Local Government Energy Audit:
Energy Audit Report

Academy of Performing Arts

Union County Vocational-Technical Schools

1776 Raritan Road

Scotch Plains, NJ 07076

January 23, 2018

Final TRC 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 Union County Vocational-Technical Schools (UCVTS) –Academy of Performing Arts (APA).

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 local governments and schools in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

1.1 Facility Summary

UCVTS - APA is a 43,341 square foot facility comprised of various educational based and performing arts space types. The facility has a number of classrooms and studios used by students and faculty throughout the year. The facility was constructed in 2010 as a new stand-alone building. It is unique for facilities at UCVTS in that it operates independently from the boiler and chiller plant located at West Hall.

Lighting at UCVTS - APA consists of mainly linear fluorescent T8 fixtures with some compact fluorescent fixtures. The facility uses both reduced wattage and standard wattage T8 lamps. A small part of the lighting system consists of stage lighting.

The heating ventilation and air conditioning (HVAC) system consists of Aaon roof top units. These units feed variable air volume (VAV) boxes that distribute conditioned air into the space.

The building envelope consists of a standard slab foundation, a rolled rubber roof, and a steel backed outer shell. The windows are a variety of double pane architectural that bring abundant natural light into the space in most parts of the building other than the theater. All building envelope components were observed to be well maintained and in good condition.

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 three (3) measures which together represent an opportunity for UCVTS - APA to reduce annual energy costs by $14,556 and annual greenhouse gas emissions by 98,471 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 3.1 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 UCVTS - APA's annual energy use by 6%.

Figure 1 – Previous 12 Month Utility Costs

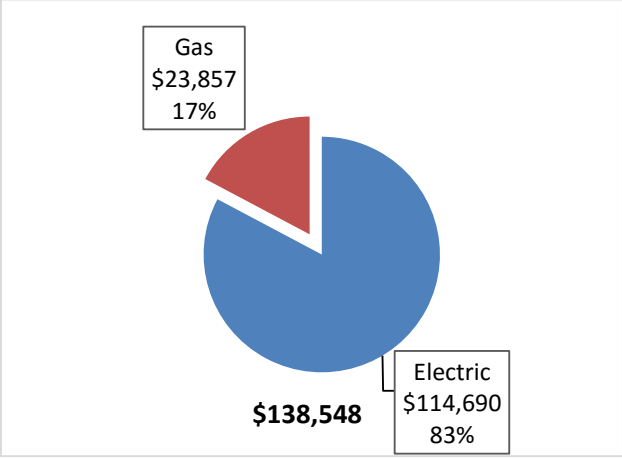
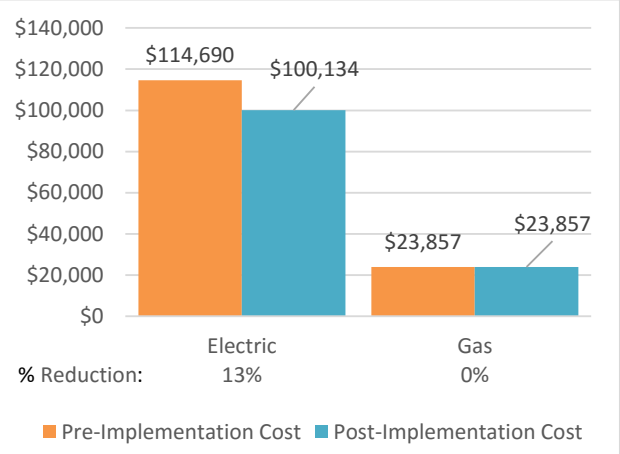


Figure 2 – Potential Post-Implementation Costs



A detailed description of UCVTS - APA'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			**97,787**	**11.4**	**0.0**	**$14,556.44**	**$45,351.10**	**$630.00**	**$44,721.10**	**3.1**	**98,471**
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	12,144	1.3	0.0	$1,807.74	$20,800.00	$0.00	$20,800.00	11.5	12,229
ECM 2	Retrofit Fixtures with LED Lamps	Yes	85,643	10.1	0.0	$12,748.71	$24,551.10	$630.00	$23,921.10	1.9	86,242
Plug Load Equipment Control - Vending Machine			**0**	**0.0**	**0.0**	**$0.00**	**$460.00**	**$0.00**	**$460.00**	**0.0**	**0**
ECM 3	Vending Machine Control	Yes	0	0.0	0.0	$0.00	$460.00	$0.00	$460.00	0.0	0
TOTALS			**97,787**	**11.4**	**0.0**	**$14,556.44**	**$45,811.10**	**$630.00**	**$45,181.10**	**3.1**	**98,471**

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

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

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

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

Energy Efficient Practices

TRC also identified 25 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 UCVTS - APA include:

- Reduce Air Leakage
- Close Doors and Windows
- Use Window Treatments/Coverings
- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Turn Off Unneeded Motors
- Reduce Motor Short Cycling
- Perform Routine Motor Maintenance
- Use Fans to Reduce Cooling Load
- Install Destratification Fans
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Ensure Economizers are Functioning Properly
- Assess Chillers & Request Tune-Ups
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Check for and Seal Duct Leakage
- Repair/Replace Steam Traps
- Perform Proper Boiler Maintenance
- Perform Proper Furnace Maintenance
- Perform Proper Water Heater Maintenance
- Perform Maintenance on Compressed Air Systems
- Install Plug Load Controls
- Replace Computer Monitors
- Water Conservation

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

On-Site Generation Measures

TRC evaluated the potential for installing on-Site generation for UCVTS - APA. Based on the configuration of the site and its loads there is a high potential for installing a photovoltaic (PV) array. The Academy of Performing Arts is one of two facilities at UCVTS that does not currently have a roof mounted solar array.

Figure 4 – Photovoltaic Potential

Potential	High	
System Potential	107	kW DC STC
Electric Generation	127,477	kWh/yr
Displaced Cost	$11,090	/yr
Installed Cost	$278,200	

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

1.3 Implementation Planning

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

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

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

- SmartStart
- Pay for Performance - Existing Building
- Combined Heat and Power and Fuel Cell (CHP-FC)
- Energy Savings Improvement Program (ESIP)
- Demand Response Energy Aggregator

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.

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

The Combined Heat & Power and Fuel Cell program can be a significant source of funding for this facility since it was identified as a good candidate for CHP on-site generation. As with other programs, please be sure to check the NJCEP website for latest details on current program availability and incentive levels.

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.

The Demand Response Energy Aggregator is a (non-NJCEP) program designed to reduce electric loads at commercial facilities, when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak power demand. Demand Response (DR) service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability. By enabling grid operators to call upon

commercial facilities to reduce their 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 facilities receive payments whether or not they are called upon to curtail their load during times of peak demand.

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			
Jim Ferris	Consultant	jferris@jfpconsulting.net	(908) 347-3784
Mark Leary	Facilities Director	mleary@ucvts.org	
TRC Energy Services			
BD, SS, IB	Auditor	bdattellas@trcsolutions.com	(732) 855-0033

2.2 General Site Information

In January, February, and March of 2017, TRC performed an energy audit at UCVTS - APA located in Scotch Plains, New Jersey. TRCs' team met with Mark Leary, Facilities Director to review the facility operations and help focus our investigation on specific energy-using systems.

UCVTS - APA is a 43,341 square foot facility comprised of various educational based and performing arts space types. The facility has a number of classrooms and studios used by students and faculty throughout the year. The facility was constructed in 2010 as a new standalone building. It is unique for facilities at UCVTS in that it operates independently from the boiler and chiller plant located at West Hall.

2.3 Building Occupancy

The Academy of Performing Arts is open on average 7 am to 10 pm, and 9 am to 6 pm on weekends throughout the year. The building has an average occupancy of approximately 200 staff and students.

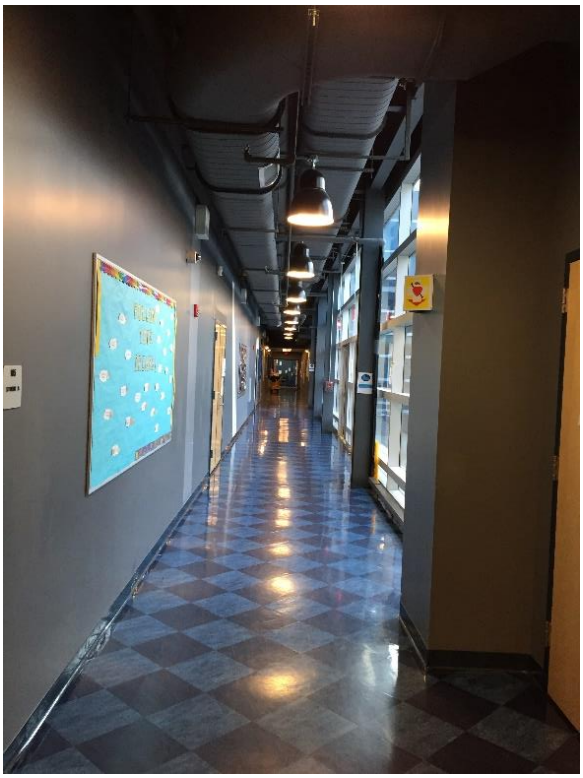
Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
APA	Weekday	7:00 AM - 10:00 PM
APA	Weekend	9:00 AM - 6:00 PM

2.4 Building Envelope

The building envelope consists of a standard slab foundation, a rolled rubber roof, and a steel backed outer shell. The windows are a variety of double pane architectural that bring abundant natural light into the space in most parts of the building other than the theater. All building envelope components were observed to be well maintained and in good condition.

2.5 Energy-Using Systems



Lighting

Lighting consists of T8 linear fluorescent fixtures using both reduced wattage and standard wattage T8 lamps. A small part of the lighting system consists of stage and aesthetic performance lighting. Lighting controls include manual switches, functional timers switches and occupancy sensor controls.

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

Direct Expansion Air Conditioning System (DX) and Gas Fired Heating

The Academy of Performing Arts HVAC equipment is unique to UCVTS in that it does not use the boiler and chiller plants located in West Hall.

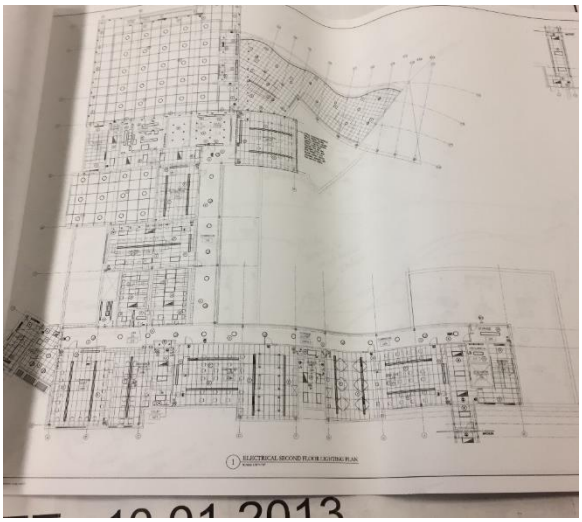
The APA facility has a very simple approach to introducing conditioned air in the space. A number of Aaon direct-expansion (DX) package units with a gas fired furnace and, in some cases, an outside air economizer are used to condition the building. The units are located on the roof of the building. These units provide constant air volume with a single supply fan to variable air volume terminal units. The terminal units in the space "communicate" with the constant volume unit to ramp up or slow down fan speed to accommodate the building load. This control strategy results in optimal efficiency. The units use scroll compressor technology and a direct expansion coil. The units also have outside air economizers to utilize free cooling when the outside air temperature is lower than the return air temperature. The gas fired furnaces provides heating as needed.

The unit is manually controlled by a thermostat located in zones. The unit operates on demand to maintain a space temperature set point around 72°F (adjustable by staff).

Building Energy Management System (BEMS)

The majority of the facility is controlled with a Honeywell building control system. The control system allows for enhanced control and tracking of the rooftop Aaon units as well has ventilation, and

supplemental conditioning equipment. The system also appears capable of aggregating the DDC points from throughout the building. Almost 100% of the building zones are DDC. The system is capable of providing trends for individual DDC points for up to one-year of historical data. A Honeywell system also provides control for the boiler plant or chiller plant in West Hall.



Building Plug Load

Approximately 40 computer work stations observed throughout the facility during the walk through. There is no centralized PC power management software installed.

There were also a number of printers, Monitors and televisions, and miscellaneous audio visual equipment noted. The facility also has a wide variety of performing arts related plug load that was taken into account.

2.6 Water-Using Systems

There are eight (8) restrooms at this facility. A sampling of restrooms found that faucets are rated for 1.5 gallons per minute (gpm), 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

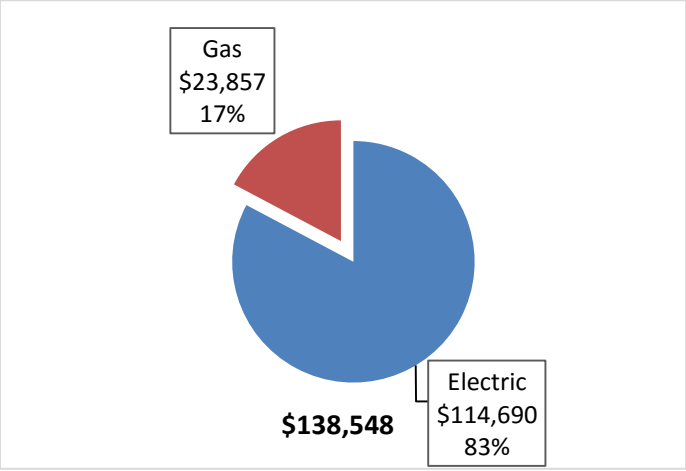
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 7 - Utility Summary

Utility Summary for UCVTS - APA		
Fuel	**Usage**	**Cost**
Electricity	770,466 kWh	$114,690
Natural Gas	29,750 Therms	$23,857
Total		**$138,548**

The current annual energy cost for this facility is $138,548 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 $0.149/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.

Figure 9 - Electric Usage & Demand

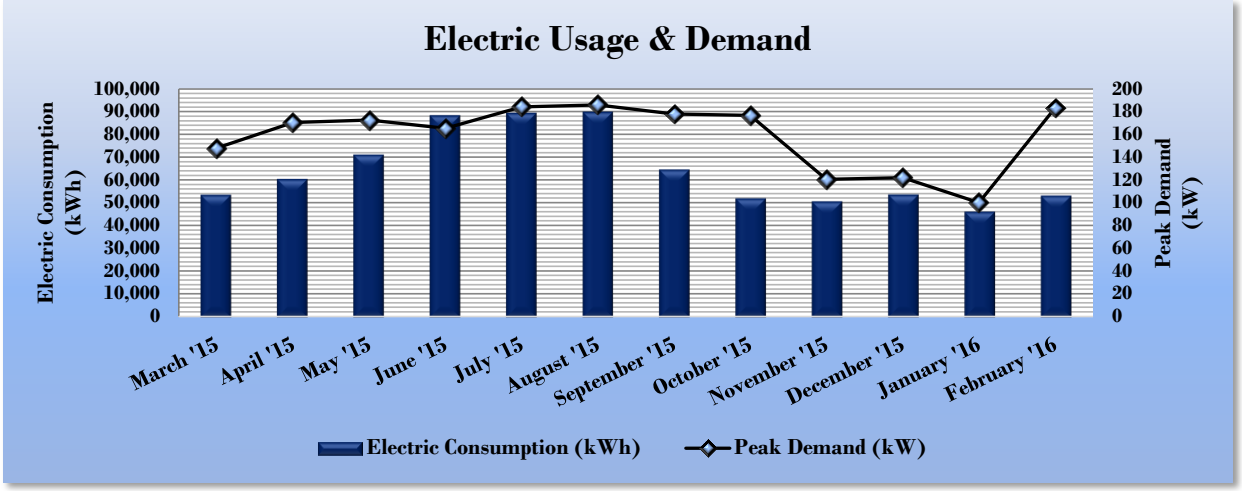


Figure 10 - Electric Usage & Demand

Electric Billing Data for UCVTS - APA					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
4/15/15	30	53,418	148	$2,335	$8,569
5/15/15	30	60,252	171	$2,603	$9,180
6/15/15	31	70,915	173	$4,336	$11,678
7/15/15	30	88,057	166	$4,666	$13,052
8/15/15	31	89,101	184	$4,693	$13,311
9/15/15	31	89,592	186	$4,625	$12,807
10/15/15	30	64,341	178	$2,402	$8,719
11/15/15	31	51,800	177	$2,100	$7,744
12/15/15	30	50,447	121	$1,653	$7,357
1/15/16	31	53,478	122	$1,603	$7,883
2/15/16	31	46,005	100	$1,222	$6,697
3/15/16	29	53,060	183	$1,560	$7,694
Totals	**365**	**770,466**	**186**	**$33,798**	**$114,690**
Annual	**365**	**770,466**	**186**	**$33,798**	**$114,690**

3.3 Natural Gas Usage

Natural gas is provided by Elizabethtown Gas. The average gas cost for the past 12 months is $0.802/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

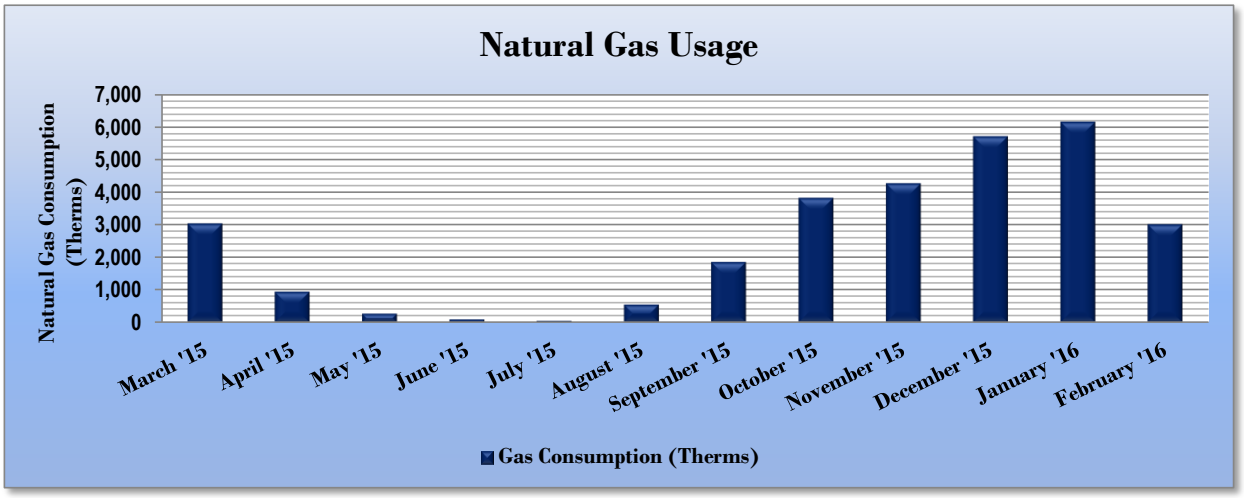


Figure 12 - Natural Gas Usage

Gas Billing Data for UCVTS - APA			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
4/15/15	30	3,038	$2,683
5/15/15	30	938	$1,007
6/15/15	31	268	$511
7/15/15	30	89	$467
8/15/15	31	51	$261
9/15/15	31	544	$700
10/15/15	30	1,851	$1,659
11/15/15	31	3,820	$2,990
12/15/15	30	4,265	$3,227
1/15/16	31	5,716	$4,102
2/15/16	31	6,161	$4,174
3/15/16	29	3,009	$2,076
Totals	**365**	**29,750**	**$23,857**
Annual	**365**	**29,750**	**$23,857**

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		
	UCVTS - APA	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	262.5	141.4
Site Energy Use Intensity (kBtu/ft^2)	129.3	58.2

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

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

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	UCVTS - APA	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	238.4	141.4
Site Energy Use Intensity (kBtu/ft^2)	121.6	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 not is one of the building categories that are eligible to receive a score.

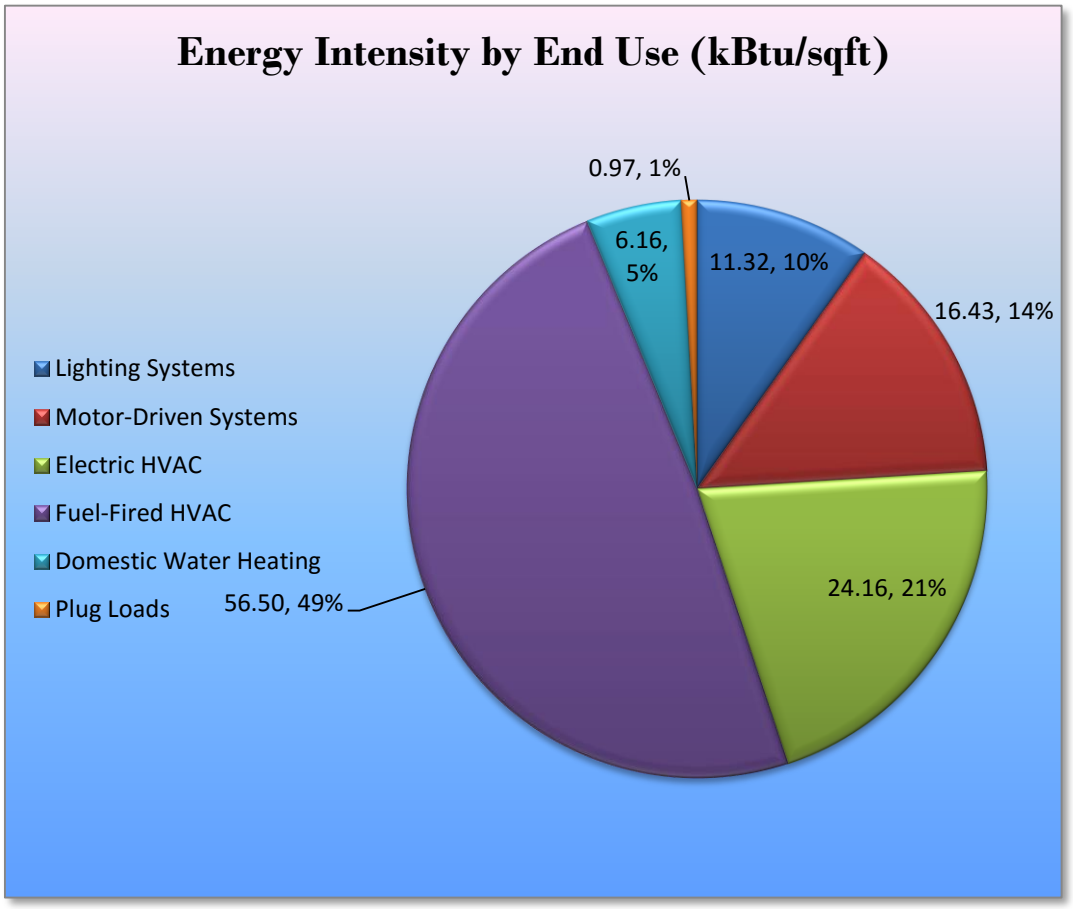
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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 UCVTS - APA 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.

The following sections describe the evaluated measures.

4.1 Recommended ECMs

The measures below have been evaluated by the auditor and are recommended for implementation at the facility.

Figure 16 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**97,787**	**11.4**	**0.0**	**$14,556.44**	**$45,351.10**	**$630.00**	**$44,721.10**	**3.1**	**98,471**
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	12,144	1.3	0.0	$1,807.74	$20,800.00	$0.00	$20,800.00	11.5	12,229
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Plug Load Equipment Control - Vending Machine		**0**	**0.0**	**0.0**	**$0.00**	**$460.00**	**$0.00**	**$460.00**	**0.0**	**0**
ECM 3	Vending Machine Control	0	0.0	0.0	$0.00	$460.00	$0.00	$460.00	0.0	0
TOTALS		**97,787**	**11.4**	**0.0**	**$14,556.44**	**$45,811.10**	**$630.00**	**$45,181.10**	**3.1**	**98,471**

* - 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		**97,787**	**11.4**	**0.0**	**$14,556.44**	**$45,351.10**	**$630.00**	**$44,721.10**	**3.1**	**98,471**
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	12,144	1.3	0.0	$1,807.74	$20,800.00	$0.00	$20,800.00	11.5	12,229
ECM 2	Retrofit Fixtures with LED Lamps	85,643	10.1	0.0	$12,748.71	$24,551.10	$630.00	$23,921.10	1.9	86,242

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 Fluorescent Fixtures with LED Lamps and Drivers

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0
Exterior	12,144	1.3	0.0	$1,807.74	$20,800.00	$0.00	$20,800.00	11.5	12,229

Measure Description

We recommend retrofitting existing fluorescent fixtures by removing fluorescent tubes and ballasts and replacing them with LEDs and LED drivers (if necessary), which are designed to be used retrofitted fluorescent fixtures. The measure uses the existing fixture housing but replaces the rest of the components with more efficient lighting technology. 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.

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	85,643	10.1	0.0	$12,748.71	$24,551.10	$630.00	$23,921.10	1.9	86,242
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend retrofitting existing T8 lamps with LED lamps. This measure saves energy by installing lower wattage 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.

4.1.2 Plug Load Equipment Control - Vending Machines

ECM 3: Vending Machine Control

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	0.0	$0.00	$460.00	$0.00	$460.00	0.0	0

Measure Description

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

5 ENERGY EFFICIENT PRACTICES

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

Reduce Air Leakage

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

Close Doors and Windows

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

Use Window Treatments/Coverings

A substantial amount of heat gain can occur through uncovered or untreated windows, especially older single pane windows and east or west-facing windows. Treatments such as high-reflectivity films or covering windows with shades or shutters can reduce solar heat gain and, consequently, cooling load and can reduce internal heat loss and the associated heating load.

Perform Proper Lighting Maintenance

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

Develop a Lighting Maintenance Schedule

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

Ensure Lighting Controls Are Operating Properly

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

Turn Off Unneeded Motors

Electric motors often run unnecessarily, and this is an overlooked opportunity to save energy. These motors should be identified and turned off when appropriate. For example, exhaust fans often run unnecessarily when ventilation requirements are already met. Reducing run hours for these motors can result in significant energy savings. Whenever possible, use automatic devices such as twist timers or occupancy sensors to ensure that motors are turned off when not needed.

Reduce Motor Short Cycling

Frequent stopping and starting of motors subjects rotors and other parts to substantial stress. This can result in component wear, reducing efficiency, and increasing maintenance costs. Adjust the load on the motor to limit the amount of unnecessary stopping and starting to improve motor performance.

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.

Install Destratification Fans

Allowing air to thermally stratify in spaces with high ceilings results in additional energy consumption by requiring the heating system to heat a volume of space much larger than the actual occupied space. Additional inefficiencies also occur because there are higher temperatures at the ceiling level than at the floor level. Higher temperatures at the ceiling accelerate heat loss through the roof, requiring additional energy consumption by the heating equipment in order to compensate for the accelerated heat transfer.

Destratification fans are specially designed to deliver a columnar, laminar flow of air balancing the air temperature from floor to ceiling. In addition to fuel savings, the use of desertification fans will reduce the recovery time necessary to warm the space after nightly temperature setbacks and will increase the comfort level of the occupants.

Practice Proper Use of Thermostat Schedules and Temperature Resets

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

Ensure Economizers are Functioning Properly

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

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.

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.

Repair/Replace Steam Traps

Properly functioning steam traps ensure that all latent heat in the steam is delivered to the end use by preventing pressurized steam from leaking. Steam traps should be inspected as part of the regular steam

system maintenance. Traps that are blocked, venting, or allowing steam to leak through should be repaired or replaced. Repairing or replacing existing steam traps will reduce steam losses.

Perform Proper Boiler Maintenance

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

Perform Proper Furnace Maintenance

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

Perform Proper Water Heater Maintenance

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

Perform Maintenance on Compressed Air Systems

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

Plug Load Controls

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

Replace Computer Monitors

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

Water Conservation

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

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

6 On-Site Generation Measures

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

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

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

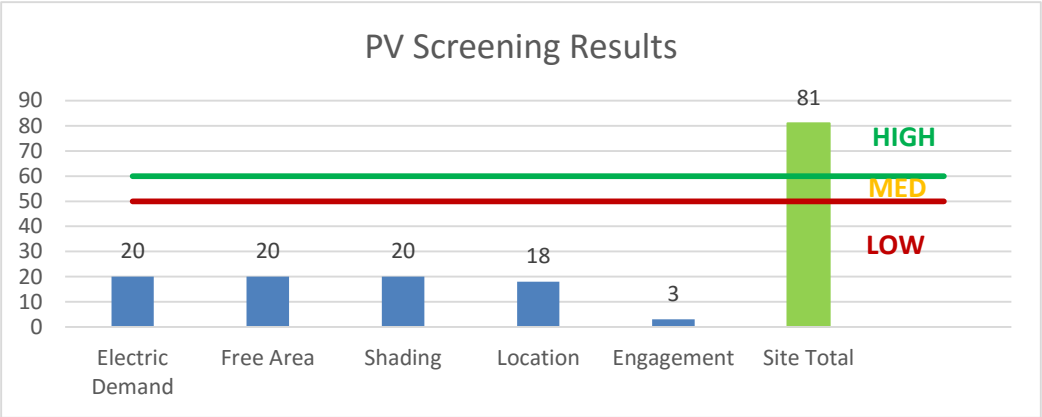
6.1 Photovoltaic

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 High potential for installing a roof mounted 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 18 - Photovoltaic Screening



Potential	High	
System Potential	107	kW DC STC
Electric Generation	127,477	kWh/yr
Displaced Cost	$11,090	/yr
Installed Cost	$278,200	

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

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

Figure 19 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	x		x			
ECM 2	Retrofit Fixtures with LED Lamps	x		x			
ECM 3	Vending Machine Control			x			

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

Generally, the incentive values provided throughout the report assume the SmartStart program is 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 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 a 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 who the region of the state where your facility is located. A complete list of Direct Install program partners is provided on the Direct Install website linked below. The contractor will be paid the measure incentives directly by the program which will pass on to you in the form of reduced material and implementation costs. This means up to 70% of eligible costs are covered by the program, subject to program caps and eligibility, while the remaining 30% of the cost is paid to the contractor by the customer.

Since DI 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 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
101	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,000	0.19	1,366	0.0	$203.37	$451.20	$0.00	2.22
102	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,000	0.19	1,366	0.0	$203.37	$451.20	$0.00	2.22
103	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,000	0.19	1,366	0.0	$203.37	$451.20	$0.00	2.22
Corridor 104	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	4,000	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,000	0.03	221	0.0	$32.87	$144.60	$0.00	4.40
Elevator	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	4,000	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,000	0.01	81	0.0	$11.98	$35.90	$0.00	3.00
Dance Studio	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	No	15	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,000	0.49	3,416	0.0	$508.43	$1,128.00	$0.00	2.22
Corridor 108	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,000	0.10	683	0.0	$101.69	$225.60	$0.00	2.22
Gen Classroom B	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,000	0.13	911	0.0	$135.58	$300.80	$0.00	2.22
Theater Studio	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	No	15	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,000	0.49	3,416	0.0	$508.43	$1,128.00	$0.00	2.22
Hallway	21	Compact Fluorescent: Pendant	Wall Switch	42	4,000	Relamp	No	21	LED Screw-In Lamps: LED	Wall Switch	17	4,000	0.34	2,415	0.0	$359.49	$1,336.67	$105.00	3.43
Administration	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,000	0.03	228	0.0	$33.90	$75.20	$0.00	2.22
Administration	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,000	0.03	228	0.0	$33.90	$75.20	$0.00	2.22
Conference Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,000	0.06	455	0.0	$67.79	$150.40	$0.00	2.22
Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,000	0.03	228	0.0	$33.90	$75.20	$0.00	2.22
Admin Support	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,000	0.13	911	0.0	$135.58	$300.80	$0.00	2.22
Front Hallway	6	Compact Fluorescent: Pendant	Wall Switch	42	4,000	Relamp	No	6	LED Screw-In Lamps: LED	Wall Switch	17	4,000	0.10	690	0.0	$102.71	$381.91	$30.00	3.43
Studio	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	No	15	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,000	0.49	3,416	0.0	$508.43	$1,128.00	$0.00	2.22
Mechanical Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	4,000	Relamp	No	6	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,000	0.07	483	0.0	$71.90	$215.40	$0.00	3.00
General Classroom	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,000	0.19	1,366	0.0	$203.37	$451.20	$0.00	2.22
Corridor	4	Compact Fluorescent: Pendant	Wall Switch	42	4,000	Relamp	No	4	LED Screw-In Lamps: LED	Wall Switch	17	4,000	0.07	460	0.0	$68.47	$254.60	$20.00	3.43
Vestibule	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	4,000	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,000	0.01	81	0.0	$11.98	$35.90	$0.00	3.00
Storage	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	4,000	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,000	0.01	74	0.0	$10.96	$48.20	$0.00	4.40
Corridor T	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,000	0.29	2,049	0.0	$305.06	$676.80	$0.00	2.22
Corridor T	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	4,000	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,000	0.02	147	0.0	$21.91	$96.40	$0.00	4.40
Performance Studio	12	Halogen Incandescent: A-19	Wall Switch	100	4,000	Relamp	No	12	LED Screw-In Lamps: LED	Wall Switch	28	4,000	0.57	3,974	0.0	$591.62	$645.04	$60.00	0.99

	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
Changing Rooms	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,000	Relamp	No	10	LED - Linear Tubes: (4) 2' Lamps	Wall Switch	34	4,000	0.18	1,288	0.0	$191.73	$765.33	$0.00	3.99
Costume	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	4,000	Relamp	No	4	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,000	0.05	322	0.0	$47.93	$143.60	$0.00	3.00
Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	4,000	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,000	0.01	81	0.0	$11.98	$35.90	$0.00	3.00
Dressing	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,000	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,000	0.13	911	0.0	$135.58	$300.80	$0.00	2.22
Corridor	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	5,500	Relamp	No	4	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	5,500	0.04	405	0.0	$60.26	$192.80	$0.00	3.20
Computer Room	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	5,500	Relamp	No	7	LED - Linear Tubes: (4) 3' Lamps	Wall Switch	42	5,500	0.23	2,258	0.0	$336.13	$601.53	$0.00	1.79
Bathrooms	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	5,500	Relamp	No	8	LED - Linear Tubes: (4) 2' Lamps	Wall Switch	34	5,500	0.15	1,417	0.0	$210.90	$612.27	$0.00	2.90
Vestibule	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	5,500	Relamp	No	1	LED - Linear Tubes: (4) 2' Lamps	Wall Switch	34	5,500	0.02	177	0.0	$26.36	$76.53	$0.00	2.90
Upper Performance	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	5,500	Relamp	No	7	LED - Linear Tubes: (4) 2' Lamps	Wall Switch	34	5,500	0.13	1,240	0.0	$184.54	$535.73	$0.00	2.90
Upper Performance	6	Halogen Incandescent: A-19	Wall Switch	100	5,500	Relamp	No	6	LED Screw-In Lamps: LED	Wall Switch	1	5,500	0.39	3,757	0.0	$559.27	$322.52	$30.00	0.52
Hallway 1	25	Compact Fluorescent: Pendant	Wall Switch	42	5,500	Relamp	No	25	LED Screw-In Lamps: LED	Wall Switch	1	5,500	0.67	6,483	0.0	$965.07	$1,591.28	$125.00	1.52
Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	5,500	Relamp	No	1	LED - Linear Tubes: (4) 2' Lamps	Wall Switch	34	5,500	0.02	177	0.0	$26.36	$76.53	$0.00	2.90
Hallway	5	Compact Fluorescent: PAR	Wall Switch	35	5,500	Relamp	No	5	LED Screw-In Lamps: LED	Wall Switch	1	5,500	0.11	1,075	0.0	$160.06	$318.26	$25.00	1.83
Elevator	4	LED Screw-In Lamps: A-19	Wall Switch	3	5,500	None	No	4	LED Screw-In Lamps: A-19	Wall Switch	3	5,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom 1	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	5,500	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	5,500	0.19	1,879	0.0	$279.63	$451.20	$0.00	1.61
Classroom 2	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	5,500	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	5,500	0.19	1,879	0.0	$279.63	$451.20	$0.00	1.61
Chem Lab	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	5,500	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	5,500	0.19	1,879	0.0	$279.63	$451.20	$0.00	1.61
Computer Room	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	5,500	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	5,500	0.39	3,757	0.0	$559.27	$902.40	$0.00	1.61
Bathroom	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	5,500	Relamp	No	4	LED - Linear Tubes: (4) 2' Lamps	Wall Switch	34	5,500	0.07	708	0.0	$105.45	$306.13	$0.00	2.90
Science Prep	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	5,500	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	5,500	0.10	939	0.0	$139.82	$225.60	$0.00	1.61
Vestibule	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	5,500	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	5,500	0.02	202	0.0	$30.13	$96.40	$0.00	3.20
Entrance Way	4	Compact Fluorescent: Pendant	Wall Switch	42	5,500	Relamp	No	4	LED Screw-In Lamps: LED	Wall Switch	17	5,500	0.07	633	0.0	$94.15	$254.60	$20.00	2.49
Jan	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	5,500	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	5,500	0.01	111	0.0	$16.48	$35.90	$0.00	2.18
Boys Toilet	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	5,500	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	5,500	0.13	1,252	0.0	$186.42	$300.80	$0.00	1.61
Girls Toilet	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	5,500	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	5,500	0.13	1,252	0.0	$186.42	$300.80	$0.00	1.61

	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
Control Room	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	5,500	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	5,500	0.29	2,818	0.0	$419.45	$676.80	$0.00	1.61
Small Instruction	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	5,500	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	5,500	0.19	1,879	0.0	$279.63	$451.20	$0.00	1.61
Exposed Grid	6	Compact Fluorescent: PAR	Wall Switch	75	5,500	Relamp	No	6	LED Screw-In Lamps: LED	Wall Switch	17	5,500	0.23	2,201	0.0	$327.65	$381.91	$30.00	1.07
Corridor	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	5,500	Relamp	No	7	LED - Linear Tubes: (4) 2' Lamps	Wall Switch	34	5,500	0.13	1,240	0.0	$184.54	$535.73	$0.00	2.90
Stairs	8	Compact Fluorescent: PAR	Wall Switch	40	5,500	Relamp	No	8	LED Screw-In Lamps: LED	Wall Switch	17	5,500	0.12	1,164	0.0	$173.24	$509.21	$40.00	2.71
Sound Studio	9	Halogen Incandescent: A-19	Wall Switch	100	5,500	Relamp	No	9	LED Screw-In Lamps: LED	Wall Switch	28	5,500	0.42	4,099	0.0	$610.11	$483.78	$45.00	0.72
Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	5,500	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	5,500	0.01	111	0.0	$16.48	$35.90	$0.00	2.18
Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	5,500	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	5,500	0.01	111	0.0	$16.48	$35.90	$0.00	2.18
Dimmer Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	5,500	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	5,500	0.01	111	0.0	$16.48	$35.90	$0.00	2.18
Theater Mezz	4	Compact Fluorescent: PAR	Wall Switch	40	5,500	Relamp	No	4	LED Screw-In Lamps: LED	Wall Switch	17	5,500	0.06	582	0.0	$86.62	$254.60	$20.00	2.71
Lobby	8	Halogen Incandescent: A-19	Wall Switch	100	5,500	Relamp	No	8	LED Screw-In Lamps: LED	Wall Switch	28	5,500	0.38	3,643	0.0	$542.32	$430.02	$40.00	0.72
Soffit	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	5,500	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	5,500	0.02	221	0.0	$32.95	$71.80	$0.00	2.18
General Classroom	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	5,500	Relamp	No	7	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	5,500	0.23	2,192	0.0	$326.24	$526.40	$0.00	1.61
Lobby	8	Compact Fluorescent: PAR	Wall Switch	40	5,500	Relamp	No	8	LED Screw-In Lamps: LED	Wall Switch	17	5,500	0.12	1,164	0.0	$173.24	$509.21	$40.00	2.71
Misc	32	Halogen Incandescent: Scone	Wall Switch	100	5,500	Fixture Replacement	No	32	LED - Linear Tubes: LED	Wall Switch	40	5,500	1.26	12,144	0.0	$1,807.74	$20,800.00	$0.00	11.51

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
Rooftop	AHU-B01	1	Supply Fan	7.5	91.0%	Yes	3,391	No	91.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU-B02	1	Supply Fan	10.0	92.0%	Yes	3,391	No	92.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU-B03	1	Supply Fan	2.0	87.0%	Yes	2,745	No	87.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU-B04	1	Supply Fan	7.5	91.0%	Yes	3,391	No	91.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU-B05	1	Supply Fan	3.0	85.0%	Yes	2,745	No	85.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU-B06	1	Supply Fan	5.0	90.0%	Yes	2,745	No	90.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU-B07	1	Supply Fan	3.0	89.0%	No	2,745	No	89.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU-B08	1	Supply Fan	5.0	90.0%	Yes	2,745	No	90.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU-B09	1	Supply Fan	5.0	90.0%	Yes	2,745	No	90.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU-B10	1	Supply Fan	3.0	89.0%	No	2,745	No	89.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU-B11	1	Exhaust Fan	0.5	85.0%	No	2,745	No	85.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	EF - 1	1	Exhaust Fan	0.5	85.0%	No	2,745	No	85.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	EF - 2	1	Exhaust Fan	1.0	85.0%	No	2,745	No	85.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	EF - 3	1	Exhaust Fan	1.0	85.0%	No	2,745	No	85.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	EF - 4	1	Exhaust Fan	1.0	85.0%	No	2,745	No	85.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	EF - 5	1	Exhaust Fan	1.0	85.0%	No	2,745	No	85.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	EF - 6	1	Exhaust Fan	1.0	85.0%	No	2,745	No	85.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	EF - 7	1	Exhaust Fan	1.0	85.0%	No	2,745	No	85.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical	DHW Circ	2	Heating Hot Water Pump	1.0	84.0%	No	2,745	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical	Distribution Pumps	2	Heating Hot Water Pump	5.0	80.0%	Yes	2,745	No	80.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical	Feed Pump	2	Water Supply Pump	60.0	92.0%	No	2,000	No	92.0%	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
Rooftop	AHU-B01	1	Packaged AC	20.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU-B02	1	Packaged AC	25.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU-B03	1	Packaged AC	5.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU-B04	1	Packaged AC	18.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU-B05	1	Packaged AC	18.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU-B06	1	Packaged AC	5.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU-B07	1	Packaged AC	10.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU-B08	1	Packaged AC	6.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU-B09	1	Packaged AC	15.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU-B10	1	Packaged AC	12.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU-B11	1	Packaged AC	6.00		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?
Computers	40	Various PC's Throughout	50.0	Yes
Monitors	55	Varios Monitors Throughout	30.0	Yes
AV Equipment	22	Various AV Throughtout	120.0	Yes
Printers	3	Copy machines	300.0	Yes
Misc APA	8	Performing Arts Equipment	1,500.0	No

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Common Area	2	Non-Refrigerated	No	0.00	0	0.0	$0.00	$460.00	$0.00	0.00