Local Government Energy Audit:
Energy Audit Report

Robert Collins Arena and Fitness Center

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 saving are included in this report to help make decisions about reducing energy use at the facility. This report, however, is not intended to serve as a detailed engineering design document. Further design and analysis may be necessary in order to implement some of the measures recommended in this report.

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

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

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

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1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for the Robert Collins Arena & Fitness Center.

The goal of an LGEA report is to provide public facilities and local governments with valuable information on their facilities' energy usage. The LGEA program identifies energy conservation measures (ECMs) and energy management options that may benefit public facilities and to provides information on financial incentives from New Jersey's Clean Energy Programs (NJCEP) and other sources assistance which may be available to help with ECM implementation.

This study was conducted by TRC Energy Services (TRC), as part of a comprehensive effort to assist New Jersey community colleges in controlling their energy costs and help to protect our environment by promoting more efficient use of energy resources statewide.

1.1 Facility Summary

The Robert Collins Arena and Fitness Center (RCA) is an 82,600 square foot facility comprised of various space types within a single building. One side is a fitness center with workout spaces, treadmills, a dance studio, and offices. The other side is a large basketball arena where sporting events and concerts are held. The building has two levels. It also contains practice gyms, a large lobby area, weight rooms, locker rooms, classroom spaces, an indoor track, restrooms, storage areas, and athletic offices.

Lighting at the Robert Collins Arena & Fitness Center consists primarily by T8 linear fluorescent fixtures. The Fitness Center and few other areas are lit mostly by recessed cans with compact fluorescent bulbs. The main arena is lit by high bay 5-lamp T5HO fluorescent fixtures. All are considered inefficient by new lighting efficiency standards and can be cost-effectively replaced with LEDs.

The building is conditioned by four main variable air volume (VAV) air handling units (AHUs). The AHUs receive chilled water and hot water from the campus central utility plant and distribute conditioned air throughout the building. The building has no large boilers, furnaces, chillers, or air conditioning units on site. The building is supplied with electric power via campus' master electric account. A thorough description of the facility and our observations are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated three energy conservation measures. Together these three ECMs represent an opportunity for Robert Collins Arena and Fitness Center to reduce its annual energy costs by $5,649 and its annual greenhouse gas emissions by 50,643 lbs CO_2e. We estimate that if all measures are implemented as recommended, the project would pay for itself in about 7.1 years. The breakdown of existing utility costs and projected annual savings following implementation of all measures are shown in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce Maintenance Building's annual energy use by about 5% overall.

Figure 1 – Previous 12 Month Utility Costs

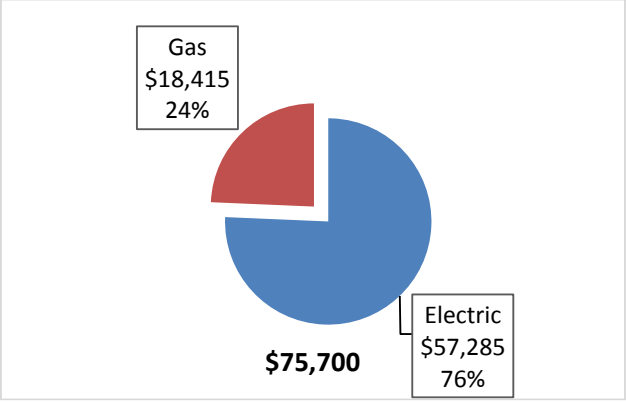
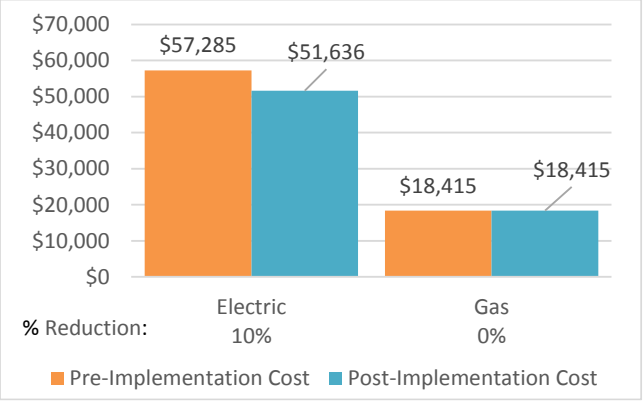


Figure 2 – Potential Post-Implementation Costs



A detailed description of Robert Collins Arena & Fitness Center's existing energy use 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			**40,576**	**11.1**	**0.0**	**$4,557.71**	**$36,179.09**	**$3,775.00**	**$32,404.09**	**7.1**	**40,860**
ECM 1	Retrofit Fixtures with LED Lamps	Yes	40,576	11.1	0.0	$4,557.71	$36,179.09	$3,775.00	$32,404.09	7.1	40,860
Lighting Control Measures			**4,195**	**1.4**	**0.0**	**$471.22**	**$7,448.00**	**$1,030.00**	**$6,418.00**	**13.6**	**4,224**
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	4,195	1.4	0.0	$471.22	$7,448.00	$1,030.00	$6,418.00	13.6	4,224
Plug Load Equipment Control - Vending Machine			**5,521**	**0.0**	**0.0**	**$620.10**	**$1,150.00**	**$0.00**	**$1,150.00**	**1.9**	**5,559**
ECM 3	Vending Machine Control	Yes	5,521	0.0	0.0	$620.10	$1,150.00	$0.00	$1,150.00	1.9	5,559
TOTALS			**50,292**	**12.5**	**0.0**	**$5,649.03**	**$44,777.09**	**$4,805.00**	**$39,972.09**	**7.1**	**50,643**

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

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

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

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.

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

Energy Efficient Practices

TRC also identified 12 low-cost (or no-cost) energy efficient practices which might yield additional energy savings for the facility. A facility's energy performance can be significantly improved by employing certain behavioral or operational adjustments and by performing better routine maintenance on building systems. These practices can extend equipment lifetime, improve occupant comfort, provide better health and safety, as well as reduce annual energy and O&M costs. Potential opportunities identified at Robert Collins Arena & Fitness Center include:

- Reduce Air Leakage
- Close Doors and Windows
- Ensure Lighting Controls Are Operating Properly
- Reduce Motor Short Cycling
- Perform Routine Motor Maintenance
- Use Fans to Reduce Cooling Load
- 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
- 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 Robert Collins Arena & Fitness Center. Based on the configuration of the site and its loads there is a low potential for installing any PV and combined heat and power self-generation measures.

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

1.3 Implementation Planning

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

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

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

- SmartStart
- 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

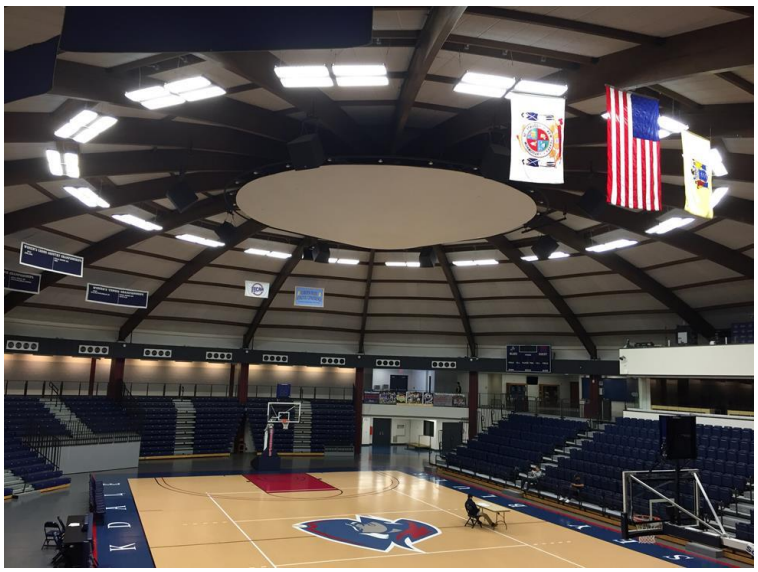
Figure 4 – Project Contacts

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 8, 2016, TRC performed an energy audit at Robert Collins Arena and Fitness Center located in Lincroft, New Jersey. TRC's team met with Tim Drury, Director of Facilities Management & Construction to review the facility operations and help focus our investigation on specific energy-using systems.

The Robert Collins Arena and Fitness Center is an 82,600 square foot facility comprised of various space types within a single building. One side is a fitness center with workout spaces, treadmills, a dance studio, and offices. The other side is a large basketball arena where sporting events and concerts are held. The building has two levels. It also contains practice gyms, a large lobby area, weight rooms, locker rooms, classroom spaces, an indoor track, restrooms, storage areas, and athletic offices.



The building is conditioned by four main variable air volume (VAV) air handling units (AHUs). The AHUs receive chilled water and hot water from the campus central utility plant and distribute conditioned air throughout the building. The building has no large boilers, furnaces, chillers, or air conditioning units on site. The building is supplied with electric power via campus's master electric account. A thorough description of the facility and our observations are located in Section 2.

2.3 Building Occupancy

The building is open every day throughout the year. Occupancy of the building varies daily depending on scheduled events. On a typical day the fitness center, classroom areas, and offices are usually occupied by a few hundred students and staff, although for sporting events and concerts there are many more. The arena has a maximum allowable occupancy of 2,600 people. The building's typical operating schedule is shown in the table below.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Robert Collins Arena (RCA)	Weekday	6:30am-8pm
Robert Collins Arena (RCA)	Weekend	8am-12pm

2.4 Building Envelope

The building is constructed of concrete with a stone facade. The arena portion of the building has a partially domed roof, while the Fitness Center has an arched roof. The remaining roof area is mostly flat and covered with a white membrane. The building's windows are double paned and in good condition. The exterior doors are constructed of glass with an aluminum frame and in good condition. No signs of sign of excessive air infiltration were observed.

2.5 On-Site Generation

The Robert Collins Arena & Fitness Center does not have any on-site electric generating capacity.

2.6 Energy-Using Systems

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

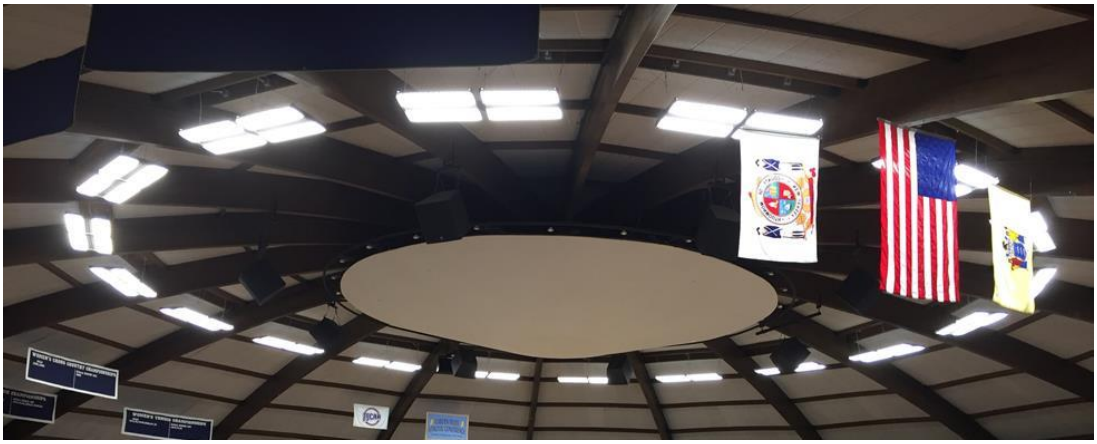
Lighting System

Lighting is provided mostly by 32-Watt linear fluorescent T8 lamps with electronic ballasts and 28-Watt linear fluorescent T5 lamps with electronic ballasts. Most of the fixtures are 1-lamp or 2-lamp, 4-foot long troffers with diffusers. The buildings also has a number of areas illuminated by compact fluorescent lamps (CFL). The fixtures in the central arena contain linear LED tubes.

Lighting control in most spaces is provided by manually operated wall switches. The lighting in some locker rooms and lavatories are controlled with occupancy sensors. The occupancy sensors are either wall or ceiling mounted depending on the space layout.

There is very little exterior lighting connected to the building.

Image 1: Lighting at RCA



Hot Water (or Steam) Heating System

The building is served by the campus's central hot water plant. The central hot water plant is comprised of eight 2,850 MBh condensing hot water boilers. (See the Central Utility Plant report for a full description of the hot water system.)

Image 2: Air Handling Units receive hot and chilled water from the Central Plant

Heating, Ventilation, and Air Conditioning (HVAC)

The building is served by the campus's district heating and cooling systems – which are supplied the main boilers and chillers at Central Utility Plant, which is next to the facility. (See the Central Utility Plant report for a full description of the hot water and chilled water system supply the RCA.)

There are four main Carrier air handling units that serve the building. Two serve the central arena and two serve the practice gym and fitness area. Each AHU draws air from its own return air shaft and supplies air to its own air shaft. These AHU are variable air volume (VAV) systems with VAV terminal reheat boxes. The units have pre heating coils as well as 2-pipe coils that can supply either heating or cooling depending on the need.

The AHU each have a 30-hp supply fan and a 25-hp return fan. All of the fans are controlled by VFDs and the system flow is controlled by changing speed of the supply and return fans. The supply fans maintain a constant duct static pressure. The return fans maintain a building static pressure.

Each basketball court has two large ventilator units located on the roof. The building also has approximately 31 small fan coil units with fractional horsepower motors that help condition the building.

The building's server room has one Mitsubishi 2-ton ductless mini-split system for additonal cooling in that area.

Image 3: Ductless Mini-Split System

Image 4: All large fan motors in the building are controlled by VFDs

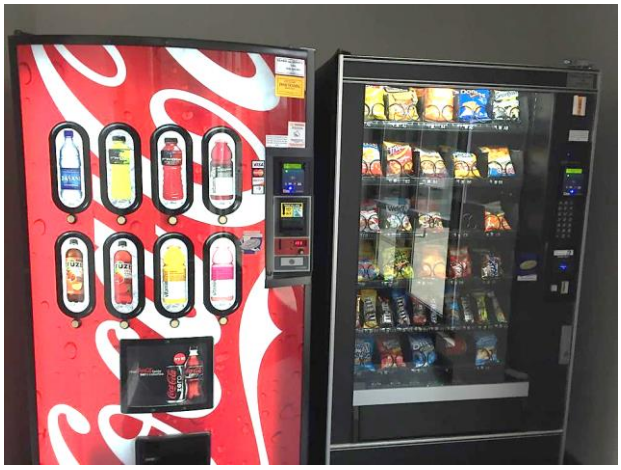
Domestic Hot Water Heating System

The domestic hot water heating system consists of two PVI water heaters with an input rating of 600 kBtu/hr each and a nominal efficiency of 83%. Each water heater has a 300 gallon storage tank. Recirculation pumps distribute domestic hot water to the facility. The recirculation pumps operate continuously.

Building Plug Load

There are 13 computer work stations throughout the facility. The computers are desktop units with LCD monitors. There is no centralized PC power management software installed. The building has multiple printers, copiers, and other typical office equipment The building has one (1) central server.

The fitness center also has 50 treadmills and 9 flat screen TVs. The buildings also has three refrigerated and two non-refrigerated vending machines.



2.7 Water-Using Systems

There are 12 restrooms, including locker rooms. A sampling of restrooms found that fixtures are low-flow faucets, toilets, and urinals, which appear to meet current federal guidelines for water conservation in public facilities.

3 SITE ENERGY USE AND COSTS

Nearly the entire campus receives electricity through the campus's main electric account. Roberts Collins Arena and Fitness Center receives hot and chilled water from the Central Utility Plant. There are no building level submeters on campus; therefore the annual electric usage had to be estimated for individual buildings on the main account. Each received a pro-rated share based on building size, function, and occupancy. It should be noted that gas used for heating the Robert Collins Arena and electric energy used by the Central Utility Plant to cool the facility is included in our estimated energy usage for this building.

Prorated utility 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

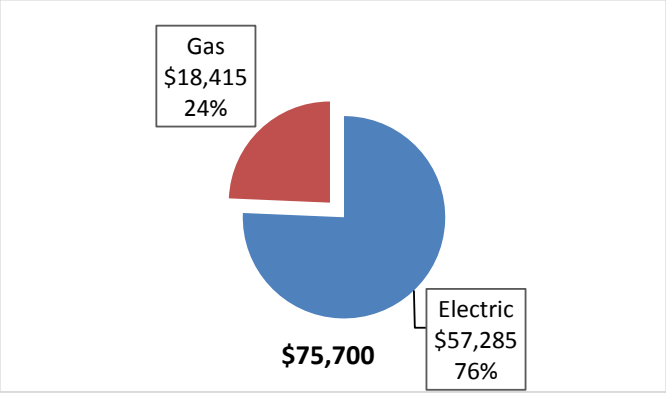
The following energy consumption and cost data is prorated from a recent 12-month period of master metered electric billing data. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 6 - Utility Summary

Utility Summary for Robert Collins Arena & Fitness Center		
Fuel	**Usage**	**Cost**
Electricity	509,996 kWh	$57,285
Natural Gas	16,035 Therms	$18,415
Total		**$75,700**

We estimate the current annual energy cost for this facility to be about $75,700, as shown in the chart below.

Figure 7 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by JCP&L. The average electric rate 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. The prorated monthly electricity consumption and peak demand are shown in the chart below.

Figure 8 - Electric Usage & Demand

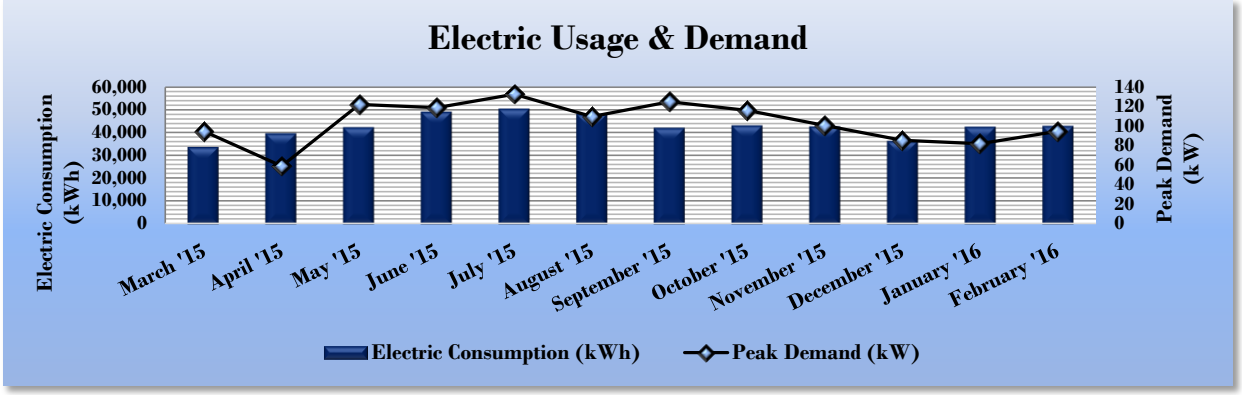


Figure 9 - Electric Usage & Demand

Electric Billing Data for Robert Collins Arena & Fitness Center					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Total Electric Cost	TRC Estimated Usage?
4/13/15	32	33,559	94.5	$3,769	Yes
5/12/15	29	39,400	58.9	$4,426	Yes
6/11/15	30	42,010	122.3	$4,719	Yes
7/13/15	32	48,802	118.9	$5,482	Yes
8/12/15	30	50,134	132.5	$5,631	Yes
9/11/15	30	47,855	109.8	$5,375	Yes
10/13/15	32	41,847	125.0	$4,700	Yes
11/12/15	30	42,927	116.2	$4,822	Yes
12/14/15	32	42,376	100.7	$4,760	Yes
1/13/16	30	36,134	85.4	$4,059	Yes
2/11/16	29	42,353	81.7	$4,757	Yes
3/11/16	29	42,600	94.5	$4,785	Yes
Totals	**365**	**509,996**	**132.5**	**$57,285**	12
Annual	**365**	**509,996**	**132.5**	**$57,285**	

3.3 Natural Gas Usage

Natural gas is provided by New Jersey Natural Gas. The average rate for natural gas service over a recent 12-month period was found to be $1.148/therm, which is the blended rate used throughout the analyses in this report. The monthly prorated gas consumption is shown in the chart below.

Figure 10 - Natural Gas Usage

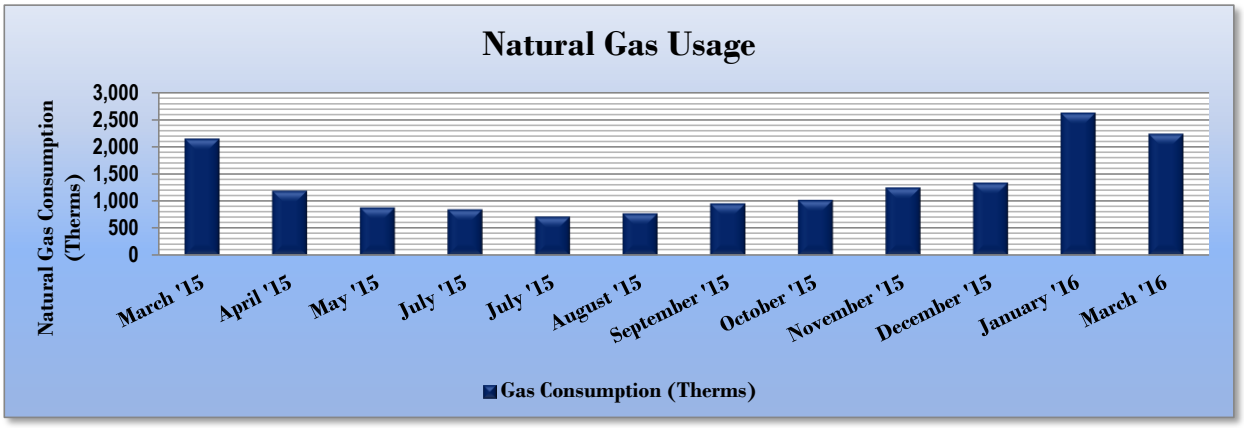


Figure 11 - Natural Gas Usage

Gas Billing Data for Robert Collins Arena & Fitness Center				
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost	TRC Estimated Usage?
4/15/15	29	2,157	$2,478	Yes
5/14/15	29	1,192	$1,369	Yes
6/11/15	28	887	$1,019	Yes
7/16/15	30	848	$974	Yes
8/12/15	32	714	$820	Yes
9/10/15	29	774	$888	Yes
10/8/15	28	962	$1,105	Yes
11/9/15	32	1,025	$1,177	Yes
12/11/15	32	1,252	$1,438	Yes
1/12/16	31	1,346	$1,546	Yes
2/11/16	31	2,631	$3,022	Yes
3/17/16	34	2,247	$2,580	Yes
Totals	**365**	**16,035**	**$18,415**	12
Annual	**365**	**16,035**	**$18,415**	

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		
	Robert Collins Arena & Fitness Center	National Median Building Type: Rec./Entertainment/Parks
Source Energy Use Intensity (kBtu/ft^2)	86.5	96.8
Site Energy Use Intensity (kBtu/ft^2)	40.5	41.2

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

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

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Robert Collins Arena & Fitness Center	National Median Building Type: Rec./Entertainment/Parks
Source Energy Use Intensity (kBtu/ft^2)	80.0	96.8
Site Energy Use Intensity (kBtu/ft^2)	38.4	41.2

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

This building is not 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, 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

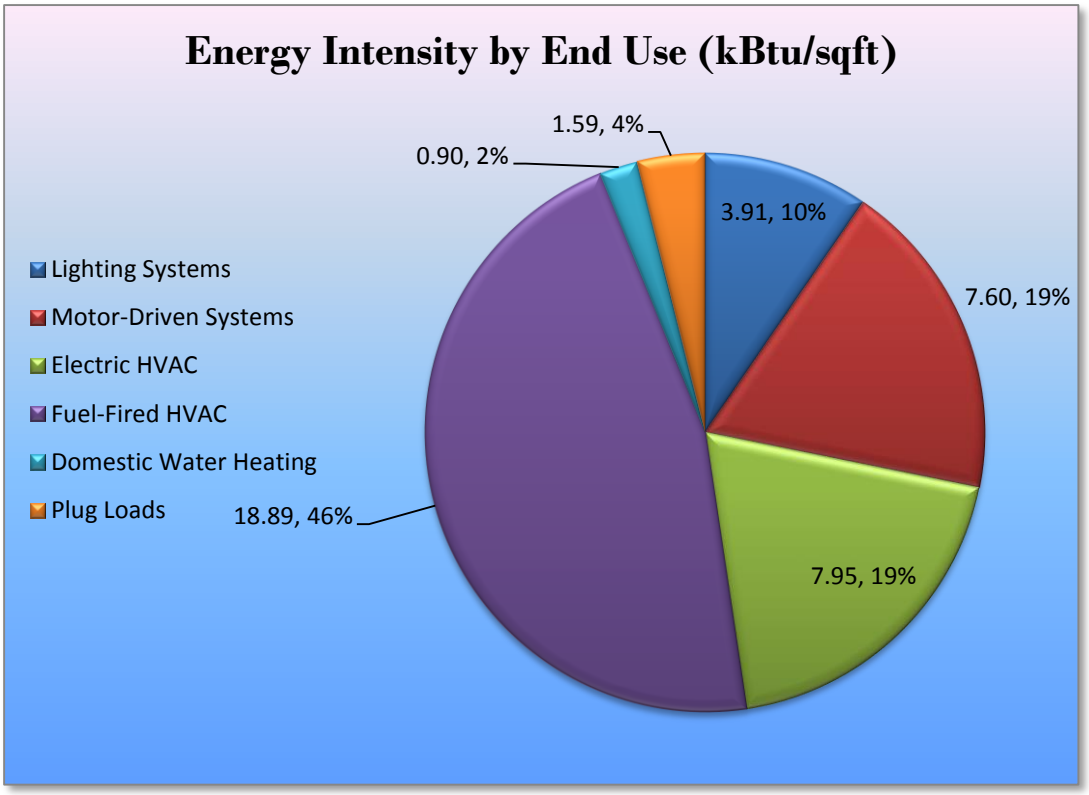
A Portfolio Manager account has been created online for your facility and you will be provided with the login information for the account. We encourage you to update your utility information in Portfolio Manager regularly, so that you can keep track of your building's performance. Free online training 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 (% and kBtu/SF)



4 ENERGY CONSERVATION MEASURES

Level of Analysis

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

The following sections describe the evaluated measures.

4.1 High Priority ECMs

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

Figure 15 – Summary of High Priority 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		**40,576**	**11.1**	**0.0**	**$4,557.71**	**$36,179.09**	**$3,775.00**	**$32,404.09**	**7.1**	**40,860**
ECM 1	Retrofit Fixtures with LED Lamps	40,576	11.1	0.0	$4,557.71	$36,179.09	$3,775.00	$32,404.09	7.1	40,860
Lighting Control Measures		**4,195**	**1.4**	**0.0**	**$471.22**	**$7,448.00**	**$1,030.00**	**$6,418.00**	**13.6**	**4,224**
ECM 2	Install Occupancy Sensor Lighting Controls	4,195	1.4	0.0	$471.22	$7,448.00	$1,030.00	$6,418.00	13.6	4,224
Plug Load Equipment Control - Vending Machine		**5,521**	**0.0**	**0.0**	**$620.10**	**$1,150.00**	**$0.00**	**$1,150.00**	**1.9**	**5,559**
ECM 3	Vending Machine Control	5,521	0.0	0.0	$620.10	$1,150.00	$0.00	$1,150.00	1.9	5,559
TOTALS		**50,292**	**12.5**	**0.0**	**$5,649.03**	**$44,777.09**	**$4,805.00**	**$39,972.09**	**7.1**	**50,643**

* - 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		**40,576**	**11.1**	**0.0**	**$4,557.71**	**$36,179.09**	**$3,775.00**	**$32,404.09**	**7.1**	**40,860**
ECM 1	Retrofit Fixtures with LED Lamps	40,576	11.1	0.0	$4,557.71	$36,179.09	$3,775.00	$32,404.09	7.1	40,860

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

ECM 1: Retrofit Fixtures with LED Lamps

Measure Description

We recommend retrofitting all existing incandescent, halogen, HID and fluorescent lighting technologies with LED lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed while leaving the fluorescent fixture ballast in place. LED bulbs can be used in existing fixtures as a direct replacement for most other lighting technologies.

This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space.

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

4.1.2 Lighting Control Measures

Recommended lighting control measures are summarized in Figure 16 below.

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		**4,195**	**1.4**	**0.0**	**$471.22**	**$7,448.00**	**$1,030.00**	**$6,418.00**	**13.6**	**4,224**
ECM 2	Install Occupancy Sensor Lighting Controls	4,195	1.4	0.0	$471.22	$7,448.00	$1,030.00	$6,418.00	13.6	4,224

ECM 2: Install Occupancy Sensor Lighting Controls

We recommend installing occupancy sensors to control lighting fixtures that are currently controlled by manual switches in all restrooms, storage rooms, fitness rooms, 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.

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.

4.1.3 Plug Load Equipment Control - Vending Machines

ECM 3: Vending Machine Control

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
5,521	0.0	0.0	$620.10	$1,150.00	$0.00	$1,150.00	1.9	5,559

Measure Description

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

5 ENERGY EFFICIENT PRACTICES

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

Reduce Air Leakage

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

Close Doors and Windows

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

Ensure Lighting Controls Are Operating Properly

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

Reduce Motor Short Cycling

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

Perform Routine Motor Maintenance

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

Use Fans to Reduce Cooling Load

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

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.

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.

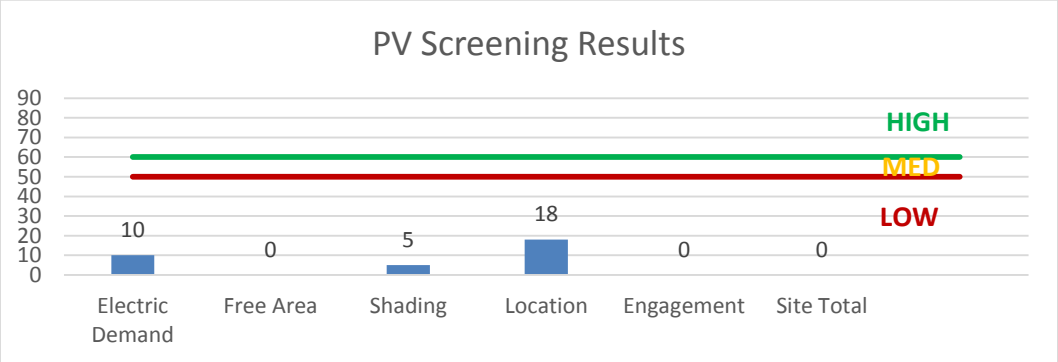
6.1 Photovoltaic

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

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

In order to be cost-effective, a solar PV array needs certain minimum criteria, such as flat or south-facing rooftop or other unshaded space on which to place the PV panels. In our opinion, the facility does appear not meet these minimum criteria for cost-effective PV installation. The slope of the roof and its orientation and potential shading of some areas would likely make this building's roof difficult to develop for solar PV electric generation.

Figure 18 - 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, because it is not separately metered. However, the college might benefit from participation in a DR program which might include DR measures at multiple building including this one. The college should consult with a DR service provider to determine eligibility requirements for campus participation.

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 19 for a list of the eligible programs identified for each recommended ECM.

Figure 19 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings
ECM 1	Retrofit Fixtures with LED Lamps	X			
ECM 2	Install Occupancy Sensor Lighting Controls	X			
ECM 3	Vending Machine Control	X			

SmartStart is generally well-suited for implementation of individual measures or small group of measures. It provides flexibility to install measures at your own pace using in-house staff or a preferred contractor. Direct Install caters to small to mid-size facilities that can bundle multiple ECMs together. This can greatly simplify participation and may lead to higher incentive amounts, but requires the use of pre-approved contractors. The Pay for Performance (P4P) program is a "whole-building" energy improvement program designed for larger facilities. It requires implementation of multiple measures meeting minimum savings thresholds, as well as use of pre-approved consultants. 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 SS 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.

8.3 Demand Response Energy Aggregator

The first step toward participation in a Demand Response (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 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 the program rules and requirements for metering and controls, a facility's ability to temporarily reduce electric load, as well as the payments involved in participating in the program. Also, these providers usually offer multiple options for DR to larger facilities and may also install controls or remote monitoring equipment to help ensure compliance of all terms and conditions of a DR contract.

See Section 7 for additional information.

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
Entrance	2	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	3,926	Relamp	No	2	LED - Fixtures: Downlight Recessed	Wall Switch	15	3,926	0.02	98	0.0	$10.96	$115.02	$0.00	10.49
Lobby	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,926	Relamp	No	5	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,926	0.07	388	0.0	$43.60	$179.50	$25.00	3.54
Lobby	5	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	3,926	Relamp	No	5	LED - Fixtures: Downlight Recessed	Wall Switch	15	3,926	0.04	244	0.0	$27.41	$287.55	$0.00	10.49
Lobby	5	Halogen Incandescent: 50W Halogen Lights MR16	Wall Switch	50	3,926	Relamp	No	5	LED Screw-In Lamps: LED Replacement for HalogenMR16 Lights	Wall Switch	7	3,926	0.17	954	0.0	$107.14	$127.50	$0.00	1.19
Lobby	5	Compact Fluorescent: 26W Pendant Lights	Wall Switch	26	3,926	Relamp	No	5	LED Screw-In Lamps: 15W LED Bulbs	Wall Switch	15	3,926	0.04	244	0.0	$27.41	$133.75	$25.00	3.97
Lobby	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Stairwell	4	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	3,926	Relamp	No	4	LED - Fixtures: Downlight Recessed	Wall Switch	15	3,926	0.04	195	0.0	$21.93	$230.04	$0.00	10.49
Stairwell	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,926	Relamp	No	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,926	0.04	233	0.0	$26.16	$107.70	$15.00	3.54
Fitness Center	27	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	3,926	Relamp	No	27	LED - Fixtures: Downlight Recessed	Wall Switch	15	3,926	0.24	1,318	0.0	$148.00	$1,552.77	$0.00	10.49
Fitness Center	14	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Wall Switch	30	3,926	Relamp	No	14	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,926	0.18	963	0.0	$108.13	$502.60	$70.00	4.00
Fitness Center	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Dance Studio	15	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,926	Relamp	Yes	15	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,748	0.26	1,404	0.0	$157.72	$1,132.65	$35.00	6.96
Dance Studio	7	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	3,926	Relamp	Yes	7	LED - Fixtures: Downlight Recessed	Occupancy Sensor	15	2,748	0.09	481	0.0	$54.07	$672.57	$35.00	11.79
Dance Studio	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Equip Rm	14	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,000	Relamp	Yes	14	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,400	0.25	691	0.0	$77.65	$772.60	$105.00	8.60
Equip Rm	10	Compact Fluorescent: 2x 26W Pendant Lights	Wall Switch	52	2,000	Relamp	Yes	10	LED Screw-In Lamps: 2x 15W LED Bulbs	Occupancy Sensor	30	1,400	0.25	701	0.0	$78.70	$805.00	$135.00	8.51
Equip Rm	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,400	0.07	188	0.0	$21.17	$117.00	$20.00	4.58
Men's Rm	9	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	2,000	Relamp	Yes	9	LED - Fixtures: Downlight Recessed	Occupancy Sensor	15	1,400	0.11	315	0.0	$35.41	$787.59	$35.00	21.25
Men's Rm	5	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,000	Relamp	Yes	5	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,400	0.09	238	0.0	$26.78	$241.00	$50.00	7.13
Men's Rm	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,000	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,400	0.09	247	0.0	$27.73	$179.50	$0.00	6.47
Women's Rm	9	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	2,000	Relamp	Yes	9	LED - Fixtures: Downlight Recessed	Occupancy Sensor	15	1,400	0.11	315	0.0	$35.41	$787.59	$35.00	21.25
Women's Rm	5	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,000	Relamp	Yes	5	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,400	0.09	238	0.0	$26.78	$511.00	$85.00	15.91
Women's Rm	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,000	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,400	0.09	247	0.0	$27.73	$179.50	$25.00	5.57
Massage Rm	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,748	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,748	0.11	410	0.0	$46.04	$234.00	$40.00	4.21
Fitness Center Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,926	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,926	0.05	293	0.0	$32.89	$117.00	$20.00	2.95

	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
Athletics Office Rm 203	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,600	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,600	0.13	298	0.0	$33.51	$292.50	$50.00	7.24
Athletics Office Rm 203	1	Exit Signs: LED - 2 W Lamp	None	6	1,600	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	1,600	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm 203A	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,600	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,120	0.07	151	0.0	$16.94	$233.00	$40.00	11.40
Rm 203B	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,600	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,120	0.07	151	0.0	$16.94	$233.00	$40.00	11.40
Rm 203C	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,600	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,120	0.07	151	0.0	$16.94	$233.00	$40.00	11.40
Rm 203D	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,600	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,120	0.07	151	0.0	$16.94	$233.00	$40.00	11.40
Rm 203E	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,600	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,120	0.07	151	0.0	$16.94	$233.00	$40.00	11.40
Rm 203F	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,600	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,120	0.14	302	0.0	$33.87	$350.00	$60.00	8.56
Rm 203F	7	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	1,600	Relamp	Yes	7	LED - Fixtures: Downlight Recessed	Occupancy Sensor	15	1,120	0.09	196	0.0	$22.03	$402.57	$0.00	18.27
Rm 204	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,600	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,120	0.14	302	0.0	$33.87	$350.00	$60.00	8.56
Athletics Office Hallway	7	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	3,926	Relamp	No	7	LED - Fixtures: Downlight Recessed	Wall Switch	15	3,926	0.06	342	0.0	$38.37	$402.57	$0.00	10.49
Athletics Office Hallway	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Restroom	1	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	1,200	Relamp	Yes	1	LED - Fixtures: Downlight Recessed	Occupancy Sensor	15	840	0.01	21	0.0	$2.36	$57.51	$5.00	22.24
Restroom	2	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Wall Switch	30	1,200	Relamp	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	840	0.03	54	0.0	$6.05	$187.80	$30.00	26.10
Arena Entrance (from Fitness Ctr)	6	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	3,926	Relamp	No	6	LED - Fixtures: Downlight Recessed	Wall Switch	15	3,926	0.05	293	0.0	$32.89	$345.06	$0.00	10.49
Arena Entrance (from Fitness Ctr)	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Display Case	8	Compact Fluorescent: 13W CFL Bulbs	Wall Switch	13	3,926	Relamp	No	8	LED Screw-In Lamps: 9W LED Bulbs	Wall Switch	9	3,926	0.03	142	0.0	$15.95	$124.00	$40.00	5.27
Arena Lobby Main Entrance	32	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	3,926	Relamp	No	32	LED - Fixtures: Downlight Recessed	Wall Switch	15	3,926	0.29	1,562	0.0	$175.41	$1,840.32	$0.00	10.49
Arena Lobby Main Entrance	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Main Entrance Right	10	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,926	Relamp	No	10	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,926	0.13	710	0.0	$79.73	$482.00	$100.00	4.79
Main Entrance Right	3	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	3,926	Relamp	No	3	LED - Fixtures: Downlight Recessed	Wall Switch	15	3,926	0.03	146	0.0	$16.44	$172.53	$0.00	10.49
Main Entrance Right	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Main Entrance Left	24	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,926	Relamp	No	24	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,926	0.31	1,704	0.0	$191.35	$1,156.80	$240.00	4.79
Main Entrance Left	3	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	3,926	Relamp	No	3	LED - Fixtures: Downlight Recessed	Wall Switch	15	3,926	0.03	146	0.0	$16.44	$172.53	$0.00	10.49
Main Entrance Left	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

	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
Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	32	1,374	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,374	0.03	54	0.0	$6.10	$71.80	$10.00	10.12
Men's Rm	6	Compact Fluorescent: 26W CFL Recessed Cans	Occupancy Sensor	26	1,374	Relamp	No	6	LED - Fixtures: Downlight Recessed	Occupancy Sensor	15	1,374	0.05	102	0.0	$11.51	$345.06	$0.00	29.98
Men's Rm	6	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	32	1,374	Relamp	No	6	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,374	0.09	163	0.0	$18.31	$215.40	$30.00	10.12
Women's Rm	6	Compact Fluorescent: 26W CFL Recessed Cans	Occupancy Sensor	26	1,374	Relamp	No	6	LED - Fixtures: Downlight Recessed	Occupancy Sensor	15	1,374	0.05	102	0.0	$11.51	$345.06	$0.00	29.98
Women's Rm	6	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	32	1,374	Relamp	No	6	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,374	0.09	163	0.0	$18.31	$215.40	$30.00	10.12
Custodian Rm 256	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,600	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,600	0.03	60	0.0	$6.70	$58.50	$10.00	7.24
Indoor Track	42	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Wall Switch	30	3,926	Relamp	No	42	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,926	0.53	2,888	0.0	$324.40	$1,507.80	$210.00	4.00
Indoor Track	5	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,926	Relamp	No	5	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,926	0.07	355	0.0	$39.87	$241.00	$50.00	4.79
Indoor Track	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Stairwell 2	4	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	3,926	Relamp	No	4	LED - Fixtures: Downlight Recessed	Wall Switch	15	3,926	0.04	195	0.0	$21.93	$230.04	$0.00	10.49
Lobby 250	5	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	3,926	Relamp	No	5	LED - Fixtures: Downlight Recessed	Wall Switch	15	3,926	0.04	244	0.0	$27.41	$287.55	$0.00	10.49
Lobby 250	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Elevator	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	8,760	Relamp	No	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,760	0.04	520	0.0	$58.37	$107.70	$15.00	1.59
Women's Rm	6	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	1,600	Relamp	Yes	6	LED - Fixtures: Downlight Recessed	Occupancy Sensor	15	1,120	0.08	168	0.0	$18.89	$345.06	$0.00	18.27
Women's Rm	6	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,600	Relamp	Yes	6	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,120	0.11	237	0.0	$26.62	$485.40	$65.00	15.79
Men's Rm	6	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	1,600	Relamp	Yes	6	LED - Fixtures: Downlight Recessed	Occupancy Sensor	15	1,120	0.08	168	0.0	$18.89	$345.06	$0.00	18.27
Men's Rm	6	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,600	Relamp	Yes	6	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,120	0.11	237	0.0	$26.62	$485.40	$65.00	15.79
Storage	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,926	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,748	0.24	1,295	0.0	$145.46	$679.50	$105.00	3.95
Stairwell 1	4	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	3,926	Relamp	No	4	LED - Fixtures: Downlight Recessed	Wall Switch	15	3,926	0.04	195	0.0	$21.93	$230.04	$0.00	10.49
Stairwell 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,926	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,926	0.03	146	0.0	$16.44	$58.50	$10.00	2.95
Stairwell 1	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground Floor Hallway Right	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,926	Relamp	No	20	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,926	0.54	2,928	0.0	$328.89	$1,170.00	$200.00	2.95
Ground Floor Hallway Right	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Storage	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,000	Relamp	No	7	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.19	261	0.0	$29.32	$409.50	$70.00	11.58
Mop Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	600	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	600	0.03	22	0.0	$2.51	$58.50	$10.00	19.30

	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
Mech Rm 104	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,000	Relamp	No	7	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.19	261	0.0	$29.32	$409.50	$70.00	11.58
Mech Rm 105	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,000	Relamp	No	7	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.19	261	0.0	$29.32	$409.50	$70.00	11.58
Ground Floor Hallway Left	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,926	Relamp	No	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,926	0.24	1,318	0.0	$148.00	$526.50	$90.00	2.95
Ground Floor Hallway Left	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Connecting Hallway	22	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,748	Relamp	No	22	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,748	0.59	2,255	0.0	$253.24	$1,287.00	$220.00	4.21
Mech Rm	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,000	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.08	112	0.0	$12.57	$175.50	$30.00	11.58
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	0.03	19	0.0	$2.09	$58.50	$10.00	23.16
Women's Locker Rm	6	Compact Fluorescent: 26W CFL Recessed Cans	Occupancy Sensor	26	1,374	Relamp	No	6	LED - Fixtures: Downlight Recessed	Occupancy Sensor	15	1,374	0.05	102	0.0	$11.51	$345.06	$0.00	29.98
Women's Locker Rm	4	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Occupancy Sensor	30	1,374	Relamp	No	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,374	0.05	96	0.0	$10.81	$143.60	$20.00	11.43
Women's Locker Rm	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,374	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,374	0.08	154	0.0	$17.27	$175.50	$30.00	8.43
Women's Locker Rm	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	1,374	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,374	0.04	75	0.0	$8.37	$144.60	$30.00	13.69
Women's Locker Rm	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,374	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,374	0.05	102	0.0	$11.51	$117.00	$20.00	8.43
Rm 122	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,600	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,120	0.81	1,809	0.0	$203.25	$1,944.00	$310.00	8.04
Rm 122	1	Exit Signs: LED - 2 W Lamp	None	6	1,600	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	1,600	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rm 122A	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	1,600	Relamp	Yes	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,120	0.07	153	0.0	$17.14	$308.80	$60.00	14.52
Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	600	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	600	0.03	22	0.0	$2.51	$58.50	$10.00	19.30
Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	600	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	600	0.03	22	0.0	$2.51	$58.50	$10.00	19.30
Rm 120	9	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	1,600	Relamp	Yes	9	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,120	0.15	343	0.0	$38.57	$549.80	$110.00	11.40
Closet	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	600	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	600	0.01	11	0.0	$1.22	$48.20	$10.00	31.35
Rm 119	12	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	1,600	Relamp	Yes	12	LED - Fixtures: Downlight Recessed	Occupancy Sensor	15	1,120	0.15	336	0.0	$37.77	$960.12	$35.00	24.49
Rm 119	10	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	1,600	Relamp	Yes	10	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,120	0.17	381	0.0	$42.85	$752.00	$135.00	14.40
Rm 119	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,600	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,120	0.07	158	0.0	$17.75	$413.60	$55.00	20.20
Basketball Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,000	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,000	0.01	20	0.0	$2.22	$35.90	$5.00	13.91
Office 117	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,600	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,600	0.05	119	0.0	$13.40	$117.00	$20.00	7.24
Office 118	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,600	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,600	0.05	119	0.0	$13.40	$117.00	$20.00	7.24

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
Men's Locker Rm 116	13	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	3,926	Relamp	Yes	13	LED - Fixtures: Downlight Recessed	Occupancy Sensor	15	2,748	0.16	894	0.0	$100.41	$1,017.63	$35.00	9.79
Men's Locker Rm 116	9	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,926	Relamp	Yes	9	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,748	0.15	842	0.0	$94.63	$703.80	$125.00	6.12
Men's Locker Rm 116	4	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Wall Switch	30	3,926	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,748	0.06	352	0.0	$39.57	$413.60	$55.00	9.06
Training Rm 115	10	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	2,000	Relamp	Yes	10	LED - Fixtures: Downlight Recessed	Occupancy Sensor	15	1,400	0.13	350	0.0	$39.35	$845.10	$35.00	20.59
Training Rm 115	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Training Rm 115A	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,400	0.07	188	0.0	$21.17	$233.00	$40.00	9.12
Training Rm 115B	6	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	2,000	Relamp	Yes	6	LED - Fixtures: Downlight Recessed	Occupancy Sensor	15	1,400	0.08	210	0.0	$23.61	$461.06	$20.00	18.68
Storage Rm 151	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,000	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,000	0.11	149	0.0	$16.75	$234.00	$40.00	11.58
Electrical Rm 152	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	500	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	500	0.11	75	0.0	$8.38	$234.00	$40.00	23.16
Lower Lobby Rec Center	12	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	3,926	Relamp	No	12	LED - Fixtures: Downlight Recessed	Wall Switch	15	3,926	0.11	586	0.0	$65.78	$690.12	$0.00	10.49
Men's Rm	6	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Wall Switch	30	2,000	Relamp	Yes	6	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,400	0.10	269	0.0	$30.23	$485.40	$65.00	13.90
Men's Rm	3	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	2,000	Relamp	Yes	3	LED - Fixtures: Downlight Recessed	Occupancy Sensor	15	1,400	0.04	105	0.0	$11.80	$172.53	$0.00	14.62
Women's Rm	10	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Wall Switch	30	2,000	Relamp	Yes	10	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,400	0.16	449	0.0	$50.39	$629.00	$85.00	10.80
Women's Rm	6	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	2,000	Relamp	Yes	6	LED - Fixtures: Downlight Recessed	Occupancy Sensor	15	1,400	0.08	210	0.0	$23.61	$345.06	$0.00	14.62
Rear Exit	2	Compact Fluorescent: 26W CFL Recessed Cans	Wall Switch	26	3,926	Relamp	No	2	LED - Fixtures: Downlight Recessed	Wall Switch	15	3,926	0.02	98	0.0	$10.96	$115.02	$0.00	10.49
Mop Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	600	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	600	0.03	22	0.0	$2.51	$58.50	$10.00	19.30
LL Elevator Area 2	9	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,926	Relamp	No	9	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,926	0.12	639	0.0	$71.76	$433.80	$90.00	4.79
LL Elevator Area 2	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Weight Rm	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,000	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,400	0.54	1,508	0.0	$169.37	$1,206.00	$195.00	5.97
Weight Rm	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mech Rm 197	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,000	Relamp	No	7	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.19	261	0.0	$29.32	$409.50	$70.00	11.58
Rm 194	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,600	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,120	0.20	452	0.0	$50.81	$467.00	$80.00	7.62
Rm 194	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Elevator	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	None	93	8,760	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	None	44	8,760	0.08	980	0.0	$110.08	$150.40	$30.00	1.09
Central Arena	72	LED - Linear Tubes: (5) 4' Lamps	Wall Switch	73	3,926	None	No	72	LED - Linear Tubes: (5) 4' Lamps	Wall Switch	73	3,926	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

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
Mech Rm	Whole Building	4	Supply Fan	30.0	93.0%	Yes	1,220	No	93.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mech Rm	Whole Building	4	Return Fan	25.0	93.0%	Yes	1,220	No	93.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mech Rm	Whole Building	2	Process Pump	0.3	80.0%	No	200	No	80.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Elevator Rm	Elevators	1	Other	75.0	92.0%	No	80	No	92.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Whole Building	Whole Building	31	Ventilation Fan	0.8	80.0%	No	1,460	No	80.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Whole Building	Whole Building	10	Exhaust Fan	10.0	89.5%	No	900	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Storage Rm	Server	1	Ductless Mini-Split AC	2.00		No							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	Whole Building	2	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?
RC Arena & Fitness Ctr	13	Desktop Computers	120.0	Yes
RC Arena & Fitness Ctr	13	Computer Monitors	28.0	Yes
RC Arena & Fitness Ctr	6	Printers	13.0	Yes
RC Arena & Fitness Ctr	2	Copy Machines	380.0	Yes
RC Arena & Fitness Ctr	9	LCD TVs (32")	120.0	No
RC Arena & Fitness Ctr	50	Treadmiils	300.0	No
Server Rm	1	Server	450.0	No

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
RC Arena & Fitness Ctr	3	Refrigerated	Yes	0.00	4,836	0.0	$543.15	$690.00	$0.00	1.27
RC Arena & Fitness Ctr	2	Non-Refrigerated	Yes	0.00	685	0.0	$76.95	$460.00	$0.00	5.98

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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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)