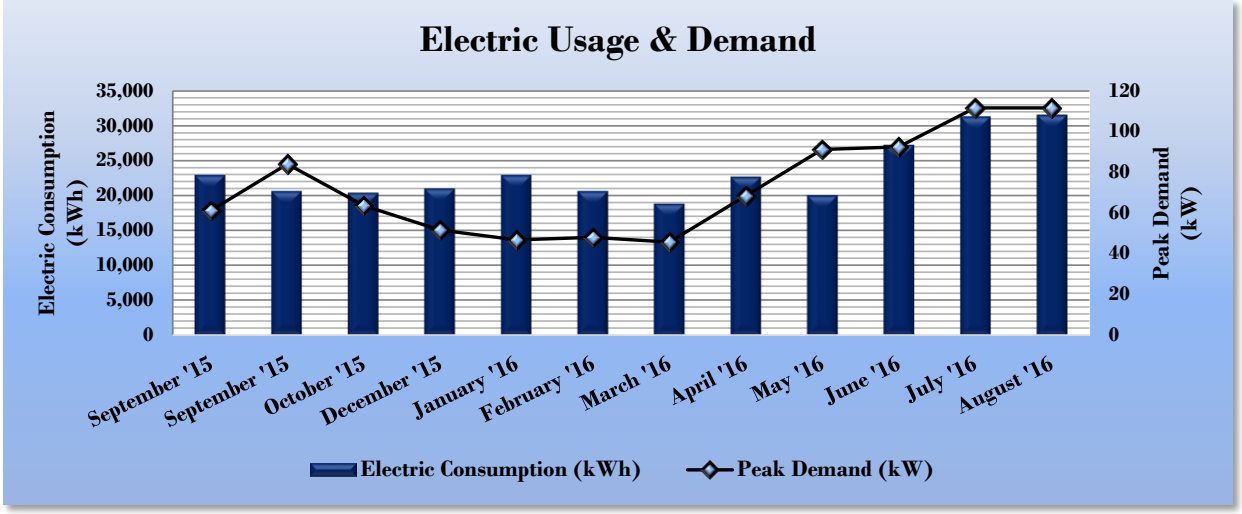


Figure 9 - Electric Usage & Demand

Electric Billing Data for NuView Academy					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
9/16/15	29	22,920	61	$761	$3,690
10/15/15	28	20,640	84	$366	$2,857
11/13/15	28	20,400	64	$277	$2,728
12/16/15	32	21,000	52	$225	$2,674
1/19/16	33	22,920	47	$204	$2,771
2/17/16	28	20,640	48	$209	$2,529
3/19/16	30	18,840	46	$200	$2,300
4/18/16	29	22,680	68	$301	$2,829
5/17/16	28	20,040	91	$402	$2,636
6/16/16	29	27,240	92	$1,187	$4,381
7/18/16	31	31,320	112	$1,404	$5,123
8/16/16	28	31,560	112	$1,404	$5,152
Totals	**353**	**280,200**	**111.6**	**$6,941**	**$39,671**
Annual	**365**	**289,725**	**111.6**	**$7,177**	**$41,020**

3.3 Natural Gas Usage

Natural gas is provided by PSE&G. The average gas cost for the past 12 months is $0.841/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below and demonstrate a load profile reflective of gas heating.

Figure 10 - Natural Gas Usage

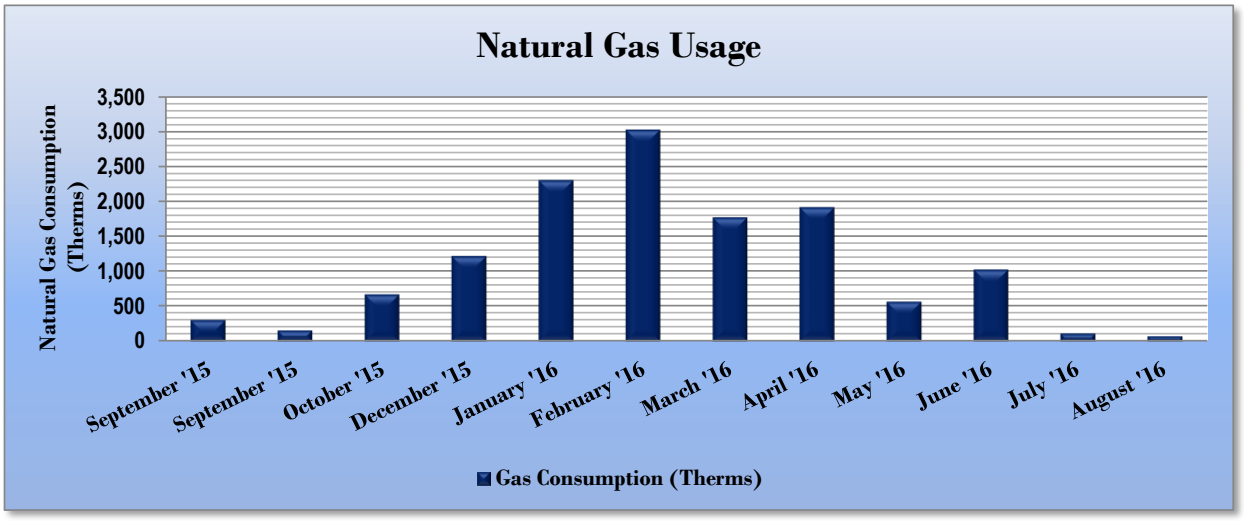


Figure 11 - Natural Gas Usage

Gas Billing Data for NuView Academy			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
9/16/15	29	303	$272
10/15/15	28	156	$192
11/13/15	28	671	$994
12/16/15	32	1,218	$1,019
1/19/16	33	2,304	$2,000
2/17/16	28	3,024	$2,388
3/19/16	30	1,769	$1,560
4/18/16	29	1,916	$1,186
5/17/16	28	567	$427
6/16/16	29	1,025	$686
7/18/16	31	111	$170
8/16/16	28	70	$147
Totals	**353**	**13,135**	**$11,041**
Annual	**365**	**13,581**	**$11,416**

3.4 Benchmarking

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

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

Figure 12 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	NuView Academy	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	197.0	141.4
Site Energy Use Intensity (kBtu/ft^2)	102.0	58.2

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

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

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	NuView Academy	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	177.4	141.4
Site Energy Use Intensity (kBtu/ft^2)	95.8	58.2

Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. Your building is one of the building categories that are eligible to receive a score. This facility has a current score of 32 which seems low for a building of this type and age. This low score should be further investigated.

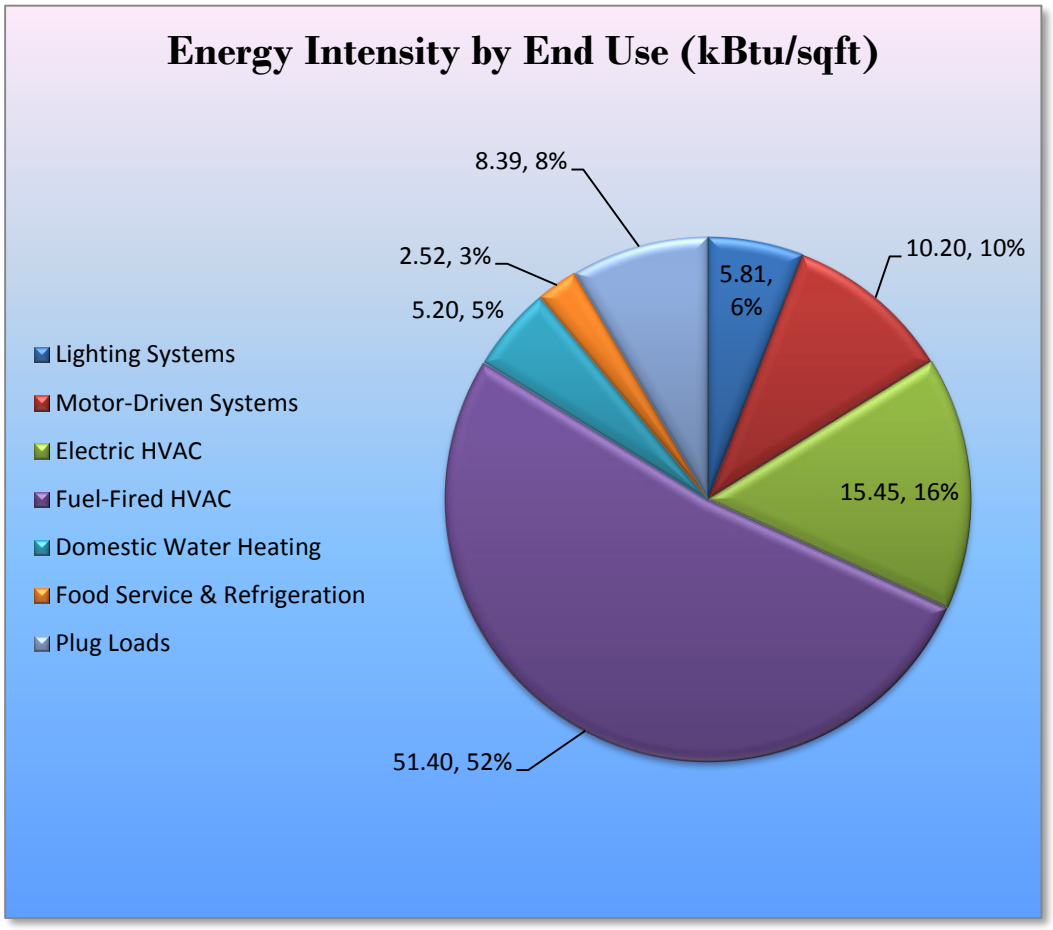
A Portfolio Manager Statement of Energy Performance (SEP) was generated for this facility, see Appendix B: ENERGY STAR® Statement of Energy Performance. For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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

3.5 Energy End-Use Breakdown

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

Figure 14 - Energy Balance (kBtu/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 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 (P4P), 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 15 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**15,962**	**5.6**	**0.0**	**$2,259.94**	**$15,422.20**	**$2,915.00**	**$12,507.20**	**5.5**	**16,074**
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ECM 4	Install VFDs on Hot Water Pumps	1,303	0.4	0.0	$184.51	$5,457.71	$0.00	$5,457.71	29.6	1,312
TOTALS		**41,990**	**15.2**	**0.0**	**$5,945.03**	**$34,267.66**	**$5,582.00**	**$28,685.66**	**4.8**	**42,284**

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

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

4.1.1 Lighting Upgrades

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

Figure 16 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**15,962**	**5.6**	**0.0**	**$2,259.94**	**$15,422.20**	**$2,915.00**	**$12,507.20**	**5.5**	**16,074**
ECM 1	Retrofit Fixtures with LED Lamps	15,962	5.6	0.0	$2,259.94	$15,422.20	$2,915.00	$12,507.20	5.5	16,074

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

ECM 1: Retrofit 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	15,962	5.6	0.0	$2,259.94	$15,422.20	$2,915.00	$12,507.20	5.5	16,074
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

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

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

4.1.2 Lighting Control Measures

Figure 17 – Summary of Lighting Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**380**	**0.1**	**0.0**	**$53.76**	**$270.00**	**$35.00**	**$235.00**	**4.4**	**382**
ECM 2	Install Occupancy Sensor Lighting Controls	380	0.1	0.0	$53.76	$270.00	$35.00	$235.00	4.4	382

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 2: 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)
380	0.1	0.0	$53.76	$270.00	$35.00	$235.00	4.4	382

Measure Description

We recommend installing occupancy sensors to control lighting fixtures that are currently controlled by manual switches in Room 110. 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 18 below.

Figure 18 – 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		**25,648**	**9.4**	**0.0**	**$3,631.33**	**$18,575.46**	**$2,632.00**	**$15,943.46**	**4.4**	**25,828**
ECM 3	Install VFDs on Constant Volume (CV) HVAC	24,345	9.1	0.0	$3,446.82	$13,117.75	$2,632.00	$10,485.75	3.0	24,515
ECM 4	Install VFDs on Hot Water Pumps	1,303	0.4	0.0	$184.51	$5,457.71	$0.00	$5,457.71	29.6	1,312

ECM 3: Install VFDs on Constant Volume (CV) HVAC

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
24,345	9.1	0.0	$3,446.82	$13,117.75	$2,632.00	$10,485.75	3.0	24,515

Measure Description

We recommend installing variable frequency drives (VFDs) to control supply fan motor speeds to convert the constant-speed, roof top air handling systems into true variable-air-volume (VAV) systems. For RTU-1 and RTU-3 duct static pressure sensors should be installed near the furthest VAV boxes and the air flow modulated to maintain duct static pressure at these furthest boxes. RTU-2 serves a single space, so the zone thermostats can be used to modulate fan speed to maintain the appropriate temperature in the zone, while maintaining a constant supply air temperature.

Energy savings results from reducing fan speed (and power) when there is a reduced load required for the zone. The magnitude of energy savings is based on the estimated amount of time that fan motors operate at partial load.

For air handlers with direct expansion (DX) cooling systems, the minimum air flow across the cooling coils required to prevent the coils from freezing will have to be determined during the final project design. The control system should be programmed to maintain the minimum air flow whenever a compressor is operating.

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)
1,303	0.4	0.0	$184.51	$5,457.71	$0.00	$5,457.71	29.6	1,312

Measure Description

We recommend installing a variable frequency drive (VFD) to control a hot water pumps. This measure requires that a majority of the hot water coils be served by two (2)-way valves and the installation of a differential pressure sensor 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 result 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 two-way valves are not currently present, additional work (and cost) will be required to reconfigure the system.

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 19 – Summary of Measures Evaluated, But Not Recommended

Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades	**1,164**	**0.6**	**0.0**	**$164.77**	**$21,482.92**	**$1,100.00**	**$20,382.92**	**123.7**	**1,172**
Install LED Fixtures	1,164	0.6	0.0	$164.77	$21,482.92	$1,100.00	$20,382.92	123.7	1,172
TOTALS	**1,164**	**0.6**	**0.0**	**$164.77**	**$21,482.92**	**$1,100.00**	**$20,382.92**	**123.7**	**1,172**

* - 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 LED Fixtures

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0
Exterior	1,164	0.6	0.0	$164.77	$21,482.92	$1,100.00	$20,382.92	123.7	1,172

Measure Description

We evaluated replacing existing fixtures containing HID lamps with new high performance 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.

Reasons for not Recommending

Although there is energy savings with replacing the HID fixtures with LED fixtures, 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 for replacement.

5 ENERGY EFFICIENT PRACTICES

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

Close Doors and Windows

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

Perform Proper Lighting Maintenance

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

Develop a Lighting Maintenance Schedule

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

Ensure Lighting Controls Are Operating Properly

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

Perform Routine Motor Maintenance

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

Use Fans to Reduce Cooling Load

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

Clean Evaporator/Condenser Coils on AC Systems

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

Clean and/or Replace HVAC Filters

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

Check for and Seal Duct Leakage

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

Perform Proper Boiler Maintenance

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

Perform Proper 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 (3) to four (4) years old have a technician inspect the sacrificial anode annually.

Water Conservation

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

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

6 On-Site Generation Measures

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

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

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

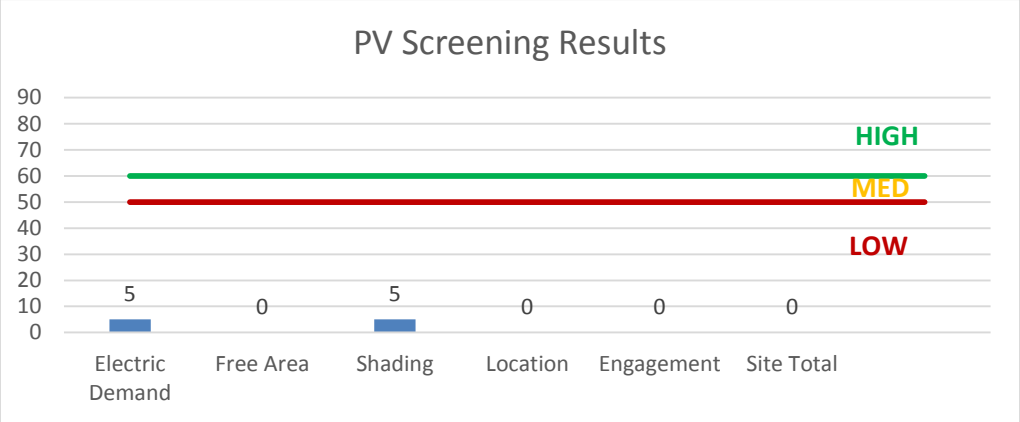
6.1 Photovoltaic

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

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

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

Figure 20 - Photovoltaic Screening



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

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

6.2 Combined Heat and Power

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.

The low and infrequent thermal load, and lack of space near the existing boilers 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 21 for a list of the eligible programs identified for each recommended ECM.

Figure 21 - 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	Retrofit Fixtures with LED Lamps	x		x			
ECM 2	Install Occupancy Sensor Lighting Controls	x		x			
ECM 3	Install VFDs on Constant Volume (CV) HVAC	x		x			
ECM 4	Install VFDs on Hot Water Pumps	x		x			

SmartStart is generally well-suited for implementation of individual measures or small group of measures. It provides flexibility to install measures at your own pace using in-house staff or a preferred contractor. Direct Install caters to small- to mid-size facilities that can bundle multiple ECMs together. This can greatly simplify participation and may lead to higher incentive amounts, but requires the use of pre-approved contractors. The 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-(1) 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 Direct Install

Overview

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

Incentives

The program pays up to 70% of the total installed cost of eligible measures, up to $125,000 per project. Direct Install participants will also be held to a fiscal year cap of $250,000 per entity.

How to Participate

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

Since Direct Install offers a free assessment of eligible measures, Direct Install is also available to small businesses and other commercial facilities too that may not be eligible for the more detailed facility audits provided by LGEA.

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

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 into 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
South Stairwell	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,610	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,610	0.11	305	0.0	$43.25	$292.50	$50.00	5.61
South Stairwell	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
2nd Fl Main Corridor	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
2nd Fl Main Corridor	25	Compact Fluorescent: 1 lmap per fix (4 pin)	Occupancy Sensor	32	1,610	None	No	25	Compact Fluorescent: 1 lmap per fix (4 pin)	Occupancy Sensor	32	1,610	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm 201	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,610	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,610	0.26	733	0.0	$103.81	$702.00	$120.00	5.61
Rm 202	3	U-Bend Fluorescent - T8: U T8 (32W) - 3L	Occupancy Sensor	92	1,610	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,610	0.10	269	0.0	$38.14	$225.60	$45.00	4.74
Rm 204	3	U-Bend Fluorescent - T8: U T8 (32W) - 3L	Occupancy Sensor	92	1,610	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,610	0.10	269	0.0	$38.14	$225.60	$45.00	4.74
Rm 205	1	U-Bend Fluorescent - T8: U T8 (32W) - 3L	Occupancy Sensor	92	1,610	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,610	0.03	90	0.0	$12.71	$75.20	$15.00	4.74
Rm 206	4	Compact Fluorescent: 1 lmap per fix (4 pin)	Occupancy Sensor	32	1,610	None	No	4	Compact Fluorescent: 1 lmap per fix (4 pin)	Occupancy Sensor	32	1,610	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm 206	14	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Occupancy Sensor	53	1,610	Relamp	No	14	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,610	0.25	713	0.0	$100.92	$863.80	$210.00	6.48
RM 207	3	U-Bend Fluorescent - T8: U T8 (32W) - 3L	Occupancy Sensor	92	1,610	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,610	0.10	269	0.0	$38.14	$225.60	$45.00	4.74
RM 208	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	1,610	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,610	0.09	244	0.0	$34.60	$234.00	$40.00	5.61
Rm 208	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,610	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,610	0.02	61	0.0	$8.65	$58.50	$10.00	5.61
Rm 209	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	1,610	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,610	0.09	244	0.0	$34.60	$234.00	$40.00	5.61
Rm 209	2	Linear Fluorescent - T8: 3' T8 (25W) - 2L	Occupancy Sensor	48	1,610	Relamp	No	2	LED - Linear Tubes: (2) 3' Lamps	Occupancy Sensor	21	1,610	0.04	100	0.0	$14.16	$106.80	$0.00	7.54
Rm 212	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,610	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,610	0.29	825	0.0	$116.78	$676.80	$135.00	4.64
Rm211	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,610	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,610	0.02	61	0.0	$8.65	$58.50	$10.00	5.61
Rm 216	3	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Occupancy Sensor	53	1,610	Relamp	No	3	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,610	0.05	153	0.0	$21.63	$185.10	$45.00	6.48
2nd Fl North Corridor	6	Compact Fluorescent: 1 lmap per fix (4 pin)	Occupancy Sensor	32	1,610	None	No	6	Compact Fluorescent: 1 lmap per fix (4 pin)	Occupancy Sensor	32	1,610	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
2nd Fl North Corridor	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 220	3	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Occupancy Sensor	53	1,610	Relamp	No	3	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,610	0.05	153	0.0	$21.63	$185.10	$45.00	6.48
Rm 219	4	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Occupancy Sensor	53	1,610	Relamp	No	4	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,610	0.07	204	0.0	$28.84	$246.80	$60.00	6.48
Rm 218	3	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Occupancy Sensor	53	1,610	Relamp	No	3	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,610	0.05	153	0.0	$21.63	$185.10	$45.00	6.48
Rm 221	3	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Occupancy Sensor	53	1,610	Relamp	No	3	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,610	0.05	153	0.0	$21.63	$185.10	$45.00	6.48
Rm 217	5	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	1,610	Relamp	No	5	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,610	0.05	148	0.0	$20.97	$241.00	$50.00	9.11

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Rm 215 - Data Room	1	U-Bend Fluorescent - T8: U T8 (32W) - 3L	Occupancy Sensor	92	1,610	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,610	0.03	90	0.0	$12.71	$75.20	$15.00	4.74
Rm 214	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,610	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,610	0.26	733	0.0	$103.81	$702.00	$120.00	5.61
Rm 213 - Coset	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	100	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	100	0.02	4	0.0	$0.54	$58.50	$10.00	90.27
Rm 210 - Roof Access	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	100	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	100	0.02	4	0.0	$0.54	$58.50	$10.00	90.27
Front Enterance	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,300	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,300	0.09	349	0.0	$49.43	$234.00	$40.00	3.92
Front Enterance	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
Main Office	10	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Occupancy Sensor	53	1,610	Relamp	No	10	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,610	0.18	509	0.0	$72.09	$617.00	$150.00	6.48
Rm 101	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,610	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,610	0.09	244	0.0	$34.60	$234.00	$40.00	5.61
Rm 123	3	U-Bend Fluorescent - T8: U T8 (32W) - 3L	Occupancy Sensor	92	1,610	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,610	0.10	269	0.0	$38.14	$225.60	$45.00	4.74
Rm 122	1	U-Bend Fluorescent - T8: U T8 (32W) - 3L	Occupancy Sensor	92	1,610	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,610	0.03	90	0.0	$12.71	$75.20	$15.00	4.74
1st Fl Main Corridor	21	Compact Fluorescent: 1 lmap per fix (4 pin)	Occupancy Sensor	32	1,610	None	No	21	Compact Fluorescent: 1 lmap per fix (4 pin)	Occupancy Sensor	32	1,610	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
1st Fl Main Corridor	7	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	7	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm 103	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,610	Relamp	No	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,610	0.24	672	0.0	$95.16	$643.50	$110.00	5.61
Rm 102	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,610	Relamp	No	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,610	0.24	672	0.0	$95.16	$643.50	$110.00	5.61
Rm 104	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,610	Relamp	No	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,610	0.24	672	0.0	$95.16	$643.50	$110.00	5.61
Rm 105	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,610	Relamp	No	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,610	0.24	672	0.0	$95.16	$643.50	$110.00	5.61
Rm 106	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	1,610	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,610	0.02	61	0.0	$8.65	$58.50	$10.00	5.61
Rm 121	4	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Occupancy Sensor	53	1,610	Relamp	No	4	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,610	0.07	204	0.0	$28.84	$246.80	$60.00	6.48
Rm 121 - Bath	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	1,610	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,610	0.02	61	0.0	$8.65	$58.50	$10.00	5.61
Rm 120 - Closet	4	U-Bend Fluorescent - T8: U T8 (32W) - 3L	Occupancy Sensor	92	1,610	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,610	0.13	359	0.0	$50.86	$300.80	$60.00	4.74
Rm 119	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,150	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,150	0.02	44	0.0	$6.18	$58.50	$10.00	7.85
Rm 118	4	U-Bend Fluorescent - T8: U T8 (32W) - 3L	Occupancy Sensor	92	1,610	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,610	0.13	359	0.0	$50.86	$300.80	$60.00	4.74
Rm 117	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,610	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,610	0.26	733	0.0	$103.81	$702.00	$120.00	5.61
Rm 116	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,610	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,610	0.26	733	0.0	$103.81	$702.00	$120.00	5.61
North Stairwell	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	High/Low Control	62	1,610	Relamp	No	7	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,610	0.15	428	0.0	$60.55	$409.50	$70.00	5.61

	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
North Stairwell	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 115	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	805	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	805	0.02	31	0.0	$4.33	$58.50	$10.00	11.21
Rm 114	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,300	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,300	0.02	87	0.0	$12.36	$58.50	$10.00	3.92
Rm 112	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,610	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,610	0.17	489	0.0	$69.20	$468.00	$80.00	5.61
Rm 113	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,300	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,300	0.09	349	0.0	$49.43	$234.00	$40.00	3.92
Gym	12	Compact Fluorescent: 1 lmap per fix (4 pin)	Wall Switch	32	2,300	None	No	12	Compact Fluorescent: 1 lmap per fix (4 pin)	Wall Switch	32	2,300	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Gym	12	Compact Fluorescent: Sport Fixture - 6 lamps per fixture	Wall Switch	210	2,300	None	No	12	Compact Fluorescent: Sport Fixture - 6 lamps per fixture	Wall Switch	210	2,300	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Gym	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Elevator	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,300	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,300	0.02	87	0.0	$12.36	$58.50	$10.00	3.92
Gym - Closet	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	1,610	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,610	0.13	367	0.0	$51.90	$351.00	$60.00	5.61
RM 110	11	U-Bend Fluorescent - T8: U T8 (32W) - 3L	Wall Switch	92	2,300	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,610	0.44	1,791	0.0	$253.55	$1,097.20	$200.00	3.54
Rm 111 - Stroage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	100	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	100	0.04	8	0.0	$1.07	$117.00	$20.00	90.27
Rm 110	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
Wall Pac	15	Compact Fluorescent: 1 lmap per fix (4 pin)	Daylight Dimming	32	1,150	None	No	15	Compact Fluorescent: 1 lmap per fix (4 pin)	Daylight Dimming	32	1,150	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Parking Lot	11	Metal Halide: Screen 15	Daylight Dimming	100	1,150	Fixture Replacement	No	11	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Daylight Dimming	20	1,150	0.58	1,164	0.0	$164.77	$21,482.92	$1,100.00	123.70
Perimeter	15	Compact Fluorescent: 2 lamp per fix (4 pin)	Daylight Dimming	26	1,150	None	No	15	Compact Fluorescent: 2 lamp per fix (4 pin)	Daylight Dimming	26	1,150	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Electric Rm	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	100	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	100	0.13	23	0.0	$3.22	$351.00	$60.00	90.27

Motor Inventory & Recommendations

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	Corridor	1	Exhaust Fan	0.5	82.5%	No	2,530	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Restroom & Corridor	1	Exhaust Fan	0.5	82.5%	No	2,530	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm 217	Boiler Burner	1	Combustion Air Fan	0.3	82.5%	No	1,265	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm 217	School	2	Heating Hot Water Pump	2.0	84.0%	No	1,265	No	84.0%	Yes	2	0.36	1,303	0.0	$184.51	$5,457.71	$0.00	29.58
Rm 217	Boiler Rm	1	Exhaust Fan	0.3	82.5%	No	2,530	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Elevator Rm	Elevator	1	Other	75.0	94.1%	No	533	No	94.1%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 1 - Bldg North End	1	Supply Fan	15.0	91.0%	No	2,530	No	91.0%	Yes	1	4.13	11,083	0.0	$1,569.18	$5,194.45	$1,200.00	2.55
Roof	RTU 1 - Bldg North End	4	Exhaust Fan	1.0	82.5%	No	1,265	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 1 - Bldg North End	2	Cooling Tower Fan	1.0	82.5%	No	1,414	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 2 - Gym	1	Supply Fan	2.9	89.5%	No	2,530	No	89.5%	Yes	1	0.81	2,179	0.0	$308.46	$2,728.85	$232.00	8.09
Roof	RTU 2 - Gym	3	Cooling Tower Fan	0.5	85.5%	No	1,414	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 3 - Bldg South End	1	Supply Fan	15.0	91.0%	No	2,530	No	91.0%	Yes	1	4.13	11,083	0.0	$1,569.18	$5,194.45	$1,200.00	2.55
Roof	RTU 3 - Bldg South End	4	Exhaust Fan	1.0	82.5%	No	1,265	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 3 - Bldg South End	2	Cooling Tower Fan	1.0	82.5%	No	1,414	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	RTU 1 - Bldg North End	1	Packaged AC	30.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 2 - Gym	1	Packaged AC	15.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 3 - Bldg South End	1	Packaged AC	36.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Data Rm	1	Split-System AC	12.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	RTU 1 - Bldg North End	1	Furnace	283.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 2 - Gym	1	Furnace	186.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 3 - Bldg South End	1	Furnace	324.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm 217	School VAV RH	1	Non-Condensing Hot Water Boiler	638.00	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
Rm 217	School	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Cooking Equipment Inventory & Recommendations

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

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
School	17	Desktop Computers	110.0	Yes
School	2	Copy Machine	1,400.0	Yes
School	4	Printer	460.0	Yes
School	3	Microwave	1,200.0	No
School	4	Small Fridge	56.0	Yes
School	3	Small Printer	46.0	Yes
School	1	Refigerator	275.0	Yes
School	1	Toaster	900.0	No
Kitchen	2	Fridge 35F	2,724.8	No

Appendix B: ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

NuView Academy

Primary Property Type: K-12 School
Gross Floor Area (ft²): 23,000
Built: 2007

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 1 Park Avenue Piscataway, New Jersey 08854	_____ . (___)___-_____	___ _____ . (___)___-_____ _____

Property ID: 5857454

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
98.7 kBtu/ft²

Source EUI
190.5 kBtu/ft²

Annual Energy by Fuel

Electric - Grid (kBtu)	956,042 (42%)
Natural Gas (kBtu)	1,313,457 (58%)

National Median Comparison

National Median Site EUI (kBtu/ft²)	84.6
National Median Source EUI (kBtu/ft²)	163.3
% Diff from National Median Source EUI	17%

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO2e/year)	179

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)