Local Government Energy Audit:
Energy Audit Report

Center for Visual Arts

Brookdale Community College
765 Newman Springs Road
Lincroft, NJ 07738

March 26, 2018

Final Report by:
TRC Energy Services

Disclaimer

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

The energy conservation measures and estimates of energy savings have been reviewed for technical accuracy. However, estimates of final energy savings are not guaranteed, because final savings may depend on behavioral factors and other uncontrollable variables. TRC 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 Center for Visual Arts.

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, as part of a comprehensive effort to assist colleges and universities in New Jersey in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

1.1 Facility Summary

The Center for Visual Arts is a 57,553 square-foot facility comprised of various space types within a single building. The building has three floors and includes classrooms, art studios, offices, a television studio, and an art gallery.

Lighting at the Center for Visual Arts is comprised of aging and inefficient fluorescent fixtures; including a large quantity of fixtures with T12 fluorescent tubes. The building is conditioned by numerous small constant volume air handling units (AHU). The cooling and heating systems consist of Carrier AHUs that are equipped with chilled and hot water coils. The chilled and hot water are supplied by the Central Utility Plant. The building receives electric power via the campus main account with JCP&L. It has no separate utility meters or submeters. 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 five energy efficiency measures. Together these measures represent an opportunity for Center for Visual Arts to reduce its annual energy costs by $21,063 and its annual greenhouse gas emissions by 188,826 lbs CO_2e. We estimate that if the measures are implemented as recommended, the project would pay for itself in 3.6 years. The breakdown of existing utility costs and the estimated energy savings following project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce Center for Visual Arts' annual energy usage by about 10% overall.

Figure 1 – Previous 12 Month Utility Costs

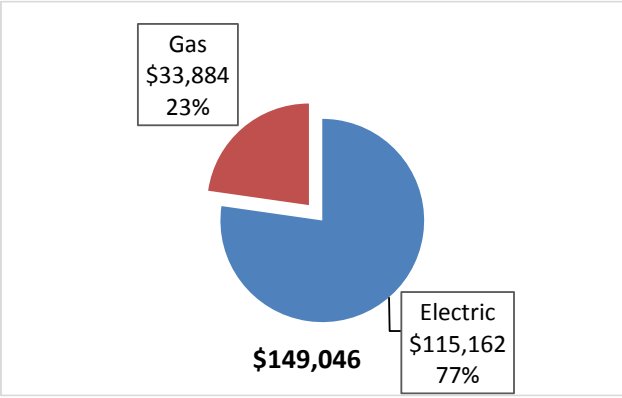
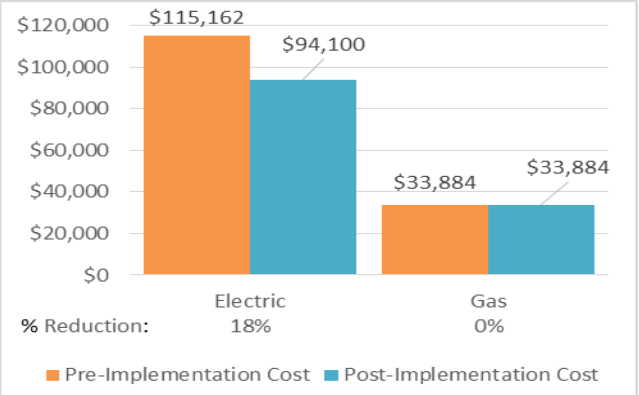


Figure 2 – Potential Post-Implementation Costs



A detailed description of Center for Visual Arts' existing energy usage can be found in Section 3.

Estimates of the total cost, energy savings, and financial incentives for the evaluated 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			**162,381**	**33.9**	**0.0**	**$18,239.52**	**$69,387.88**	**$8,820.00**	**$60,567.88**	**3.3**	**163,517**
ECM 1	Install LED Fixtures	Yes	2,105	0.3	0.0	$236.50	$1,052.28	$200.00	$852.28	3.6	2,120
ECM 2	Retrofit Fixtures with LED Lamps	Yes	158,372	33.4	0.0	$17,789.15	$65,431.62	$8,620.00	$56,811.62	3.2	159,479
ECM 3	Install LED Exit Signs	Yes	1,904	0.1	0.0	$213.87	$2,903.99	$0.00	$2,903.99	13.6	1,917
Lighting Control Measures			**20,775**	**4.8**	**0.0**	**$2,333.50**	**$14,706.00**	**$2,085.00**	**$12,621.00**	**5.4**	**20,920**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	20,775	4.8	0.0	$2,333.50	$14,706.00	$2,085.00	$12,621.00	5.4	20,920
Variable Frequency Drive (VFD) Measures			**5,145**	**1.4**	**0.0**	**$577.93**	**$3,807.95**	**$800.00**	**$3,007.95**	**5.2**	**5,181**
ECM 5	Install VFDs on Constant Volume (CV) HVAC	Yes	5,145	1.4	0.0	$577.93	$3,807.95	$800.00	$3,007.95	5.2	5,181
TOTALS			**188,301**	**40.0**	**0.0**	**$21,150.95**	**$87,901.83**	**$11,705.00**	**$76,196.83**	**3.6**	**189,618**

* - 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 than using 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 which may benefit the facility. A building'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 Center for Visual Arts include:

- Reduce Air Leakage
- Close Doors and Windows
- Ensure Lighting Controls Are Operating Properly
- Reduce Motor Short Cycling
- Perform Routine Motor Maintenance
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Ensure Economizers are Functioning Properly
- Check for and Seal Duct Leakage
- Perform Proper Water Heater Maintenance
- 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 the Center for Visual Arts. Based on the configuration of the site and its electric and thermal loads, we believe that there is a low potential for installing any solar PV or 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
- 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.

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 8.2 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			
Tim Drury	Director of Facilities Management & Construction	tdrury@brookdalecc.edu	732-224-2217
TRC Energy Services			
Tom Page	Auditor	tpage@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On December 7, 2016, TRC performed an energy audit at Center for Visual Arts located in Lincroft, New Jersey. TRC's team met with Tim Drury to review the facility operations and help focus our investigation on specific energy-using systems.

The Center for Visual Arts is a 57,553 square-foot facility comprised of various space types within a single building. The building has three floors and includes classrooms, art studios, offices, a television studio, and an art gallery.

The building receives electric power via the campus main account with JCP&L. The building has no separate utility meters. The breakdown of energy usage is based on both our estimates of the Center for Visual Arts' share of the total electric and gas loads as well as the number and sizes of the energy-using equipment on site.

TRC recommends installing electric submeters for all buildings and also, metering the hot and chilled water flow to each building to better sharpen the view of relative energy demand between one campus building and another.

2.3 Building Occupancy

The building is open for classes from Monday through Friday and closed on the weekends. The typical daily schedule is presented in the table below. During a typical day, the facility is occupied by approximately 250 staff and students.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Center for Visual Arts (CVA)	Weekday	7am-10pm
Center for Visual Arts (CVA)	Weekend	Closed

2.4 Building Envelope

The building is constructed of concrete and concrete block with a metal siding façade. The building's roof is pitched and covered with composite shingles. The attic was observed to be well insulated. The building has double pane windows which are in good condition. The exterior doors are constructed of aluminum and glass and there were no signs of excessive infiltration.

2.5 On-Site Generation

Center for Visual Arts does not have any electric generation capacity installed on site.

2.6 Energy-Using Systems

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

Lighting System

Lighting is provided mostly by 32-Watt linear fluorescent T8 lamps with electronic ballasts, as well as and compact fluorescent lamps (CFL). The fixtures are mostly 4-foot long troffers with 1, 2, or 3 lamps and diffusers. There are also many recessed can ceiling fixtures with compact fluorescent lamps.

Lighting control in most spaces is provided by wall switches. Exit signs use compact fluorescent lamps. Exterior lighting is minimal, containing a mix of fluorescent, incandescent, and HID. The exterior lights are controlled by photocells.

Image 1: Light Fixtures at CVA




Chilled Water System

A single chilled water plant located on the roof consists of two 150-ton, Carrier, air-cooled reciprocating chillers. The chillers are arranged in a variable flow primary-only distribution loop. Each chiller is served by a dedicated 10-hp primary pump; controlled with VFDs.

The chiller plant is relatively new and is well maintained. The chiller plant supplies chilled water to air handlers 1 through 5.

Image 2: Two Carrier 150-Ton Chillers

Hot Water Heating System

The building is served by the campus's central hot water plant. The central hot water plant is comprised of eight 95% efficient 3,000MBh HARSCO P-K MACH condensing hot water boilers. A more detailed description of the campus hot water system is provided in the energy audit report for that building.

Hot water is distributed through the building by two pumps located in the mechanical room. Each pump is driven by a 20 hp motor.

Image 3: Heating Hot Water Pumps

Air Handling System

Image 4: Carrier AHUs

Five Carrier air handling units serve the building. Each AHU draws air from its own return air shaft and supplies air to its own air shaft.

AHUs is located in mechanical spaces throughout the building. The AHUs are variable air volume (VAV) systems. Each AHU has a single 10-HP supply fan. The AHU has both a chilled water cooling coil and a hot water heating coil. The coils use 2-way valves to modulate the volume of water suppled and the AHU supply air temperature. Supply air temperature modulates to maintain the zone temperature setpoints. The AHUs appear to be in good condition.

Three exhaust fans on the roof maintain building static pressures.

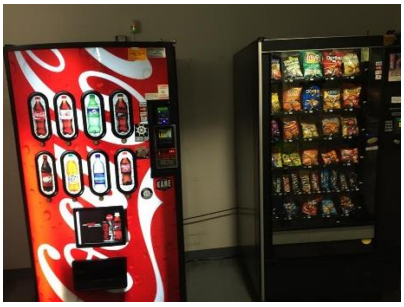
Domestic Hot Water Heating System

Domestic hot water is provided by an A.O. Smith gas fired water heater with an input rating of 75 kBtu/hr and a nominal efficiency of 80%. The water heater has a 100-gallon storage tank. A single 1 hp recirculation pump distributes domestic hot water to the entire site building. The recirculation pumps operate continuously.

Building Plug Load

There are roughly 139 desktop computers and 188 LCD monitors throughout the facility. In addition to the typical classroom projectors, printers, and copy machine equipment, we noted two computer servers, two vending machines, and 31 large LCD televisions.

Image 5: Plug Load Equipment at CVA



2.7 Water-Using Systems

There are seven restrooms at this facility. A sampling of restrooms found that faucets, toilets and urinals are rated as low flow devices, according to federal guidelines for water conservation in public facilities.

3 SITE ENERGY USE AND COSTS

Nearly the entire campus receives electricity through a master electric meter. A large portion of the campus receives natural gas through master gas meter. The main meters were prorated for individual buildings based on building size and function. It should be noted that the energy used by the central utility plant is included in the proration to this this building.

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

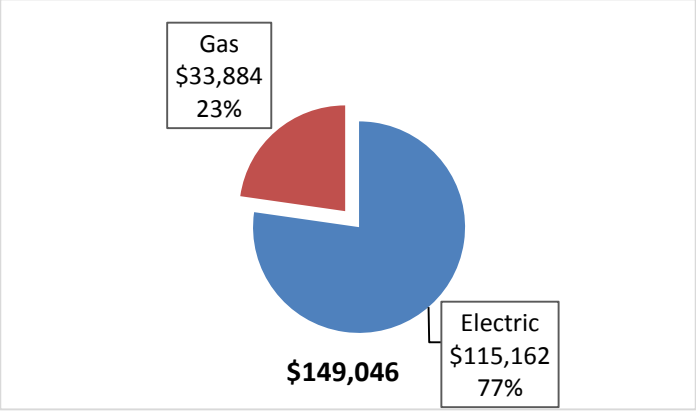
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. Submeter data was not available for a full 12-month period. Therefore, we had to use our best estimate of consumption for each building to divide up the master metered energy purchases. Annual electric usage for each building on the main account was estimated. Thermal load for each building on the central heating and cooling loops was apportioned according to building square footages. The resulting usage estimates may vary from current actual energy usage for some buildings that are supplied by the master metered electric and gas accounts. Below is our estimate of the portion of energy consumptions and costs that can be attributed to the Center for Visual Arts building.

Figure 6 - Utility Summary

Utility Summary for Center for Visual Arts		
Fuel	**Usage**	**Cost**
Electricity	1,025,256 kWh	$115,162
Natural Gas	29,506 Therms	$33,884
Total		**$149,046**

The current annual energy cost for this facility is $149,046 as shown in the chart below.

Figure 7 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by JCP&L. It is supplied via the main electric account for the campus and distributed from the Central Utility Plant to the Center for Visual Arts Central building. The average electric cost over a recent 12-month period was found to be $0.112/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. Building electric usage is not sub-metered. TRC estimated the Center for Visual Art's portion of the campus' annual electric usage based on the building's size, type, and operating hours. The prorated monthly electricity consumption and peak demand are shown in the chart below.

In order to better track energy usage over time, we recommend that all campus buildings eventually install electric sub-meters. New smart electric meters are now widely available. Investment in smart electric meters for all buildings will not save any additional energy by itself, but it may uncover additional energy savings opportunities. New smart meters can provide real time remote monitoring of each building's energy usage and log energy usage data over time to check that building systems and controls are all functioning as anticipated.

Figure 8 -Electric Usage & Demand

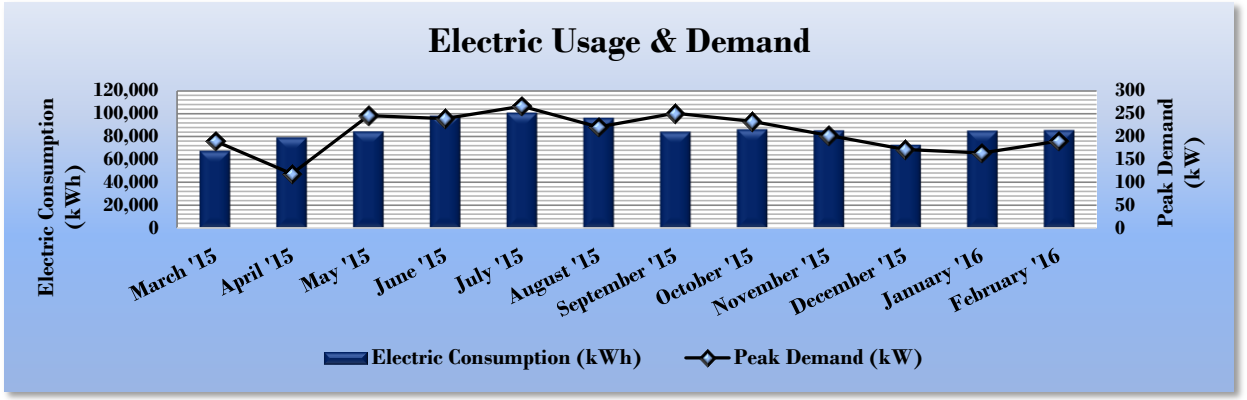


Figure 9 -Electric Usage & Demand

Electric Billing Data for Center for Visual Arts					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Total Electric Cost	TRC Estimated Usage?
4/13/15	32	67,463	190.0	$7,578	Yes
5/12/15	29	79,207	118.4	$8,897	Yes
6/11/15	30	84,453	245.8	$9,486	Yes
7/13/15	32	98,108	239.1	$11,020	Yes
8/12/15	30	100,785	266.5	$11,321	Yes
9/11/15	30	96,203	220.8	$10,806	Yes
10/13/15	32	84,126	251.2	$9,449	Yes
11/12/15	30	86,298	233.6	$9,693	Yes
12/14/15	32	85,190	202.4	$9,569	Yes
1/13/16	30	72,640	171.6	$8,159	Yes
2/11/16	29	85,144	164.3	$9,564	Yes
3/11/16	29	85,639	190.0	$9,619	Yes
Totals	**365**	**1,025,256**	**266.5**	**$115,162**	12
Annual	**365**	**1,025,256**	**266.5**	**$115,162**	

3.3 Natural Gas Usage

Natural gas is provided by New Jersey Natural Gas. The average gas cost for the past 12 months is $1.148/therm, which is the blended rate used throughout the analyses in this report. TRC estimated the Center for Visual Art's portion of the campus' annual natural gas usage for heating based on the building's size, type, and operating hours. The monthly prorated gas consumption is shown in the chart below.

Figure 10 -Natural Gas Usage

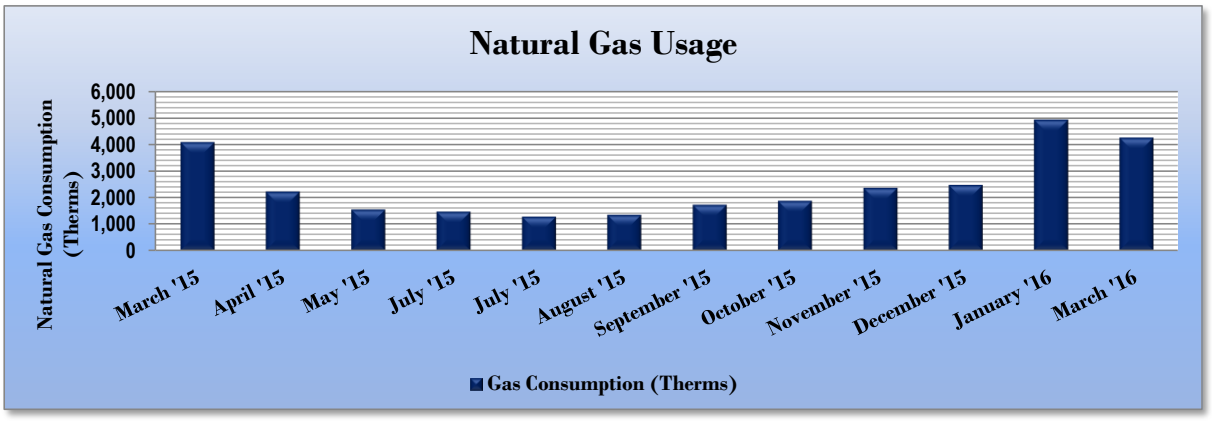


Figure 11 Natural Gas Usage

Gas Billing Data for Center for Visual Arts				
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost	TRC Estimated Usage?
4/15/15	29	4,078	$4,683	Yes
5/14/15	29	2,215	$2,544	Yes
6/11/15	28	1,543	$1,772	Yes
7/16/15	30	1,457	$1,674	Yes
8/12/15	32	1,271	$1,459	Yes
9/10/15	29	1,341	$1,540	Yes
10/8/15	28	1,725	$1,981	Yes
11/9/15	32	1,873	$2,151	Yes
12/11/15	32	2,361	$2,711	Yes
1/12/16	31	2,463	$2,828	Yes
2/11/16	31	4,929	$5,661	Yes
3/16/16	34	4,249	$4,879	Yes
Totals	**365**	**29,506**	**$33,884**	12
Annual	**365**	**29,506**	**$33,884**	

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		
	Center for Visual Arts	National Median Building Type: Higher Education - Public
Source Energy Use Intensity (kBtu/ft^2)	244.7	262.6
Site Energy Use Intensity (kBtu/ft^2)	112.0	130.7

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		
	Center for Visual Arts	National Median Building Type: Higher Education - Public
Source Energy Use Intensity (kBtu/ft^2)	209.6	262.6
Site Energy Use Intensity (kBtu/ft^2)	100.9	130.7

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

This building is not eligible to receive an ENERGY STAR® score, because it shares electric and gas end usage with the other central campus buildings which are all served by the Central Utility Plant's main electric and gas accounts. Without individual submeters to measure each building's actual electric and thermal energy usage, we cannot be certain that the assumptions on which we based our estimates of building performance are accurate for this building and other central campus buildings. Because of this limitation, a Portfolio Manager Statement of Energy Performance (SEP) was generated for all of the BCC Lincroft central campus buildings combined, based on the utility data provided for the master electric and gas accounts. Please 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.

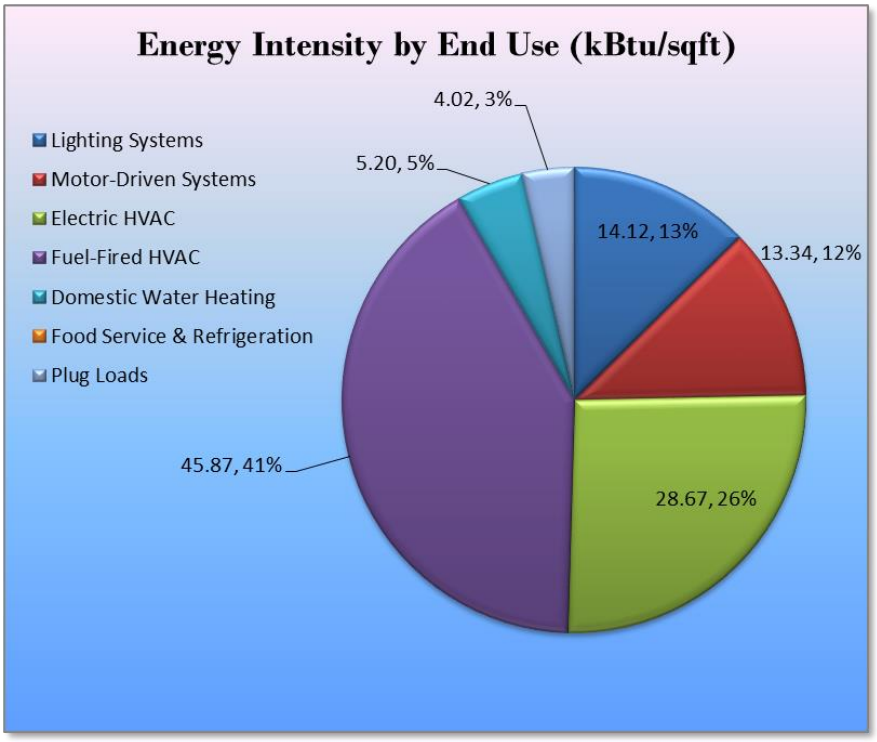
A Portfolio Manager account has been created online for your facility and you will be provided with the login information for the account. We encourage you to update your utility information in Portfolio Manager regularly, so that you can keep track of your building's performance. Free online training 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. The Central Utility Plant boilers are included in the analysis but that their operating hours were scaled to be consistent with the prorated historical energy use.

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/ft²,%)



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

4.1 Summary of ECMs

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

Figure 15 – Summary of 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		**161,595**	**33.9**	**0.0**	**$18,151.18**	**$69,387.88**	**$8,820.00**	**$60,567.88**	**3.3**	**162,725**
ECM 1	Install LED Fixtures	2,105	0.3	0.0	$236.50	$1,052.28	$200.00	$852.28	3.6	2,120
ECM 2	Retrofit Fixtures with LED Lamps	157,585	33.4	0.0	$17,700.82	$65,431.62	$8,620.00	$56,811.62	3.2	158,687
ECM 3	Install LED Exit Signs	1,904	0.1	0.0	$213.87	$2,903.99	$0.00	$2,903.99	13.6	1,917
Lighting Control Measures		**20,775**	**4.8**	**0.0**	**$2,333.50**	**$14,706.00**	**$2,085.00**	**$12,621.00**	**5.4**	**20,920**
ECM 4	Install Occupancy Sensor Lighting Controls	20,775	4.8	0.0	$2,333.50	$14,706.00	$2,085.00	$12,621.00	5.4	20,920
Variable Frequency Drive (VFD) Measures		**5,145**	**1.4**	**0.0**	**$577.93**	**$3,807.95**	**$800.00**	**$3,007.95**	**5.2**	**5,181**
ECM 5	Install VFDs on Constant Volume (CV) HVAC	5,145	1.4	0.0	$577.93	$3,807.95	$800.00	$3,007.95	5.2	5,181
TOTALS		**187,514**	**40.0**	**0.0**	**$21,062.61**	**$87,901.83**	**$11,705.00**	**$76,196.83**	**3.6**	**188,826**

* - 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		**161,595**	**33.9**	**0.0**	**$18,151.18**	**$69,387.88**	**$8,820.00**	**$60,567.88**	**3.3**	**162,725**
ECM 1	Install LED Fixtures	2,105	0.3	0.0	$236.50	$1,052.28	$200.00	$852.28	3.6	2,120
ECM 2	Retrofit Fixtures with LED Lamps	157,585	33.4	0.0	$17,700.82	$65,431.62	$8,620.00	$56,811.62	3.2	158,687
ECM 3	Install LED Exit Signs	1,904	0.1	0.0	$213.87	$2,903.99	$0.00	$2,903.99	13.6	1,917

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

ECM 1: Install LED Fixtures

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0
Exterior	2,105	0.3	0.0	$236.50	$1,052.28	$200.00	$852.28	3.6	2,120

Measure Description

We recommend replacing the existing fixtures containing exterior HID lamps serving the parking area 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 tube and more than 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	154,647	32.8	0.0	$17,370.74	$64,571.78	$8,535.00	$56,036.78	3.2	155,728
Exterior	3,725	0.6	0.0	$418.42	$859.84	$85.00	$774.84	1.9	3,751

Measure Description

We recommend retrofitting existing T8 fluorescent, compact florescent, incandescent, and halogen 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 tube and more than 10 times longer than many incandescent lamps.

ECM 3: Install LED Exit Signs

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	1,904	0.1	0.0	$213.87	$2,903.99	$0.00	$2,903.99	13.6	1,917
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend replacing all incandescent or compact fluorescent exit signs with LED exit signs. Although exit signs use only a few watts each, they are on 24 hours a day, seven days a week. So, the savings from installing lower wattage LED exit signs adds up over time. LED exit signs require virtually no maintenance and have a life expectancy of at least 20 years. This measure saves energy by installing LED fixtures, which use less power than other technologies with an equivalent lighting output.

4.1.2 Lighting Control Measures

Figure 17 – Summary of Lighting Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**20,775**	**4.8**	**0.0**	**$2,333.50**	**$14,706.00**	**$2,085.00**	**$12,621.00**	**5.4**	**20,920**
ECM 4	Install Occupancy Sensor Lighting Controls	20,775	4.8	0.0	$2,333.50	$14,706.00	$2,085.00	$12,621.00	5.4	20,920

ECM 4: Install Occupancy Sensor Lighting Controls

Measure Description

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

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

4.1.3 Variable Frequency Drive Measures

Our recommendations for variable frequency drive (VFD) measures are summarized in Figure 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		**5,145**	**1.4**	**0.0**	**$577.93**	**$3,807.95**	**$800.00**	**$3,007.95**	**5.2**	**5,181**
ECM 5	Install VFDs on Constant Volume (CV) HVAC	5,145	1.4	0.0	$577.93	$3,807.95	$800.00	$3,007.95	5.2	5,181

ECM 5: Install VFDs on Constant Volume (CV) HVAC

Measure Description

We recommend installing variable frequency drives (VFDs) to control exhaust fan motor speeds to better control the static pressure within the buildings while savings energy. The building's AHU supply fans are controlled with VFD, so a variable volume of outside is brought into the building. By controlling the exhaust fans to track the supply air, energy savings results from reducing fan speed (and power) when there is a reduced demand outside air. The magnitude of energy savings is based on the estimated amount of time that fan motors operate at partial load.

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.

Ensure Lighting Controls Are Operating Properly

Lighting controls are very cos- 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.

Reduce Motor Short Cycling

Frequent stopping and starting of motors subject 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.

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 setpoints and increase cooling setpoints). Cooling load can be reduced further by increasing the facility's occupied setpoint 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.

Check for and Seal Duct Leakage

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

Perform Proper Water Heater Maintenance

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

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 gallons per minute (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 gallons per flush (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

Image 6: Aerial View of CVA Rooftop

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 size of the free area shows that the facility has a Low potential for installing a cost-effective solar PV. In our screening of the site for solar development potential, Center for Visual Arts scored only a 58 out of 100, due to lack of suitable rooftop space.

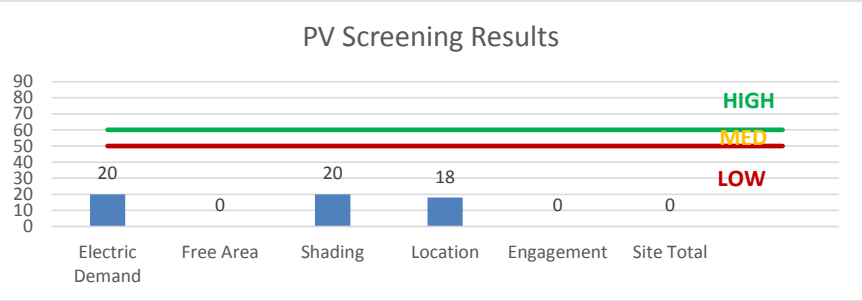
In order to be cost-effective, a solar PV array needs certain minimum criteria, such as flat or south-facing rooftop or other unshaded space on which to place the PV panels.

The Center for Visual Arts has only one small section of rooftop which is south-facing, ~3000 ft^2. This area might support up to a 42 kW solar array, which could generate up to 59,000 kWh per year. This could offset as much as $6,600 in electric purchases from the grid. However, this site may be too small to be truly cost effective.

If Brookdale Community College is interested in solar development at the Lincroft campus, it would likely be more economic to develop other buildings with larger flat rooftops first (or perhaps areas nearby that might be suitable for a ground-based array), rather than to install a relatively modest solar array here.

In our opinion, the facility does appear not seem meet the minimum criteria for cost-effective PV installation.

Figure 19 - 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

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.

In our opinion this building is not a good candidate for DR.

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

Figure 20 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings
ECM 1	Install LED Fixtures	X			
ECM 2	Retrofit Fixtures with LED Lamps	X			
ECM 3	Install LED Exit Signs	X			
ECM 4	Install Occupancy Sensor Lighting Controls	X			
ECM 5	Install VFDs on Constant Volume (CV) HVAC	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. This facility does not meet all of the criteria for participating in the P4P program based on the measures identified in this study. 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 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
Central Corridor	33	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,750	Relamp	No	33	LED - Fixtures: Downlight Recessed	Wall Switch	25	3,750	0.51	2,989	0.0	$335.69	$2,100.45	$0.00	6.26
Central Corridor	14	Incandescent: 100W Incandescent (in recessed cans)	Wall Switch	100	3,750	Relamp	No	14	LED Screw-In Lamps: 23W LED Bulbs	Wall Switch	20	3,750	0.82	4,830	0.0	$542.53	$374.50	$70.00	0.56
Central Corridor	4	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	4	LED Exit Signs: 2 W Lamp	None	2	8,760	0.02	282	0.0	$31.68	$430.22	$0.00	13.58
3rd Flr Landing	3	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,750	Relamp	No	3	LED - Fixtures: Downlight Recessed	Wall Switch	25	3,750	0.05	272	0.0	$30.52	$190.95	$0.00	6.26
Rm 212	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,000	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.14	647	0.0	$72.72	$341.60	$65.00	3.80
Rm 211	18	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,000	Relamp	Yes	18	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,100	0.97	4,558	0.0	$511.99	$2,252.40	$430.00	3.56
Rm 211	6	Halogen Incandescent: 75W Spotlight Bulbs	Wall Switch	75	3,000	Relamp	No	6	LED Screw-In Lamps: 12W LED Spotlight Bulbs	Wall Switch	12	3,000	0.28	1,304	0.0	$146.48	$139.86	$30.00	0.75
Rm 211	4	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,000	Relamp	Yes	4	LED - Fixtures: Downlight Recessed	Occupancy Sensor	25	2,100	0.08	393	0.0	$44.18	$254.60	$0.00	5.76
Prop Rm	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,500	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,050	0.14	324	0.0	$36.36	$341.60	$65.00	7.61
Rm 210 A/B	33	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,000	Relamp	Yes	33	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,100	1.78	8,357	0.0	$938.66	$3,679.40	$730.00	3.14
Rm 210 A/B	23	Halogen Incandescent: 75W Spotlight Bulbs	Wall Switch	75	3,000	Relamp	No	23	LED Screw-In Lamps: 12W LED Spotlight Bulbs	Wall Switch	12	3,000	1.07	4,999	0.0	$561.52	$536.13	$115.00	0.75
Storage Rm 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,500	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,050	0.09	216	0.0	$24.24	$266.40	$50.00	8.93
Storage Rm 2	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,500	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,050	0.18	432	0.0	$48.48	$416.80	$80.00	6.95
Men's Rm	3	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,750	Relamp	Yes	3	LED - Fixtures: Downlight Recessed	Occupancy Sensor	25	2,625	0.06	369	0.0	$41.42	$460.95	$35.00	10.28
Men's Rm	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,750	Relamp	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,625	0.05	283	0.0	$31.75	$377.70	$50.00	10.32
Women's Rm	3	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,750	Relamp	Yes	3	LED - Fixtures: Downlight Recessed	Occupancy Sensor	25	2,625	0.06	369	0.0	$41.42	$460.95	$35.00	10.28
Women's Rm	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,000	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,100	0.06	302	0.0	$33.87	$413.60	$55.00	10.59
Rm 208	30	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,000	Relamp	Yes	30	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,100	1.62	7,597	0.0	$853.32	$3,394.00	$670.00	3.19
Rm 208	16	Halogen Incandescent: 75W Spotlight Bulbs	Wall Switch	75	3,000	Relamp	Yes	16	LED Screw-In Lamps: 12W LED Spotlight Bulbs	Occupancy Sensor	12	2,100	0.78	3,676	0.0	$412.94	$642.96	$115.00	1.28
Rm 208	3	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,000	Relamp	Yes	3	LED - Fixtures: Downlight Recessed	Occupancy Sensor	25	2,100	0.06	295	0.0	$33.13	$460.95	$35.00	12.86
Storage Area 1	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,500	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,050	0.14	324	0.0	$36.36	$341.60	$65.00	7.61
Storage Area 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,500	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,050	0.09	216	0.0	$24.24	$266.40	$50.00	8.93
Changing Rm	1	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	1,500	Relamp	Yes	1	LED - Fixtures: Downlight Recessed	Occupancy Sensor	25	1,050	0.02	49	0.0	$5.52	$179.65	$20.00	28.91
Main Stairway 2nd Flr	2	Linear Fluorescent - T8: 4' T8 (32W) - 12L	Wall Switch	352	3,750	Relamp	No	2	LED - Linear Tubes: (12) 4' Lamps	Wall Switch	174	3,750	0.26	1,535	0.0	$172.45	$460.98	$0.00	2.67
Main Stairway 2nd Flr	2	Compact Fluorescent: 2x 13W CFL (wall sconces)	Wall Switch	26	3,750	Relamp	No	2	LED Screw-In Lamps: 9W LED Bulbs	Wall Switch	18	3,750	0.01	69	0.0	$7.75	$36.00	$20.00	2.06

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Corridor 2	19	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,750	Relamp	No	19	LED - Fixtures: Downlight Recessed	Wall Switch	25	3,750	0.29	1,721	0.0	$193.28	$1,209.35	$0.00	6.26
Corridor 2	3	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	2	8,760	0.02	212	0.0	$23.76	$322.67	$0.00	13.58
Rm 206	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.09	288	0.0	$32.32	$266.40	$50.00	6.70
Rm 205	6	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	2,000	Relamp	Yes	6	LED - Fixtures: Downlight Recessed	Occupancy Sensor	25	1,400	0.13	393	0.0	$44.18	$497.90	$20.00	10.82
Rm 205A	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.18	575	0.0	$64.64	$416.80	$80.00	5.21
Rm 205A	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	None	32	2,000	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	None	15	2,000	0.03	81	0.0	$9.04	$71.80	$10.00	6.83
Rm 205B	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.18	575	0.0	$64.64	$416.80	$80.00	5.21
Rm 205B	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	None	32	2,000	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	None	15	2,000	0.03	81	0.0	$9.04	$71.80	$10.00	6.83
Rm 205C	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.14	432	0.0	$48.48	$341.60	$65.00	5.71
Rm 205C	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	None	32	2,000	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	None	15	2,000	0.03	81	0.0	$9.04	$71.80	$10.00	6.83
Rm 205D	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.14	432	0.0	$48.48	$341.60	$65.00	5.71
Rm 205D	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	None	32	2,000	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	None	15	2,000	0.03	81	0.0	$9.04	$71.80	$10.00	6.83
Rm 205E	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.18	575	0.0	$64.64	$416.80	$80.00	5.21
Rm 205E	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	None	32	2,000	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	None	15	2,000	0.03	81	0.0	$9.04	$71.80	$10.00	6.83
Rm 205F	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.18	575	0.0	$64.64	$416.80	$80.00	5.21
Rm 205F	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	None	32	2,000	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	None	15	2,000	0.03	81	0.0	$9.04	$71.80	$10.00	6.83
Interior Design Studio	36	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,000	Relamp	Yes	36	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,100	1.94	9,116	0.0	$1,023.99	$3,964.80	$790.00	3.10
Interior Design Studio	8	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,000	Relamp	Yes	8	LED - Fixtures: Downlight Recessed	Occupancy Sensor	25	2,100	0.17	787	0.0	$88.36	$779.20	$35.00	8.42
Interior Design Studio	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,000	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.28	1,295	0.0	$145.44	$721.20	$125.00	4.10
Interior Design Studio	15	Linear Fluorescent - T9: 9" Circline Tubes (22W)	None	22	3,000	Relamp	No	15	LED - Linear Tubes: (1) 12W LED Circline	None	12	3,000	0.11	518	0.0	$58.13	$720.00	$0.00	12.39
Interior Design Studio	15	Incandescent: 60W Screw-In Bulb	None	60	3,000	Relamp	No	15	LED Screw-In Lamps: 9W LED Bulbs	None	9	3,000	0.56	2,639	0.0	$296.45	$232.50	$75.00	0.53
Attic	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.02	38	0.0	$4.26	$58.50	$10.00	11.38
IDS Storage	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,500	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,050	0.28	647	0.0	$72.72	$567.20	$110.00	6.29
2nd Flr Corridor	9	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	1,500	Relamp	No	9	LED - Fixtures: Downlight Recessed	Wall Switch	25	1,500	0.14	326	0.0	$36.62	$572.85	$0.00	15.64
2nd Flr Corridor	5	Linear Fluorescent - T8: 4' T8 (32W) - 12L	Wall Switch	352	3,750	Relamp	No	5	LED - Linear Tubes: (12) 4' Lamps	Wall Switch	174	3,750	0.66	3,838	0.0	$431.12	$1,152.45	$0.00	2.67

	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 202	2	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	2,000	Relamp	Yes	2	LED - Fixtures: Downlight Recessed	Occupancy Sensor	25	1,400	0.04	131	0.0	$14.73	$243.30	$20.00	15.16
Rm 202	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,400	0.03	96	0.0	$10.77	$58.50	$10.00	4.50
Srorage Area	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,500	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,050	0.31	719	0.0	$80.80	$701.00	$120.00	7.19
Rm 201	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.74	3,453	0.0	$387.83	$1,636.00	$280.00	3.50
Rm 201	30	Linear Fluorescent - T9: 9" Circline Tubes (22W)	None	22	3,000	Relamp	No	30	LED - Linear Tubes: (1) 12W LED Circline	None	12	3,000	0.22	1,035	0.0	$116.26	$1,440.00	$0.00	12.39
Rm 201	30	Incandescent: 60W Screw-In Bulb	None	60	3,000	Relamp	No	30	LED Screw-In Lamps: 9W LED Bulbs	None	9	3,000	1.13	5,279	0.0	$592.91	$465.00	$150.00	0.53
Rm 203	6	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,000	Relamp	Yes	6	LED - Fixtures: Downlight Recessed	Occupancy Sensor	25	2,100	0.13	590	0.0	$66.27	$497.90	$20.00	7.21
Rm 203	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,000	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.18	863	0.0	$96.96	$416.80	$80.00	3.47
Rm 203	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.06	288	0.0	$32.32	$117.00	$20.00	3.00
Rm 203	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.01	28	0.0	$3.10	$117.00	$20.00	31.29
1st Flr Stairwell	2	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,750	Relamp	No	2	LED - Fixtures: Downlight Recessed	Wall Switch	25	3,750	0.03	181	0.0	$20.34	$127.30	$0.00	6.26
2nd Flr Stairwell	3	Compact Fluorescent: 2x 13W CFL (wall sconces)	Wall Switch	26	3,750	Relamp	No	3	LED Screw-In Lamps: 9W LED Bulbs	Wall Switch	18	3,750	0.02	104	0.0	$11.63	$54.00	$30.00	2.06
2nd Flr Stairwell	1	Linear Fluorescent - T8: 4' T8 (32W) - 12L	Wall Switch	352	3,750	Relamp	No	1	LED - Linear Tubes: (12) 4' Lamps	Wall Switch	174	3,750	0.13	768	0.0	$86.22	$230.49	$0.00	2.67
1st Flr Corridor	36	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,750	Relamp	No	36	LED - Fixtures: Downlight Recessed	Wall Switch	25	3,750	0.56	3,260	0.0	$366.21	$2,291.40	$0.00	6.26
1st Flr Corridor 1	2	Compact Fluorescent: 2x 13W CFL (wall sconces)	Wall Switch	26	3,000	Relamp	No	2	LED Screw-In Lamps: 9W LED Bulbs	Wall Switch	18	3,000	0.01	55	0.0	$6.20	$36.00	$20.00	2.58
Rm 103	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.55	2,590	0.0	$290.87	$1,323.00	$215.00	3.81
Rm 103	6	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	6	LED Exit Signs: 2 W Lamp	None	2	8,760	0.03	423	0.0	$47.53	$645.33	$0.00	13.58
Rm 103 Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,500	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,050	0.09	216	0.0	$24.24	$266.40	$50.00	8.93
Rm 101	17	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	Yes	17	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.52	2,446	0.0	$274.71	$1,264.50	$205.00	3.86
Rm 102	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.18	575	0.0	$64.64	$416.80	$80.00	5.21
Rm 104	17	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,000	Relamp	Yes	17	LED - Fixtures: Downlight Recessed	Occupancy Sensor	25	2,100	0.36	1,672	0.0	$187.75	$1,352.05	$35.00	7.01
Rm 105	17	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,000	Relamp	Yes	17	LED - Fixtures: Downlight Recessed	Occupancy Sensor	25	2,100	0.36	1,672	0.0	$187.75	$1,352.05	$35.00	7.01
Men's Rm	5	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,000	Relamp	Yes	5	LED - Fixtures: Downlight Recessed	Occupancy Sensor	25	2,100	0.10	492	0.0	$55.22	$588.25	$35.00	10.02
Men's Rm	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,000	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,100	0.06	302	0.0	$33.87	$143.60	$20.00	3.65
Women's Rm	4	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,000	Relamp	Yes	4	LED - Fixtures: Downlight Recessed	Occupancy Sensor	25	2,100	0.08	393	0.0	$44.18	$524.60	$35.00	11.08

	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
Women's Rm	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,000	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,100	0.06	302	0.0	$33.87	$143.60	$20.00	3.65
Mop Closet	1	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	1,000	Relamp	Yes	1	LED - Fixtures: Downlight Recessed	Occupancy Sensor	25	700	0.02	33	0.0	$3.68	$179.65	$20.00	43.37
1st Flr Corridor 2	11	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,750	Relamp	No	11	LED - Fixtures: Downlight Recessed	Wall Switch	25	3,750	0.17	996	0.0	$111.90	$700.15	$0.00	6.26
Rm 106	27	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	Yes	27	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.83	3,884	0.0	$436.31	$2,119.50	$340.00	4.08
Rm 106	15	Linear Fluorescent - T9: 9" Circline Tubes (22W)	None	22	2,000	Relamp	No	15	LED - Linear Tubes: (1) 12W LED Circline	None	12	2,000	0.11	345	0.0	$38.75	$720.00	$0.00	18.58
Rm 106	15	Incandescent: 60W Screw-In Bulb	None	60	2,000	Relamp	No	15	LED Screw-In Lamps: 9W LED Bulbs	None	9	2,000	0.56	1,760	0.0	$197.64	$232.50	$75.00	0.80
Rm 106 Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,500	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,050	0.18	432	0.0	$48.48	$416.80	$80.00	6.95
Office Rm 108	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.28	863	0.0	$96.96	$567.20	$110.00	4.72
Office Rm 108	7	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,000	Relamp	Yes	7	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,400	0.11	352	0.0	$39.51	$367.30	$55.00	7.90
Server Rm	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,000	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	700	0.06	96	0.0	$10.77	$233.00	$40.00	17.91
Sm Kitchen	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,000	Relamp	Yes	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,400	0.05	144	0.0	$16.16	$191.20	$35.00	9.67
1st Flr Foyer	18	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,750	Relamp	No	18	LED - Fixtures: Downlight Recessed	Wall Switch	25	3,750	0.28	1,630	0.0	$183.10	$1,145.70	$0.00	6.26
1st Flr Foyer	2	Compact Fluorescent: 42W CFL Screw-In Bulbs	Wall Switch	42	3,750	Relamp	No	2	LED Screw-In Lamps: 20W LED Bulbs	Wall Switch	20	3,750	0.03	190	0.0	$21.31	$81.00	$0.00	3.80
1st Flr Foyer	2	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	2	8,760	0.01	141	0.0	$15.84	$215.11	$0.00	13.58
Gallery	67	Halogen Incandescent: 75W Spotlight Bulbs	Wall Switch	75	3,750	Relamp	No	67	LED Screw-In Lamps: 12W LED Spotlight Bulbs	Wall Switch	12	3,750	3.11	18,203	0.0	$2,044.66	$1,561.77	$335.00	0.60
Gallery	1	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,750	Relamp	No	1	LED - Fixtures: Downlight Recessed	Wall Switch	25	3,750	0.02	91	0.0	$10.17	$63.65	$0.00	6.26
Gallery	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,750	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,750	0.04	213	0.0	$23.98	$75.20	$15.00	2.51
Gallery	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	2	8,760	0.01	71	0.0	$7.92	$107.56	$0.00	13.58
Lower Level Stairwell	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,750	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,750	0.04	213	0.0	$23.98	$75.20	$15.00	2.51
Lower Level Stairwell	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,750	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,750	0.01	75	0.0	$8.48	$35.90	$5.00	3.65
Men's Rm	2	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,000	Relamp	Yes	2	LED - Fixtures: Downlight Recessed	Occupancy Sensor	25	2,100	0.04	197	0.0	$22.09	$397.30	$35.00	16.40
Men's Rm	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,000	Relamp	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,100	0.05	226	0.0	$25.40	$107.70	$15.00	3.65
Women's Rm	2	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,000	Relamp	Yes	2	LED - Fixtures: Downlight Recessed	Occupancy Sensor	25	2,100	0.04	197	0.0	$22.09	$397.30	$35.00	16.40
Women's Rm	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,750	Relamp	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,625	0.05	283	0.0	$31.75	$107.70	$15.00	2.92
Elevator	6	Incandescent: 60W Screw-In Bulb	Wall Switch	60	3,750	Relamp	No	6	LED Screw-In Lamps: 9W LED Bulbs	Wall Switch	9	3,750	0.23	1,320	0.0	$148.23	$93.00	$30.00	0.43

	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
1st Flr Corridor	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,750	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,750	0.07	427	0.0	$47.96	$150.40	$30.00	2.51
1st Flr Corridor	2	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,750	Relamp	No	2	LED - Fixtures: Downlight Recessed	Wall Switch	25	3,750	0.03	181	0.0	$20.34	$127.30	$0.00	6.26
1st Flr Corridor	3	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	2	8,760	0.02	212	0.0	$23.76	$322.67	$0.00	13.58
Rm 116	27	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	Yes	27	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.83	3,884	0.0	$436.31	$2,119.50	$340.00	4.08
Rm 116	18	Halogen Incandescent: 75W Spotlight Bulbs	Wall Switch	75	3,000	Relamp	No	18	LED Screw-In Lamps: 12W LED Spotlight Bulbs	Wall Switch	12	3,000	0.83	3,912	0.0	$439.45	$419.58	$90.00	0.75
Rm 116	1	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,000	Relamp	No	1	LED - Fixtures: Downlight Recessed	Wall Switch	25	3,000	0.02	72	0.0	$8.14	$63.65	$0.00	7.82
Rm 116	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	2	8,760	0.01	71	0.0	$7.92	$107.56	$0.00	13.58
Rm 116 Studio	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.25	1,151	0.0	$129.28	$738.00	$115.00	4.82
Rm 116 Studio	2	Compact Fluorescent: 13W CFL Screw-In Bulbs	Wall Switch	13	3,000	Relamp	No	2	LED Screw-In Lamps: 9W LED Bulbs	Wall Switch	9	3,000	0.01	28	0.0	$3.10	$31.00	$0.00	10.00
Dark Rooms	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,500	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,500	0.44	1,025	0.0	$115.09	$902.40	$180.00	6.28
Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,500	Relamp	Yes	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,050	0.05	108	0.0	$12.12	$191.20	$35.00	12.89
Rm 117	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.55	2,590	0.0	$290.87	$1,323.00	$215.00	3.81
Rm 117	6	Halogen Incandescent: 75W Spotlight Bulbs	Wall Switch	75	3,000	Relamp	No	6	LED Screw-In Lamps: 12W LED Spotlight Bulbs	Wall Switch	12	3,000	0.28	1,304	0.0	$146.48	$139.86	$30.00	0.75
Rm 118	27	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	Yes	27	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.83	3,884	0.0	$436.31	$2,119.50	$340.00	4.08
Rm 118	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,000	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.51	2,374	0.0	$266.63	$1,097.20	$200.00	3.36
Damp Rm	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,000	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,000	0.07	342	0.0	$38.36	$150.40	$30.00	3.14
Kiln Rm	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	No	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.22	1,025	0.0	$115.09	$526.50	$90.00	3.79
Kiln Rm	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,000	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,000	0.04	171	0.0	$19.18	$75.20	$15.00	3.14
Kiln Rm	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	2	8,760	0.01	71	0.0	$7.92	$107.56	$0.00	13.58
Lower Level Stairwell 2	2	Compact Fluorescent: 2x 13W CFL (wall sconces)	Wall Switch	26	3,750	Relamp	No	2	LED Screw-In Lamps: 9W LED Bulbs	Wall Switch	18	3,750	0.01	69	0.0	$7.75	$36.00	$0.00	4.64
Lower Level Stairwell 2	1	Incandescent: 60W Screw-In Bulb	Wall Switch	60	3,750	Relamp	No	1	LED Screw-In Lamps: 9W LED Bulbs	Wall Switch	9	3,750	0.04	220	0.0	$24.70	$15.50	$0.00	0.63
Lower Level Corridor	5	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,750	Relamp	No	5	LED - Fixtures: Downlight Recessed	Wall Switch	25	3,750	0.08	453	0.0	$50.86	$318.25	$0.00	6.26
Lower Level Corridor	4	Compact Fluorescent: 2x 13W CFL (wall sconces)	Wall Switch	26	3,750	Relamp	No	4	LED Screw-In Lamps: 9W LED Bulbs	Wall Switch	18	3,750	0.02	138	0.0	$15.50	$72.00	$40.00	2.06
Lower Level Corridor	2	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	2	8,760	0.01	141	0.0	$15.84	$215.11	$0.00	13.58
Storage Rm	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,500	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,050	0.03	72	0.0	$8.08	$174.50	$30.00	17.88

	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
LL Mech Rm	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,000	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.15	228	0.0	$25.58	$351.00	$60.00	11.38
LL Mech Rm	1	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	2	8,760	0.01	71	0.0	$7.92	$107.56	$0.00	13.58
LL Corridor	19	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,750	Relamp	No	19	LED - Fixtures: Downlight Recessed	Wall Switch	25	3,750	0.29	1,721	0.0	$193.28	$1,209.35	$0.00	6.26
LL Corridor	3	Exit Signs: Fluorescent	None	9	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	2	8,760	0.02	212	0.0	$23.76	$322.67	$0.00	13.58
Elevator Rm	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	500	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	500	0.02	19	0.0	$2.13	$58.50	$10.00	22.76
Men's Rm	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,000	Relamp	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,100	0.05	226	0.0	$25.40	$377.70	$50.00	12.90
Men's Rm	2	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,000	Relamp	Yes	2	LED - Fixtures: Downlight Recessed	Occupancy Sensor	25	2,100	0.04	197	0.0	$22.09	$127.30	$0.00	5.76
Women's Rm	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,000	Relamp	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,100	0.05	226	0.0	$25.40	$377.70	$50.00	12.90
Women's Rm	2	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,000	Relamp	Yes	2	LED - Fixtures: Downlight Recessed	Occupancy Sensor	25	2,100	0.04	197	0.0	$22.09	$127.30	$0.00	5.76
Electrical Rm	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	500	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	500	0.05	38	0.0	$4.26	$117.00	$20.00	22.76
Server Rm	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	500	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	500	0.02	19	0.0	$2.13	$58.50	$10.00	22.76
Rm 005	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,000	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	0.41	1,942	0.0	$218.16	$792.80	$155.00	2.92
Rm 005	1	Linear Fluorescent - T9: 9" Circline Tubes (27W)	None	27	2,000	Relamp	No	1	LED - Linear Tubes: (1) 12W LED Circline	None	12	2,000	0.01	35	0.0	$3.88	$48.00	$0.00	12.39
Rm 005	1	Incandescent: 52W Screw-In Bulb	None	52	2,000	Relamp	No	1	LED Screw-In Lamps: 9W LED Bulbs	None	9	2,000	0.03	99	0.0	$11.11	$15.50	$5.00	0.95
Rm 004	27	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	Yes	27	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.83	3,884	0.0	$436.31	$1,849.50	$305.00	3.54
Rm 004	8	Linear Fluorescent - T9: 9" Circline Tubes (27W)	Wall Switch	27	3,000	Relamp	No	8	LED - Linear Tubes: (1) 12W LED Circline	Wall Switch	12	3,000	0.09	414	0.0	$46.50	$384.00	$0.00	8.26
Rm 004	8	Incandescent: 52W Screw-In Bulb	Wall Switch	52	3,000	Relamp	No	8	LED Screw-In Lamps: 9W LED Bulbs	Wall Switch	9	3,000	0.25	1,187	0.0	$133.31	$124.00	$40.00	0.63
Rm 007	29	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,000	Relamp	Yes	29	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,100	1.34	6,258	0.0	$702.95	$2,990.80	$540.00	3.49
Rm 007	6	Incandescent: 60W Screw-In Bulb	Wall Switch	60	3,000	Relamp	No	6	LED Screw-In Lamps: 9W LED Bulbs	Wall Switch	9	3,000	0.23	1,056	0.0	$118.58	$93.00	$30.00	0.53
Storage	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,500	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,050	0.18	432	0.0	$48.48	$467.00	$80.00	7.98
Mech Rm 2	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,000	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.15	228	0.0	$25.58	$351.00	$60.00	11.38
LL Stairwell 3	1	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	3,750	Relamp	No	1	LED - Fixtures: Downlight Recessed	Wall Switch	25	3,750	0.02	91	0.0	$10.17	$63.65	$0.00	6.26
Rm 207	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.18	863	0.0	$96.96	$467.00	$80.00	3.99
Rm 205	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,000	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,100	0.06	288	0.0	$32.32	$233.00	$40.00	5.97
Main Stairway 2nd Flr	2	Incandescent: 100W Incandescent (pendant fixtures - center spot)	Wall Switch	100	3,750	Relamp	No	2	LED Screw-In Lamps: 23W LED Bulbs	Wall Switch	23	3,750	0.11	664	0.0	$74.60	$53.50	$10.00	0.58

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
2nd Flr Corridor	5	Incandescent: 100W Incandescent (pendant fixtures - center spot)	Wall Switch	100	3,750	Relamp	No	5	LED Screw-In Lamps: 23W LED Bulbs	Wall Switch	23	3,750	0.28	1,660	0.0	$186.49	$133.75	$25.00	0.58
2nd Flr Stairwell	1	Incandescent: 100W Incandescent (pendant fixtures - center spot)	Wall Switch	100	3,750	Relamp	No	1	LED Screw-In Lamps: 23W LED Bulbs	Wall Switch	23	3,750	0.06	332	0.0	$37.30	$26.75	$5.00	0.58
2nd Flr Electrical Rm	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	500	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	500	0.05	38	0.0	$4.26	$117.00	$20.00	22.76
Bollard Walkway Lights	8	Incandescent: 60W Screw-In Bulb	Wall Switch	60	4,380	Relamp	No	8	LED Screw-In Lamps: 9W LED Bulbs	Wall Switch	9	4,380	0.30	2,055	0.0	$230.84	$430.02	$40.00	1.69
Rear Door	1	Compact Fluorescent: 2x 23W CFL (recessed cans)	Wall Switch	46	4,380	Relamp	No	1	LED - Fixtures: Downlight Recessed	Wall Switch	25	4,380	0.02	106	0.0	$11.88	$63.65	$0.00	5.36
Front Door	4	Halogen Incandescent: 75W Spotlight Bulbs	Wall Switch	75	4,380	Relamp	No	4	LED Screw-In Lamps: 12W LED Spotlight Bulbs	Wall Switch	12	4,380	0.19	1,269	0.0	$142.58	$195.41	$20.00	1.23
Front Door Bollard	1	Incandescent: 60W Screw-In Bulb	Wall Switch	60	4,380	Relamp	No	1	LED Screw-In Lamps: 9W LED Bulbs	Wall Switch	9	4,380	0.04	257	0.0	$28.85	$53.75	$5.00	1.69
Parking Area	2	Metal Halide: (1) 250W Lamp	Wall Switch	295	4,380	Fixture Replacement	No	2	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Wall Switch	86	4,380	0.31	2,105	0.0	$236.50	$1,052.28	$200.00	3.60

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	CVA	2	Exhaust Fan	10.0	88.5%	Yes	3,391	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mech Rm	CVA	2	Heating Hot Water Pump	20.0	88.5%	Yes	3,391	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mech Rm	CVA	2	Chilled Water Pump	10.0	88.5%	Yes	3,391	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mech Rm	CVA	1	Process Pump	1.0	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mech Rm	CVA	5	Supply Fan	10.0	90.2%	Yes	3,391	No	90.2%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	CVA	1	Exhaust Fan	10.0	88.5%	No	3,391	No	88.5%	Yes	1	1.37	5,145	0.0	$577.93	$3,807.95	$800.00	5.20

Electric Chiller Inventory & Recommendations

		Existing Conditions			Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Chiller Quantity	System Type	Cooling Capacity per Unit (Tons)	Install High Efficiency Chillers?	Chiller Quantity	System Type	Constant/ Variable Speed	Cooling Capacity (Tons)	Full Load Efficiency (kW/Ton)	IPLV Efficiency (kW/Ton)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	CVA Building	2	Air-Cooled Reciprocating Chiller	150.00	No							0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Rm	Central Campus	8	Condensing Hot Water Boiler	2,850.00	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
Mech Rm	CVA	1	Storage Tank Water Heater (> 50 Gal)	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?
CVA	139	Desktop Computers	120.0	Yes
CVA	188	Computer Monitors	28.0	Yes
CVA	17	Printers	13.0	Yes
CVA	31	32" LCD TV	92.0	Yes
CVA	6	Microwaves	900.0	Yes
CVA	2	Servers	450.0	No
CVA	8	Copiers	290.0	Yes

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
LL Hallway	1	Refrigerated	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
LL Hallway	1	Non-Refrigerated	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

N/A

ENERGY STAR® Score[1]

Brookdale Community College - Lincroft Campus

Primary Property Type: College/University
Gross Floor Area (ft²): 900,381
Built: 1967

For Year Ending: February 29, 2016
Date Generated: June 28, 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
Brookdale Community College - Lincroft Campus 765 Newman Springs Road Lincroft, New Jersey 07738	Brookdale Community College 765 Newman Springs Road Lincroft, NJ 07738 (732) 224-2217	Timothy Drury 765 Newman Springs Road Lincroft, NJ 07738 (732) 224-2217 tdrury@brookdalecc.edu

Property ID: 5733170

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
95.4 kBtu/ft²

Source EUI
211.9 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	48,132,581 (56%)
Natural Gas (kBtu)	37,799,044 (44%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	118.2
National Median Source EUI (kBtu/ft²)	262.6
% Diff from National Median Source EUI	-19%

Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	7,528

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)