Local Government Energy Audit:
Energy Audit Report

College Center (#9)

Ocean County College

1 College Drive
Toms River, NJ 08754

October 18, 2018

Final Report by:
TRC Energy Services

Disclaimer

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

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

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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 College Center (#9).

The goal of a LGEA is to provide you with information on how your facility uses energy, identify energy conservation measures (ECMs) that can reduce your energy use, and put you in a position to implement the ECMs. The LGEA also sets you on the path to receive financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing the ECMs.

This study was conducted by TRC Energy Services (TRC), as part of a comprehensive effort to assist New Jersey local government in controlling energy costs and protecting our environment by offering a full spectrum of energy management options.

1.1 Facility Summary

College Center (#9) is a 19,033 square foot facility comprised of spaces such as offices, a cafeteria, student lounges and common areas. The building functions all year from 7:00 AM to 10:00 PM during the weekdays and from 9:00 AM to 6:00 PM during the weekends. Space heating is provided using two gas-fired, non-condensing hot water boilers and two roof top packaged units. Space cooling is provided by an 80-ton, water-cooled chiller coupled with air handlers. Lighting mostly consists of aging and inefficient T8 linear tube lighting and HVAC equipment in need of replacement. A thorough description of the facility and our observations are located in Section 2.

This energy audit report reflects the conditions and opportunities that were observed during the time of the audit. Since the audit, plans have been made to demolish the facility in 2019 making the following recommendations unfeasible.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated seven measures and recommends six measures which represent an opportunity for College Center (#9) to reduce annual energy costs by $36,717 and annual greenhouse gas emissions by 226,997 lbs CO_2e. The measures would pay for themselves in 3.0 years. The breakdown of existing and potential utility costs is illustrated in Figure 1 and Figure 2, respectively. These projects represent an opportunity to reduce College Center (#9)'s annual energy use by 45.4%.

Figure 1 – Previous 12 Month Utility Costs

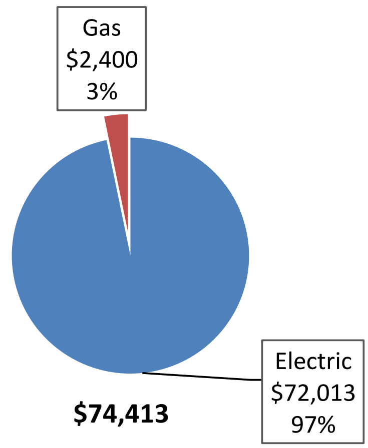
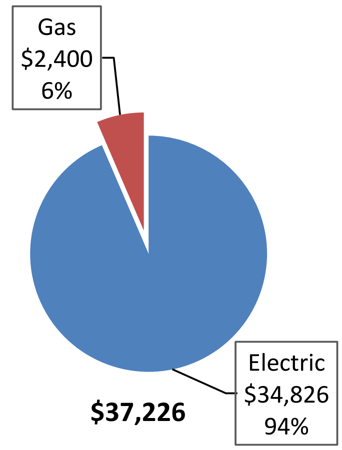


Figure 2 – Potential Post-Implementation Costs



A detailed description of College Center (#9)'s existing energy use can be found in Section 3.

The evaluated measures have been listed and grouped into major categories as shown in Figure 3. Brief descriptions of the categories can be found below and descriptions of the individual 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			**24,884**	**7.5**	**0.0**	**$4,053.18**	**$14,575.43**	**$1,435.00**	**$13,140.43**	**3.24**	**25,058**
ECM 1	Retrofit Fixtures with LED Lamps	Yes	24,884	7.5	0.0	$4,053.18	$14,575.43	$1,435.00	$13,140.43	3.24	25,058
Motor Upgrades			**2,886**	**0.9**	**0.0**	**$470.06**	**$10,108.54**	**$0.00**	**$10,108.54**	**21.50**	**2,906**
	Premium Efficiency Motors	No	2,886	0.9	0.0	$470.06	$10,108.54	$0.00	$10,108.54	21.50	2,906
Variable Frequency Drive (VFD) Measures			**101,977**	**9.4**	**0.0**	**$16,610.18**	**$33,734.66**	**$2,700.00**	**$31,034.66**	**1.87**	**102,690**
ECM 2	Install VFDs on Constant Volume (CV) HVAC	Yes	19,807	5.5	0.0	$3,226.14	$5,194.45	$1,200.00	$3,994.45	1.24	19,945
ECM 3	Install VFDs on Chilled Water Pumps	Yes	24,185	2.5	0.0	$3,939.28	$9,622.10	$0.00	$9,622.10	2.44	24,354
ECM 4	Install VFDs on Hot Water Pumps	Yes	10,985	1.4	0.0	$1,789.19	$10,915.41	$0.00	$10,915.41	6.10	11,061
ECM 5	Install VFDs on Cooling Tower Fans	Yes	47,001	0.0	0.0	$7,655.58	$8,002.70	$1,500.00	$6,502.70	0.85	47,329
Electric Chiller Replacement			**98,560**	**41.3**	**0.0**	**$16,053.64**	**$69,450.35**	**$3,440.00**	**$66,010.35**	**4.11**	**99,249**
ECM 6	Install High Efficiency Chillers	Yes	98,560	41.3	0.0	$16,053.64	$69,450.35	$3,440.00	$66,010.35	4.11	99,249
TOTAL OF ALL EVALUATED MEASURES			**228,307**	**59.1**	**0.0**	**$37,187.07**	**$127,868.98**	**$7,575.00**	**$120,293.98**	**3.23**	**229,903**
TOTALS OF RECOMMENDED MEASURES			**225,421**	**58.1**	**0.0**	**$36,717.00**	**$117,760.44**	**$7,575.00**	**$110,185.44**	**3.00**	**226,997**

* - 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.

Motor Upgrades generally involve replacing old standard efficiency motors with motors of the current efficiency standard (EISA 2007). Motors will be replaced with the same size motors. This measure saves energy by reducing the power used by the motors due to improved electrical efficiency.

Variable Frequency Drives measures generally involve controlling the speed of a motor to achieve a flow or temperature rather than using a valve, damper, or no means at all. These measures save energy by slowing a motor which is an extremely efficient method of control.

Electric Chiller measures generally involve replacing old inefficient hydronic chillers with modern energy efficient systems. New chillers can provide cooling equivalent to older chillers, but use less energy. These measures save energy by reducing the power used by the chiller due to improved electrical and heat transfer efficiency.

Energy Efficient Practices

TRC also identified 10 low (or no) cost energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral and operational adjustments as well as performing routine maintenance on building systems. Through these practices equipment lifetime can be extended; occupant comfort, health and safety can be improved; and annual energy, operation, and maintenance costs can be reduced. Opportunities identified at College Center (#9) include:

- Reduce Air Leakage
- Close Doors and Windows
- Use Window Treatments/Coverings
- Ensure Lighting Controls Are Operating Properly
- Use Thermostat Schedules and Temperature Resets
- Clean and/or Replace HVAC Filters
- Perform Boiler Maintenance
- Perform Water Heater Maintenance
- Install Plug Load Controls
- Water Conservation

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

Self-Generation Measures

TRC evaluated the potential for installing self-generation sources for College Center (#9). 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 the self-generation potential, please refer to Section 6.

1.3 Implementation Planning

To realize the energy savings from the ECMs listed in this report, the equipment changes outlined for each ECM need to be selected and installed through project implementation. One of the first considerations is if there is capital available for project implementation. Another consideration is whether to pursue individual ECMs, a group of ECMs, or a comprehensive approach wherein all ECMs are pursued, potentially in conjunction with other facility projects or improvements.

Rebates, incentives, and financing are available from the NJBPU, NJCEP, as well as some of the state's investor-owned utilities, to help reduce the costs associated with the implementation of energy efficiency projects. Prior to implementing any project, please review the appropriate incentive program guidelines before proceeding. This is important because in most cases you will need to submit an application for the incentives before purchasing materials and beginning installation.

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

- SmartStart
- SREC (Solar Renewable Energy Certificate) Registration Program (SRP)
- Energy Savings Improvement Program (ESIP)

For facilities with capital available for implementation of selected individual measures or phasing 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 design the ECM(s), select the equipment and apply for the incentive(s). Program pre-approval is required for some SmartStart incentives, so only after receiving approval may the ECM(s) be installed. The incentive values listed above in Figure 3 represent the SmartStart program and will be explained further in Section 8, as well as the other programs as mentioned below.

For facilities without capital available 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 external project development, design, and implementation services as well as financing for implementing ECMs. This LGEA report is the first step for participating in ESIP and should help you determine next steps. Refer to Section 8.3 for additional information on the ESIP Program.

Additional descriptions of all relevant incentive programs are located in Section 8 or: www.njcleanenergy.com/ci.

To ensure projects are implemented such that maximum savings and incentives are achieved, bids and specifications should be reviewed by your procurement personnel and/or consultant(s) to ensure that selected equipment coincides with LGEA recommendations, as well as applicable incentive program guidelines and requirements.

2 Facility Information and Existing Conditions

2.1 Project Contacts

Figure 4 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
James Calamia	Director of Facilities	jcalamia@ocean.edu	732-255-0400 x 2066
Designated Representative			
Eugene Caufield	Supervisor of Maintenance	ecaufield@ocean.edu	(732) 600-0123
TRC Energy Services			
Smruti Srinivasan	Auditor	ssrinivasan@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On June 14, 2016, TRC performed an energy audit at College Center (#9) located in Toms River, New Jersey. TRC's team met with Eugene Caulfield to review the facility operations and focus the investigation on specific energy-using systems.

College Center (#9) is a 19,033 square foot facility comprised of spaces such as a few offices, a cafeteria, student lounges and common areas. The building was constructed in 1970. Space heating in the building is provided using two gas-fired, non-condensing hot water boilers and two roof top packaged heated units. Space cooling is provided using an 80-ton water-cooled chiller distributing air through the air handlers. Lighting consists of aging and inefficient T8 linear tube lighting.

2.3 Building Occupancy

The building functions all year from 7:00 AM to 10:00 PM for the offices and students during the weekdays and from 9:00 AM to 6:00 PM for students during the weekends. The typical schedule is presented in the table below.

Figure 5 - Building Schedule

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

2.4 Building Envelope

The building is constructed of concrete block, and structural steel with a brick facade. The buildings have flat roofs covered with an asphalt membrane that is in decent condition. The buildings have double pane windows and the exterior doors are constructed of aluminum framed glass that are in fair condition.

2.5 On-Site Generation

College Center (#9) does not have any on-site electric generation systems currently installed.

2.6 Energy-Using Systems

Please refer to Appendix A: Equipment Inventory & Recommendations for an inventory of equipment.

Lighting System

Lighting is provided predominately by 32-Watt linear fluorescent T8 lamps with electronic ballasts as well as compact fluorescent lamps (CFL). Most of the building tenant spaces use 2-lamp or 3-lamp, 2-foot wide by 4-foot long and 2-foot U-bent troffers with diffusers. Areas like food court, hallway, solar lounge etc., are lit using 42-watt CFL fixtures.

Lighting control in the spaces are provided using manual wall switches and occupancy sensors. The occupancy sensors are either wall mounted depending on the space layout. Stairwells, elevator lobbies and main lobby areas do not contain any occupancy sensors. The exterior lights in the building contain wall packs containing high pressure sodium lamps controlled using photo cells.

Hot Water System

The hot water system in the building consists of two gas-fired, non-condensing hot water boilers from Weil McLain with an output capacity of 948 MBh and a thermal efficiency of 81%. The hot water from the boiler is circulated to the air handling units, unit heaters and the unit vents in the building through two constant speed hot water pumps of 2hp capacity each. These terminal units have constant speed supply fans that distribute heated air to the respective spaces. The motors and pipe insulation are in poor condition.



Chilled Water and Condenser Water System

Space cooling is provided by an 80-ton water-cooled reciprocating chiller. The chilled water is circulated using two constant speed pumps of 7.5 hp capacity to the air handling units. The air handling units have 15 hp supply fans (also constant speed) distribute conditioned air to the respective parts of the building. A 5 hp constant speed condenser water pump circulates condenser water to a single cell induced draft cooling tower located on the ground. The cooling tower fan is rated at 25 hp and has a constant speed motor. The chiller is 21 years old and has been recommended for replacement.

There is a dedicated 2-ton split system that serves a specific room in the building. This part of the building is controlled using individual thermostat.



Domestic Hot Water

The domestic hot water system for the facility consists of one gas-fired domestic hot water heater from A.O. Smith. This unit has an input capacity of 399 MBh and an efficiency of 68%. The gallon capacity of this equipment is 50 gallons. The domestic water heater is two years old and well maintained.


Plug load & Vending Machines

There are roughly 12 computer work stations in the office spaces. The laptops in the facility depends on the number of students at any time. Other plug loads at the facility include printers, electric heaters, air coolers, ceiling fans, microwave oven and toasters. There is no centralized PC power management software installed.

2.7 Water-Using Systems

A sampling of restrooms found that all of the faucets are rated for 2.2 gallons per minute (gpm) or higher, the toilets are rated at 2.5 gallons per flush (gpf) and the urinals are rated at 2 gpf.

3 Site Energy Use and Costs

Utility data for electricity and natural gas was analyzed to identify opportunities for savings. In addition, data for electricity and natural gas was evaluated to determine the annual energy performance metrics for the building in energy cost/ft^2 and energy use/ft^2. These energy use indices are indicative of the relative energy effectiveness of this building. There are a number of factors that could cause the energy use of this building to vary from the "typical" energy use for other facilities identified as: Higher Education - Private. Specific local climate conditions, daily occupancy hours of the facility, seasonal fluctuations in occupancy, daily operating hours of energy use systems, and the behavior of the occupants with regard to operating systems that impact energy use such as turning off appliances and leaving windows open. Please refer to the Benchmarking section within Section 3.4 for additional information.

3.1 Total Cost of Energy

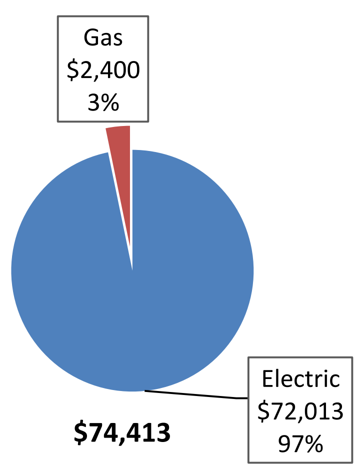
The following energy consumption and cost data is based on the last 12 month period of utility usage data that was provided for each utility. The annual consumption and cost was developed from this information.

Figure 6 - Utility Summary

Utility Summary for College Center (#9)		
Fuel	**Usage**	**Cost**
Electricity	442,119 kWh	$72,013
Natural Gas	2,090 Therms	$2,400
Total		**$74,413**

The current utility cost for this site is $74,413 as shown in the chart below.

Figure 7 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by JCP&L. The average electric cost (combined for commodity, transmission and distribution) for the past 12 months is $0.163/kWh, which is the blended rate used throughout the analyses in this report. The monthly electricity consumption and peak demand is represented graphically in the chart below.

Figure 8 - Graph of Electric Usage & Demand

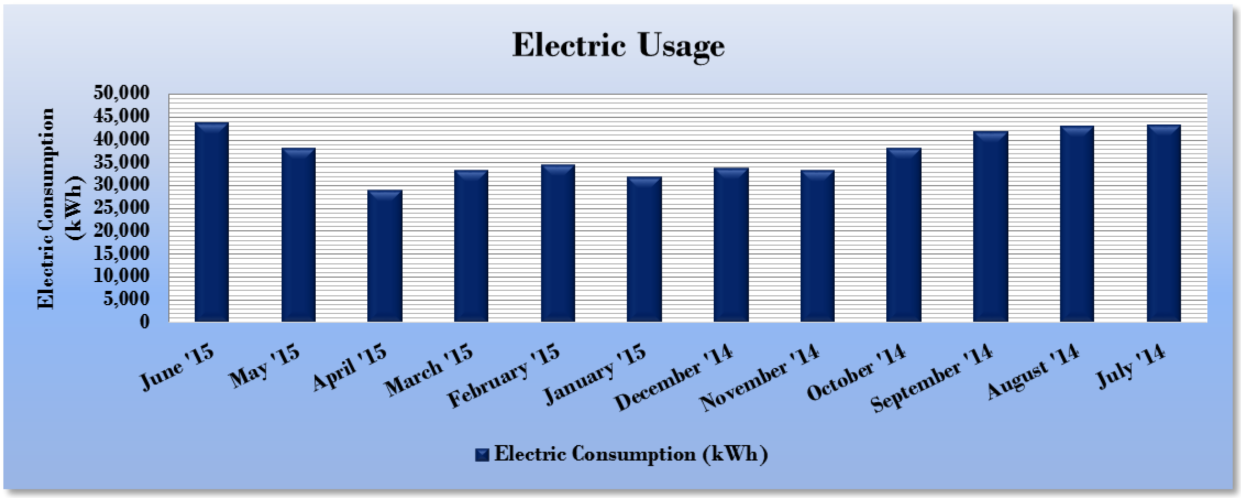


Figure 9 - Table of Electric Usage & Demand

Electric Billing Data for College Center (#9)					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
7/8/15	30	43,757			$6,057
6/8/15	32	38,026			$6,102
5/7/15	30	28,955			$4,800
4/7/15	32	33,337			$5,230
3/6/15	29	34,513			$8,035
2/5/15	30	31,864			$5,830
1/6/15	32	33,822			$5,614
12/5/14	31	33,342			$5,864
11/4/14	32	38,121			$6,491
10/3/14	29	41,677			$6,730
9/5/14	29	42,805			$6,563
8/6/14	30	43,113			$4,895
Totals	**366**	**443,330**	**0**	**$0**	**$72,210**
Annual	**365**	**442,119**	**0**	**$0**	**$72,013**

3.3 Natural Gas Usage

Natural gas is provided by NJ Natural Gas. The average gas cost for the past 12 months is $1.148/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is represented graphically in the chart below.

Figure 10 - Graph of Natural Gas Usage

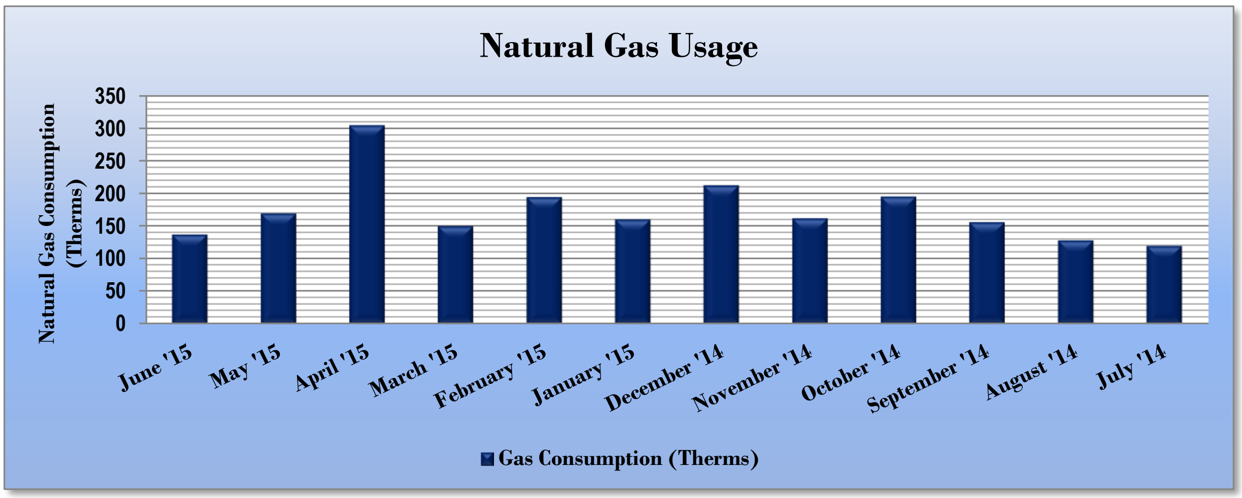


Figure 11 - Table of Natural Gas Usage

Gas Billing Data for College Center (#9)				
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost	TRC Estimated Usage?
6/24/15	29	137	$167	Yes
5/26/15	34	169	$206	Yes
4/22/15	30	304	$350	Yes
3/23/15	25	150	$185	Yes
2/26/15	31	194	$232	Yes
1/26/15	34	160	$196	Yes
12/23/14	35	212	$257	Yes
11/18/14	26	161	$167	Yes
10/23/14	34	195	$206	Yes
9/19/14	30	156	$182	Yes
8/20/14	28	128	$154	Yes
7/23/14	28	119	$92	Yes
Totals	**364**	**2,085**	**$2,394**	12
Annual	**365**	**2,090**	**$2,400**	

3.4 Benchmarking

This facility was benchmarked through 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 compares its performance against a yearly baseline, national medians, or similar buildings in your portfolio. Metrics used in this comparison are the energy use intensity (EUI) and ENERGY STAR® Score.

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 energy than similar buildings on a square foot basis or if that building performs better than the median. EUI is presented in both 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 is the raw fuel consumed to generate the energy consumed at the site, factoring in energy production and distribution losses.

Figure 12 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	College Center (#9)	National Median Building Type: Higher Education - Private
Source Energy Use Intensity (kBtu/ft^2)	260.4	262.6
Site Energy Use Intensity (kBtu/ft^2)	90.2	130.7

By implementing all recommended measures covered in this reporting, the Project's estimated post-implementation EUI improves 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		
	College Center (#9)	National Median Building Type: Higher Education - Private
Source Energy Use Intensity (kBtu/ft^2)	131.9	262.6
Site Energy Use Intensity (kBtu/ft^2)	49.3	130.7

Many buildings can also receive a 1 – 100 ENERGYSTAR® score. This score 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 type does not currently qualify to receive a score. However a campus wide Statement of Energy Performance from ENERGY STAR® Portfolio Manager® can be found in Appendix B: ENERGY STAR® Statement of Energy Performance.

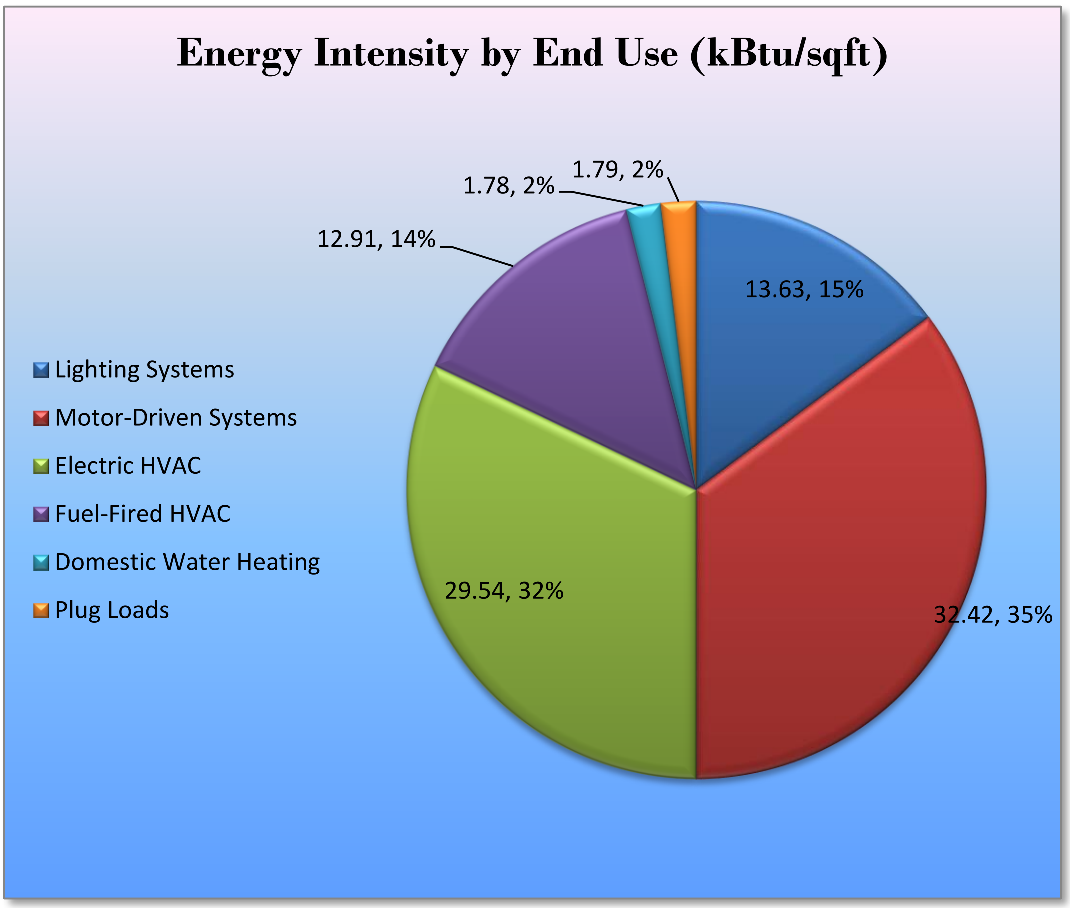
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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 and determine their proportional contribution to overall building energy usage. This visual representation of energy end uses highlights systems that may benefit most from energy efficiency projects.

Figure 14 - Energy Balance (kBtu/SF, %)



4 Energy Conservation Measures

Level of Analysis

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information to the College Center (#9) regarding financial incentives for which they may qualify to implement the recommended measures. For this audit report, most measures have received only a preliminary analysis of feasibility which identifies expected ranges of savings and costs. This level of analysis is usually considered sufficient to demonstrate project cost-effectiveness and help prioritize energy measures. Savings are based on the New Jersey Clean Energy Program Protocols to Measure Resource Savings dated June 29, 2016, approved by the New Jersey Board of Public Utilities. Further analysis or investigation may be required to calculate more precise savings based on specific circumstances. A higher level of investigation may be necessary to support any custom SmartStart or Pay for Performance, or Direct Install incentive applications. Financial incentives for the ECMs identified in this report have been calculated based the NJCEP prescriptive SmartStart program. Some measures and proposed upgrade projects may be eligible for higher incentives than those shown below through other NJCEP programs as described in Section 8.

The following sections describe the evaluated measures.

4.1 Recommended ECMs

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

Figure 15 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**24,884**	**7.5**	**0.0**	**$4,053.18**	**$14,575.43**	**$1,435.00**	**$13,140.43**	**3.24**	**25,058**
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* - 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

Our recommendations for upgrades to existing lighting measures 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		**24,884**	**7.5**	**0.0**	**$4,053.18**	**$14,575.43**	**$1,435.00**	**$13,140.43**	**3.24**	**25,058**
ECM 1	Retrofit Fixtures with LED Lamps	24,884	7.5	0.0	$4,053.18	$14,575.43	$1,435.00	$13,140.43	3.24	25,058

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

ECM 1: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	24,884	7.5	0.0	$4,053.18	$14,575.43	$1,435.00	$13,140.43	3.24	25,058
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.00	0

Measure Description

This measure evaluates replacing linear T8 fluorescent lamps with LED tube lamps and replacing incandescent and halogen screw-in/plug-in based lamps with LED lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed although there is a fluorescent fixture ballast in place. Other tube lamps require that fluorescent fixture ballasts be removed or replaced with LED drivers. Screw-in/plug-in LED lamps can be used as a direct replacement for most other screw-in/plug-in lamps. This measure saves energy by installing LED sources which use less power than other technologies with a comparable light output.

Maintenance savings are anticipated since LED sources have burn hours which are more than twice that of a fluorescent source and more than 10 times incandescent sources. LED lamps that use the existing fluorescent fixture ballast will be constrained by the remaining hours of the ballast. Maintenance savings may be partially offset by the higher material costs associated with LED sources.

4.1.2 Variable Frequency Drive Measures

Our recommendations for variable frequency drive (VFD) measures are summarized in Figure 17 below.

Figure 17 – Summary of Variable Frequency Drive ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**101,977**	**9.4**	**0.0**	**$16,610.18**	**$33,734.66**	**$2,700.00**	**$31,034.66**	**1.87**	**102,690**
ECM 3	Install VFDs on Constant Volume (CV) HVAC	19,807	5.5	0.0	$3,226.14	$5,194.45	$1,200.00	$3,994.45	1.24	19,945
ECM 4	Install VFDs on Chilled Water Pumps	24,185	2.5	0.0	$3,939.28	$9,622.10	$0.00	$9,622.10	2.44	24,354
ECM 5	Install VFDs on Hot Water Pumps	10,985	1.4	0.0	$1,789.19	$10,915.41	$0.00	$10,915.41	6.10	11,061
ECM 6	Install VFDs on Cooling Tower Fans	47,001	0.0	0.0	$7,655.58	$8,002.70	$1,500.00	$6,502.70	0.85	47,329

ECM 2: Install VFDs on CV HVAC

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
19,807	5.5	0.0	$3,226.14	$5,194.45	$1,200.00	$3,994.45	1.24	19,945

Measure Description

This measure evaluates installing a variable frequency drive (VFD) to control supply fan motor speed in the air handling unit (15 hp) and converting the constant-volume, single-zone air handling system into a variable-air-volume (VAV) system. A separate VFD is required to control the return fan motor or dedicated exhaust fan motor if the air handler has one. The zone thermostats will modulate the VFD speed to maintain the appropriate temperature in the zone, while maintaining a constant supply air temperature. Energy savings result from reducing fan speed (and power) when there is a reduced load in the zone. The magnitude of energy savings is based on the amount of time at reduced loads.

ECM 3: Install VFDs on Chilled Water Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
24,185	2.5	0.0	$3,939.28	$9,622.10	$0.00	$9,622.10	2.44	24,354

Measure Description

This measure evaluates installing a variable frequency drive (VFD) to control the two chilled water pumps (7.5hp). This measure requires that a majority of the chilled water coils be served by 2-way valves and that a differential pressure sensor is installed in the chilled water loop. As the chilled water valves close, the differential pressure increases. The VFD modulates pump speed to maintain a differential pressure setpoint. Energy savings result from reducing pump motor speed (and power) as chilled water valves close. The magnitude of energy savings is based on the amount of time at reduced loads.

For system with variable chilled water flow through the chiller, the minimum flow to prevent the chiller from tripping will have to be determined during the final project design. The control system should be programmed to maintain the minimum flow through the chiller and to prevent pump cavitation.

ECM 4: Install VFDs on Hot Water Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
10,985	1.4	0.0	$1,789.19	$10,915.41	$0.00	$10,915.41	6.10	11,061

Measure Description

This measure evaluates installing a variable frequency drive (VFD) to control the two hot water pumps (2hp). This measure requires that a majority of the hot water coils be served by 2-way valves and that a differential pressure sensor is installed in the hot water loop. As the hot water valves close, the differential pressure increases. The VFD modulates pump speed to maintain a differential pressure setpoint. Energy savings result from reducing pump motor speed (and power) as hot water valves close. The magnitude of energy savings is based on the amount of time at reduced loads.

ECM 5: Install VFDs on Cooling Tower Fans

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)
47,001	0.0	0.0	$7,655.58	$8,002.70	$1,500.00	$6,502.70	0.85	47,329

Measure Description

This measure evaluates installing a variable frequency drive (VFD) to control the 25hp cooling tower fan motor. The VFD will allow the cooling tower fan to operate at the minimum speed necessary to maintain the temperature of the condenser water returning to the chiller. Energy savings result from reducing fan speed (and power) when there is a reduced load on the chiller and outside air wet bulb temperatures are depressed. The magnitude of energy savings is based on the amount of time at reduced loads.

4.1.3 Electric Chiller Replacement

Our recommendations for electric chiller replacement measures are summarized in Figure 18 below.

Figure 18-Summary of Eclectic Chiller Replacement 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)
Electric Chiller Replacement		**98,560**	**41.3**	**0.0**	**$16,053.64**	**$69,450.35**	**$3,440.00**	**$66,010.35**	**4.11**	**99,249**
ECM 6	Install High Efficiency Chillers	98,560	41.3	0.0	$16,053.64	$69,450.35	$3,440.00	$66,010.35	4.11	99,249

ECM 6: Install High Efficiency Chillers

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)
98,560	41.3	0.0	$16,053.64	$69,450.35	$3,440.00	$66,010.35	4.11	99,249

Measure Description

This measure evaluates replacing the 80 ton old inefficient electric chiller with new high efficiency chillers. The type of chiller to be installed depends on the magnitude of the cooling load and variability of the cooling load profile. Positive displacement chillers are usually under 600 tons of cooling capacity and centrifugal chillers generally start at 150 tons of cooling capacity. Constant speed chillers should be used to meet cooling loads with little or no variation while variable speed chillers are more efficient for variable cooling load profiles. Water cooled chillers are more efficient than air cooled chillers but require cooling towers and additional pumps to circulate the cooling water. In any given size range variable speed chillers tend to have better part load efficiency but worse full load efficiency than constant speed chillers.

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

4.2 ECMs Evaluated but not Recommended

The measure below have been evaluated by the auditor but are not recommended for implementation at the facility. Reasons for exclusion can be found in each measure description section.

Figure 19-Summar of Measures Evaluated, But Not Recommended

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Motor Upgrades		**2,886**	**0.9**	**0.0**	**$470.06**	**$10,108.54**	**$0.00**	**$10,108.54**	**21.50**	**2,906**
	Premium Efficiency Motors	2,886	0.9	0.0	$470.06	$10,108.54	$0.00	$10,108.54	21.50	2,906

4.2.1 Motor Upgrades

ECM 7: Premium Efficiency Motors

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
2,886	0.9	0.0	$470.06	$10,108.54	$0.00	$10,108.54	21.50	2,906

Measure Description

This measure evaluated replacing the chilled water pump motors (two 7.5hp motors) and cooling tower fan motor (25hp) standard efficiency motors with high efficiency motors. The evaluation assumes existing motors will be replaced with the same size motors. It is important that the speed of each new motor match the speed of the motor it replaces as closely as possible. The base case motor efficiencies are obtained from nameplate information. Proposed case premium motor efficiencies are obtained from the New Jersey's Clean Energy Program Protocols to Measure Resource Savings (2016). Savings are based on the difference between baseline and proposed efficiencies and the annual operating hours.

This measure is not recommended as the payback for the measure is higher than the useful life of the equipment itself.

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 low or no-cost efficiency strategies. By employing certain behavioral and operational adjustments as well as performing routine maintenance on building systems, equipment lifetime can be extended; occupant comfort, health and safety can be improved; and annual energy, operation, and maintenance costs can be reduced. The recommendations below are provided as a framework for developing a whole building maintenance plan that is customized to your facility. Consult with qualified equipment specialists for details on proper maintenance and system operation.

Reduce Air Leakage

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

Close Doors and Windows

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

Use Window Treatments/Coverings

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

Ensure Lighting Controls Are Operating Properly

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

Use 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.

Clean and/or Replace HVAC Filters

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

Perform Boiler Maintenance

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

Perform 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 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 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 generally needs a minimum of 4,000 sq ft of 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.

TRC analyzed the potentially available rooftop areas for each of the central campus buildings, in order to determine the potential cost and energy savings for installing a campus-wide solar PV array at Ocean County College. Based on our analysis, we estimate that Ocean County College has about 106,687 square feet of available unshaded roof space for all buildings combined.

We estimate that the available rooftop space could support up to **1,487 kW** of solar generating capacity (~4,956 PV panels @300-W_{DC} each).[1] The combined PV array could generate nearly 2 million kWh on an annual basis. This could potentially offset $326,719 of annual electric purchases from the grid. In addition, Ocean County College could receive during the first 15 years of the solar project's lifetime, up to $795,309 per year in Solar Renewable Energy Certificate (SREC) income (@ $235/MWh). We estimate that the installed cost of such an array would be about $5.2 million. Based on these numbers, we estimate that such an investment would have a simple payback period of about 6.5 years.

Rebates are not available for solar projects, but owners of solar projects MUST register their projects in the SREC Registration Program prior to the start of construction in order to establish the project's eligibility to earn SRECs. Registration of the intent to participate in New Jersey's solar marketplace provides market participants with information about the pipeline of anticipated new solar capacity and insight into future SREC pricing. Refer to Section 8.2 for additional information.

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

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

[1] Our estimate was based on the National Renewable Energy Lab's *PVWatts*® Online Calculator (http://pvwatts.nrel.gov/), plus TRC's analysis of current market conditions for commercial solar power development in New Jersey.

7 Demand Response

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

By enabling grid operators to call upon Curtailment Service Providers and energy consumers 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 will receive payments whether or not their facility is called upon to curtail their load.

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 program often find it to be a valuable source of revenue for their facility(ies) because the payments can significantly offset annual utility 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 event cycle. DR program participants often have to install smart meters and 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 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.

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section.. Please refer to Figure 20 for a list of the eligible programs identified for each recommended ECM.

Figure 20 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Retrofit Fixtures with LED Lamps	x				
ECM 2	Install VFDs on Constant Volume (CV) HVAC	x				
ECM 3	Install VFDs on Chilled Water Pumps	x				
ECM 4	Install VFDs on Hot Water Pumps		x			
ECM 5	Install VFDs on Cooling Tower Fans	x				
ECM 6	Install High Efficiency Chillers	x				

SmartStart is generally well suited for implementation of individual or small sets of measures, with the flexibility to install projects at your own pace using in-house staff or a preferred contractor. Direct Install caters to small to mid-size facilities to bundle measures and simplify participation, 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 and requires implementation of multiple measures meeting minimum savings thresholds, as well as use of pre-approved consultants. The Large Energy Users Program (LEUP) is available to New Jersey's largest energy users giving them flexibility to install as little or as many measures, in a single facility or several facilities, with incentives capped based on the entity's annual energy consumption; applicants can use in-house staff or preferred contractor.

Generally, the incentive values provided throughout the report assume the SmartStart program is utilized because it provides a consistent comparison of available incentives.

Brief descriptions of all relevant alternative financing and incentive programs are located in the sections below. You may also check the following website for further information, including most current program availability, requirements, and incentive levels: www.njcleanenergy.com/ci.

8.1 SmartStart

Overview

SmartStart 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 SmartStart custom program provides incentives for new and innovative technologies, or process improvements not defined through one of the prescriptive incentives listed above.

Although your facility is an existing building, and only the prescriptive incentives have been applied in the calculations, the SmartStart custom measure path is recommended for ECM 4 (Install VFDs on Hot Water Pumps). These incentives are calculated utilizing a number of factors, including project cost, energy savings and comparison to existing conditions or a defined standard. To qualify, the proposed measure(s) must be at least 2% more efficient than current energy code or recognized industry standard, and save at least 75,000 kWh or 1,500 therms annually.

SmartStart 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 in the SS program (inclusive of prescriptive and custom) 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 prescriptive program you will need to submit an application for the specific equipment installed or 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. Please note that SmartStart custom application requirements are different from the prescriptive applications and will most likely require additional effort to complete.

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

8.2 SREC Registration Program

The SREC (Solar Renewable Energy Certificate) Registration Program (SRP) is used to register the intent to install solar projects in New Jersey. Rebates are not available for solar projects, but owners of solar projects MUST register their projects in the SRP prior to the start of construction in order to establish the project's eligibility to earn SRECs. Registration of the intent to participate in New Jersey's solar marketplace provides market participants with information about the pipeline of anticipated new solar capacity and insight into future SREC pricing.

After the registration is accepted, construction is complete, and final paperwork has been submitted and is deemed complete, the project is issued a New Jersey certification number which enables it to generate New Jersey SRECs. SREC's are generated once the solar project has been authorized to be energized by the Electric Distribution Company (EDC).

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

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

Information about the SRP can be found at: [www.njcleanenergy.com/srec.](http://www.njcleanenergy.com/srec)

8.3 Energy Savings Improvement Program

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

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

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

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

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

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

9 Energy Purchasing and Procurement Strategies

9.1 Retail Electric Supply Options

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

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

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

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

9.2 Retail Natural Gas Supply Options

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

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

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

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

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Entrance	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	3,385	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,385	0.05	257	0.0	$41.85	$117.00	$20.00	2.32
Entrance	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
Hallway	18	CFL Screw-In Lamps: Recessed Fixtures	Wall Switch	100	4,836	Relamp	No	18	LED Screw-In Lamps: Recessed fixtures	Wall Switch	15	4,836	1.13	8,509	0.0	$1,385.95	$1,761.35	$0.00	1.27
Room 101	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	3,385	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,385	0.07	385	0.0	$62.78	$175.50	$30.00	2.32
Room 102	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	3,385	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,385	0.10	514	0.0	$83.70	$234.00	$40.00	2.32
Room 103	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	3,385	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,385	0.36	1,927	0.0	$313.88	$752.00	$150.00	1.92
Food Court	48	Incandescent: Hanging fixtures	Wall Switch	150	960	Relamp	No	48	LED Screw-In Lamps: Hanging fixtures	Wall Switch	30	960	4.24	6,359	0.0	$1,035.77	$4,696.94	$480.00	4.07
Food Court	9	CFL Screw-In Lamps: Wall fixtures	Wall Switch	60	960	Relamp	No	9	LED Screw-In Lamps: Wall fixture	Wall Switch	15	960	0.30	447	0.0	$72.83	$880.68	$0.00	12.09
Men's room	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	400	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	400	0.04	27	0.0	$4.35	$126.40	$0.00	29.09
Men's room	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	400	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	400	0.03	16	0.0	$2.62	$71.80	$10.00	23.57
Hallway	2	CFL Screw-In Lamps: Focus lights	Wall Switch	100	4,836	Relamp	No	2	LED Screw-In Lamps: Focus lights	Wall Switch	15	4,836	0.13	945	0.0	$153.99	$195.71	$0.00	1.27
Hallway	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	3,385	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,385	0.05	257	0.0	$41.85	$117.00	$20.00	2.32
Hallway	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	3,385	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,385	0.02	113	0.0	$18.39	$63.20	$0.00	3.44
Room 109 - office	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,912	Relamp	No	4	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,912	0.16	750	0.0	$122.18	$380.53	$80.00	2.46
Solar Lounge	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,912	Relamp	No	24	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,912	0.58	2,652	0.0	$432.00	$1,404.00	$240.00	2.69
Solar Lounge	4	CFL Screw-In Lamps: CFL fixtures	Wall Switch	100	2,912	Relamp	No	4	LED Screw-In Lamps: CFL Screw in lamps	Wall Switch	60	2,912	0.12	536	0.0	$87.27	$391.41	$0.00	4.48
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	400	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	400	0.04	23	0.0	$3.71	$75.20	$15.00	16.23
Eating area	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,912	Relamp	No	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,912	0.24	1,105	0.0	$180.00	$585.00	$100.00	2.69
Women's Room	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	400	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	400	0.04	27	0.0	$4.35	$126.40	$0.00	29.09
Custodial Closet	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	52	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	52	0.02	2	0.0	$0.28	$63.20	$0.00	223.74
Food Serivice office	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	3,385	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,385	0.15	771	0.0	$125.55	$351.00	$60.00	2.32
Display Board	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,912	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,912	0.05	221	0.0	$36.00	$117.00	$20.00	2.69
104 - Office of student life	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,836	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,836	0.05	367	0.0	$59.79	$117.00	$20.00	1.62
104 - Office of student life	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	3,385	Relamp	No	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,385	0.17	899	0.0	$146.48	$409.50	$70.00	2.32
108 - Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,912	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,912	0.07	332	0.0	$54.00	$175.50	$30.00	2.69

	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
Room - 105	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,912	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,912	0.02	111	0.0	$18.00	$58.50	$10.00	2.69
Room - 105	1	Incandescent: Globe fixture	Wall Switch	40	2,912	Relamp	No	1	LED Screw-In Lamps: Globe fixture	Wall Switch	7	2,912	0.02	111	0.0	$18.00	$97.85	$10.00	4.88
Room - 105	1	CFL Screw-In Lamps: Globe fixture	Wall Switch	30	2,912	Relamp	No	1	LED Screw-In Lamps: Globe fixture	Wall Switch	7	2,912	0.02	77	0.0	$12.55	$97.85	$0.00	7.80
Entrance	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,912	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,912	0.04	194	0.0	$31.64	$126.40	$0.00	4.00
Dining	10	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	400	Relamp	No	10	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	400	0.21	133	0.0	$21.73	$632.00	$0.00	29.09
Loading dock	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,836	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,836	0.07	551	0.0	$89.68	$175.50	$30.00	1.62
Exterior wall packs	8	High-Pressure Sodium: (1) 100W Lamp	Wall Switch	138	4,380	None	No	8	High-Pressure Sodium: (1) 100W Lamp	Wall Switch	138	4,380	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
Mechanical Room	Mechanical Room	1	Air Compressor	1.0	85.5%	No	4,957	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cooling Tower	Mechanical Room	1	Cooling Tower Fan	25.0	93.6%	No	4,067	Yes	93.6%	Yes	1	0.00	47,001	0.0	$7,655.58	$11,471.03	$1,500.00	1.30
Mechanical Room	Airhandling unit	1	Supply Fan	15.0	91.0%	No	3,391	No	91.0%	Yes	1	5.51	19,807	0.0	$3,226.14	$5,194.45	$1,200.00	1.24
Mechanical Room	Building	1	Chilled Water Pump	7.5	85.5%	No	3,391	Yes	91.0%	Yes	1	1.50	12,998	0.0	$2,117.10	$4,738.24	$0.00	2.24
Mechanical Room	Building	1	Chilled Water Pump	7.5	88.5%	No	3,391	Yes	91.0%	Yes	2	1.35	12,490	0.0	$2,034.39	$7,146.74	$0.00	3.51
Mechanical Room	Building	1	Condenser Water Pump	5.0	78.0%	No	2,745	Yes	89.5%	No		0.45	1,265	0.0	$206.05	$800.37	$0.00	3.88
Building	Fan coil units	31	Supply Fan	0.3	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	DSP 111	1	Other	5.0	89.5%	No	2,745	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Building	1	Heating Hot Water Pump	2.0	84.4%	No	2,745	Yes	86.5%	Yes	1	0.38	2,826	0.0	$460.25	$3,623.09	$0.00	7.87
Boiler Room	Building	3	Heating Hot Water Pump	2.0	84.4%	No	2,745	Yes	86.5%	Yes	3	1.13	8,477	0.0	$1,380.75	$10,869.28	$0.00	7.87

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
College Center	UV 001	1	Split-System AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric Chiller Inventory & Recommendations

		Existing Conditions			Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Chiller Quantity	System Type	Cooling Capacity per Unit (Tons)	Install High Efficiency Chillers?	Chiller Quantity	System Type	Constant/ Variable Speed	Cooling Capacity (Tons)	Full Load Efficiency (kW/Ton)	IPLV Efficiency (kW/Ton)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical Room	Book Store and College Centre	1	Water-Cooled Reciprocating Chiller	80.00	Yes	1	Water-Cooled Reciprocating Chiller	Variable	80.00	0.75	0.48	41.27	98,560	0.0	$16,053.64	$69,450.35	$3,440.00	4.11

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Rooftop	Building	2	Furnace	400.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Building	2	Non-Condensing Hot Water Boiler	948.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Mechanical Room	4	Warm Air Unit Heater	60.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

DHW Inventory & Recommendations

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

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
College centre	12	Computer	75.0	Yes
College centre	2	Printer - Big	515.0	No
College centre	1	Electric Heater	1,500.0	No
College centre	1	Microwave	1,000.0	No
College centre	1	Fridge	8.6	No
College centre	1	Air cooler	1,242.0	Yes
College centre	1	Printer - Small	20.0	No
College centre	8	Ceiling fans	100.0	No
College centre	1	Toaster	1,050.0	No

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

N/A

ENERGY STAR® Score[1]

Ocean County College

Primary Property Type: College/University
Gross Floor Area (ft²): 526,034
Built: 1966

For Year Ending: June 30, 2015
Date Generated: June 21, 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
Ocean County College 1 College Drive Toms River, New Jersey 08754	Ocean County College 1 College Drive Toms River, NJ 08754 732-255-0533	James Calamia 1 College Drive Toms River, NJ 08754 732-255-0533 jcalamia@ocean.edu

Property ID: 5093695

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
173.3 kBtu/ft²

Source EUI
324 kBtu/ft²

Annual Energy by Fuel

Other: (kBtu)	4,536,360 (5%)
Natural Gas (kBtu)	50,787,318 (56%)
Electric - Grid (kBtu)	35,847,151 (39%)

National Median Comparison

National Median Site EUI (kBtu/ft²)	140.5
National Median Source EUI (kBtu/ft²)	262.6
% Diff from National Median Source EUI	23%

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO2e/year)	N/A

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)