Local Government Energy Audit:
Energy Audit Report

Robert J. Novins Planetarium (#13)

Ocean County College

1 College Drive
Toms River, New Jersey 08754
October 18, 2018

Final Report by:
TRC Energy Services

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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 Robert J. Novins Planetarium (#13).

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

The Robert J. Novins Planetarium (#13) is a 7,856 square foot facility built in 1974. It is constructed of brick masonry and structural steel. Windows and doors are fully glass and interior lighting is provided by linear T8 fixtures and lamps with electronic ballasts, compact fluorescent lamps (CFL), and halogen incandescent lamps. Lighting control is provided by manual wall switches. The Planetarium cooling is supplied with cooling from the administration chiller while hot water for heating is provided by a campus-wide hot water distribution loop. Chilled and hot water are distributed by a Trane central station air handler equipped chilled and hot water coils. There are also three Mitsubishi ductless heat pumps.

A thorough description of the facility and our observations are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated four projects which represent an opportunity for Robert J. Novins Planetarium (#13) to reduce annual energy costs by roughly $2,733 and annual greenhouse gas emissions by 16,796 lbs CO_2e. The measures would pay for themselves in roughly 3.35 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 Robert J. Novins Planetarium's annual energy use by 6.8%.

Figure 1 – Previous 12 Month Utility Costs

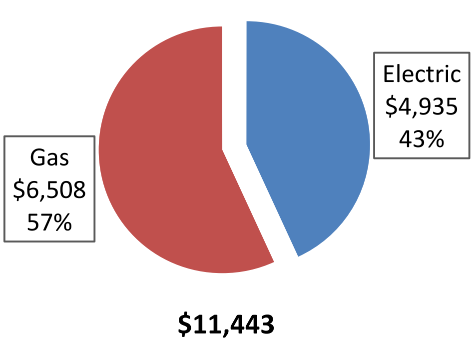
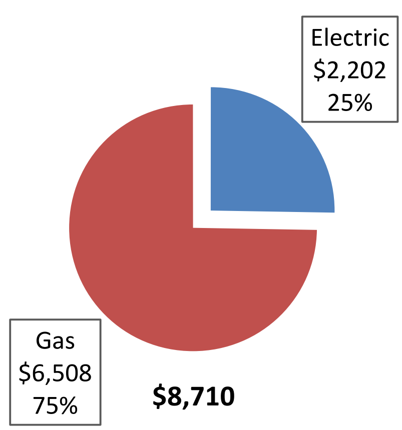


Figure 2 – Potential Post-Implementation Costs



A detailed description of Robert J. Novins Planetarium (#13)'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 Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			13,994	4.5	$2,293.03	$8,702.57	$825.00	$7,877.57	3.44	14,091
ECM 1	Install LED Fixtures	Yes	8,301	2.8	$1,360.18	$4,918.67	$295.00	$4,623.67	3.40	8,359
ECM 2	Retrofit Fixtures with LED Lamps	Yes	5,693	1.7	$932.85	$3,783.90	$530.00	$3,253.90	3.49	5,733
Lighting Control Measures			1,354	0.4	$221.86	$1,508.00	$260.00	$1,248.00	5.63	1,363
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	1,354	0.4	$221.86	$1,508.00	$260.00	$1,248.00	5.63	1,363
Domestic Water Heating Upgrade			1,332	0.0	$218.24	$28.68	$0.00	$28.68	0.13	1,341
ECM 4	Install Low-Flow Domestic Hot Water Devices	Yes	1,332	0.0	$218.24	$28.68	$0.00	$28.68	0.13	1,341
TOTALS			16,679	4.9	$2,733.13	$10,239.25	$1,085.00	$9,154.25	3.35	16,796

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

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

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

Lighting Controls measures generally involve the installation of automated controls to turn off lights or reduce light output when conditions allow. Automated control reduces reliance on occupant behavior for adjusting lights. These measures save energy by reducing the amount of time lights are on.

Domestic Water Heating upgrade measures generally involve replacing old inefficient domestic water heating systems with modern energy efficient systems. New domestic water heating systems can provide equivalent or greater capacity as older systems, but use less energy. These measures save energy by reducing the fuel used by the domestic water heating systems due to improved efficiency or the removal of standby losses.

Energy Efficient Practices

TRC also identified 13 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 Robert J. Novins Planetarium (#13) include:

- Close Doors and Windows
- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Perform Routine Motor Maintenance
- Use Fans to Reduce Cooling Load
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- 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 Energy Services evaluated the potential for installing on-site generation sources for Robert J. Novins Planetarium (#13). Based on the configuration of the site and its loads there is a low potential for installing any PV and combined heat and power on-site 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
- Direct Install
- SREC (Solar Renewable Energy Certificate) Registration Program (SRP)
- Energy Savings Improvement Program (ESIP)
- Demand Response Energy Aggregator

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.

This facility also qualifies for the Direct Install program which, through an authorized network of participating contractors, can assist with the implementation of a group of measures versus installing individual measures or phasing implementation. This program is designed to be turnkey and will provide an incentive up to 70% of the cost of the project identified by the designated contractor.

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 8.4 for additional information on the ESIP Program.

The Demand Response Energy Aggregator is a program (non-NJCEP) designed to reduce consumer electric load when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak demand. Demand Response (DR) service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability 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. Refer to Section 7 for additional information on this program.

Additional descriptions of all relevant incentive programs are located in Section 8. You may also check the following website for further information on available rebates and incentives: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 OfFacilities	jcalamia@ocean.edu	732-255-0400 Ext.2066
Designated Representative			
John Jack	Maintenance Technician		732-255-0400
TRC Energy Services			
Moussa Traore	Auditor	mtraore@trcsolutions.com	732-855-2879

2.2 General Site Information

On June 13, 2016, TRC performed an energy audit at Robert J. Novins Planetarium (#13) located in Toms River, New Jersey. TRC's team met with John Jack to review the facility operations and focus the investigation on specific energy-using systems.

The Robert J. Novins Planetarium (#13) is a 7,856 square foot facility comprised of offices, classroom, planetarium, and gift shop. The building was constructed in 1974 and has received a major renovation in 2009. It has a flat roof and the planetarium has a dome that is a virtual 3-D video space and offers multiple shows each week plus a shop with space-related merchandise. The windows and doors are fully glass with aluminum frames. The auditorium has a seating capacity of 100 people.

The building receives electricity via the campus's main account (with JCP&L). The building has no separate utility meters onsite during the site visit, but the site contact mentioned that all campus buildings will be metered very soon. The facility's interior lighting is provided by a combination of linear T8 fixtures and lamps with electronic ballasts, compact fluorescent lamps (CFL), and halogen incandescent lamps. Lighting control is provided by manual wall switches.

The Planetarium cooling is supplied with cooling from the administration chiller while hot water for heating is provided by a campus-wide hot water distribution loop.

2.3 Building Occupancy

The entire facility is used year round by the public and the typical schedule is presented in the table below.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Robert J. Novins Planetarium #13	Weekday	10:00 AM - 10:00 PM
Robert J. Novins Planetarium #13	Weekend	12:00 PM - 11:00 PM

2.4 Building Envelope

The foundation consists of, reinforced concrete foundation. Exterior walls are constructed of brick masonry and structural steel. The building has a flat roof that was not accessible during the site visit, but is in good condition as mentioned by the site contact. The windows and entrance doors are fully glass. The front entrance windows are aluminum frame and set in store front type windows. All door and window seals appeared to be tight. No signs of outside air infiltration were noted.

2.5 On-site Generation

The campus has a 1.1 MW Waukesha reciprocating engine combined heat and power (CHP) power plant at the Central Plant. The CHP plant generates a significant portion of the power used by the Planetarium Building and other central campus buildings.

2.6 Energy-Using Systems

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

Lighting System

Lighting is provided predominately by 32-Watt linear fluorescent T8 lamps with electronic ballasts as well as compact fluorescent lamps (CFL) and halogen incandescent lamps. The auditorium is lit with a combination of 13-Watt CFL recessed cans and linear 32-Watt T8 fixtures and lamps. The corridor or waiting area is lit with 32-Watt T8 and halogen incandescent lamps, and the remaining building's spaces are lit with linear T8 fixtures and lamps. Most of the building spaces use 2, and 3 lamps 4-foot long troffers with diffusers. Interior lighting control is provided mainly by manual wall switches. The facility has minimal exterior lights which consists of halogen incandescent and 400-Watt metal halide. They are controlled with photocells.

Chilled Water System

The building receives chilled water from the administration chiller. The chilled water is supplied to the Trane central station air handler equipped with chilled and hot water coils. The chilled water is supplied by a dedicated 3 hp pump equipped with variable frequency drive (VFD). The air handler has 15 and 10 hp as supply and return fans and run at variable speed.

Hot Water System

As with chilled water, the hot water is also received from the campus central heating loop. Hot water is generated at the central plant by four condensing Aerco boilers with an output capacity of 5,580 kBtu/hr (which also provide heat to the reciprocating engine Waukessha CHP system). The hot water is supplied to the Trane central station air handler by two dedicated 3 hp pumps that are equipped with VFD. The AHU is a variable air volume (VAV) system with VAV terminal reheat coils. The operation and scheduling of the central station air handler is controlled from the building energy management system (BEMS) of the Central Plant.

Air Conditioning (DX)

Three 2.5 Ton Mitsubishi ductless heat pumps are used as supplemental cooling and heating system for the auditorium and other spaces. The units utilize a scroll compressor and a direct-expansion (DX) coil. They used R410A as refrigerant and have an inverter technology for maximum energy-efficiency, precise temperature control, and more consistent comfort. The inverter-driven compressor varies speed dynamically to adapt continuously to the room load.

Restrooms and common areas are exhausted by mechanical exhaust fans.

Domestic Hot Water

The building has a minimal demand for domestic hot water. Domestic hot water is provided by one 40-gallon electric A.O. Smith hot water heater located in room 108. It is eight years old and appeared to be in good condition. No domestic hot water upgrades are recommended at this time as the building has no gas service for a gas-fired water heater.

2.7 Water-Using Systems

There are two restrooms at this facility. A sampling of restrooms found that faucets are rated for 2.2 gallons per minute (gpm) or higher, the toilets are rated at 2.5 gallons per flush (gpf) and the urinals are rated at 2 gpf. We recommend the building's restrooms to be fitted with modern water-conserving low-flow fixtures.

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 - Public. 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 billing data that was provided for each utility. Sub-meter data was not available for a full 12-month period. So, we had to use our best estimate of consumption for each building to divide up the energy purchases through the master electric and gas accounts. Annual electric usage for each building on the main account was estimated from the partial year submeter data that was available. Thermal load for each building on the central heating and cooling loops was apportioned according to building square footage. These estimates were complicated by the fact that the amount of electricity produced by the Central Plant's CHP system could not be determined precisely for the billing period for which we had utility bills. So, our usage estimates may vary from current actual energy usage for some buildings that are supplied by master metered electric and gas accounts.

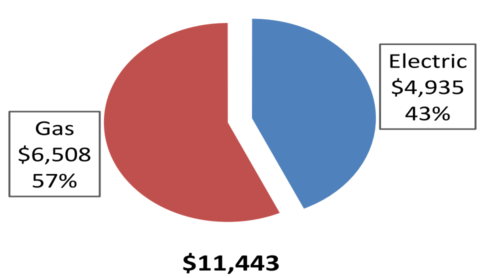
The Planetarium building receives all electric and thermal energy from the campus' mater electric and gas accounts. Below is our estimate of the portion of energy consumptions and costs that can be attributed to the Library building.

Figure 6 - Utility Summary

Utility Summary for Robert J. Novins Planetarium Building		
Fuel	Usage	Cost
Electricity	30,116 kWh	$4,935
Natural Gas	7,375 Therms	$6,508
Total		$11,443

The current utility cost for this site is $11,443 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 $0.164/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 - Electric Usage & Demand

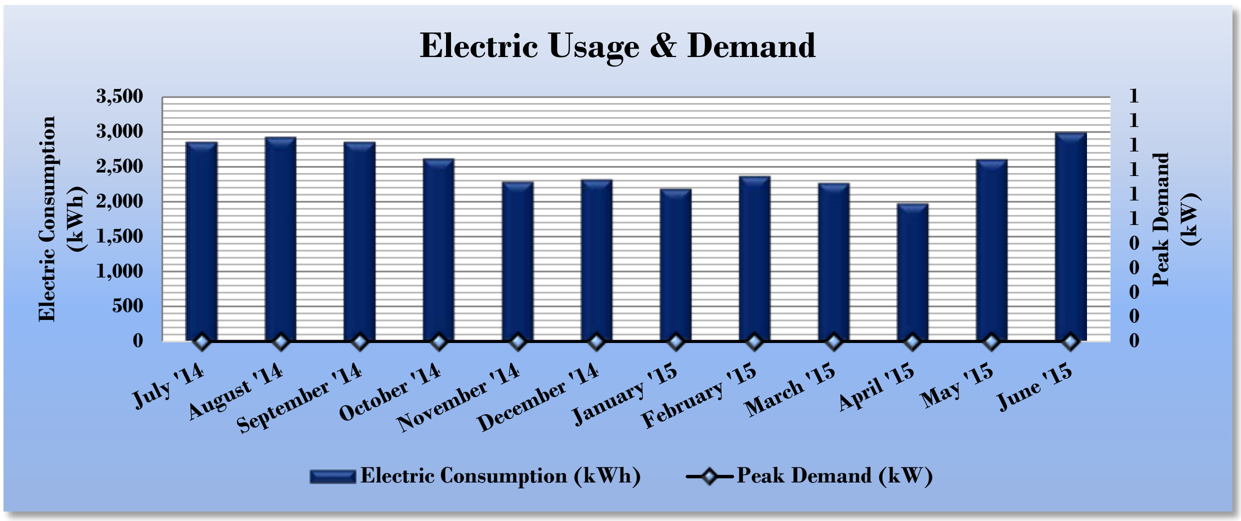


Figure 9 - Electric Usage & Demand

Electric Billing Data for Robert J. Novins Planetarium Building						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
8/1/14	31	2,860			$331	Yes
9/1/14	29	2,925			$451	Yes
10/1/14	29	2,857			$463	Yes
11/1/14	32	2,622			$448	Yes
12/1/14	31	2,289			$403	Yes
1/1/15	32	2,321			$386	Yes
2/1/15	30	2,187			$401	Yes
3/1/15	29	2,370			$553	Yes
4/1/15	32	2,269			$359	Yes
5/1/15	30	1,980			$330	Yes
6/1/15	32	2,610			$420	Yes
7/1/15	30	2,991			$417	Yes
Totals	367	30,281	0	$0	$4,962	12
Annual	365	30,116	0	$0	$4,935	

3.3 Natural Gas Usage

Natural gas is provided by NJ Natural Gas. It is supplied to the boilers at the Central Plant. The gas fires the main boilers there and distributes hot water to 10 campus buildings, including the Planetarium. The gas is also used to generate a portion of the campus' electric and chilled water demand via the Plant's CHP and absorption chiller equipment. This makes it difficult to assign a final end-use gas consumption for each building. From the main gas account, we determined the average gas cost for the most recent 12-month billing period to be $0.882/therm. This is the blended rate used throughout the analyses in this report. Estimated monthly gas consumption for the building is shown in the chart below.

Figure 10 - Natural Gas Usage

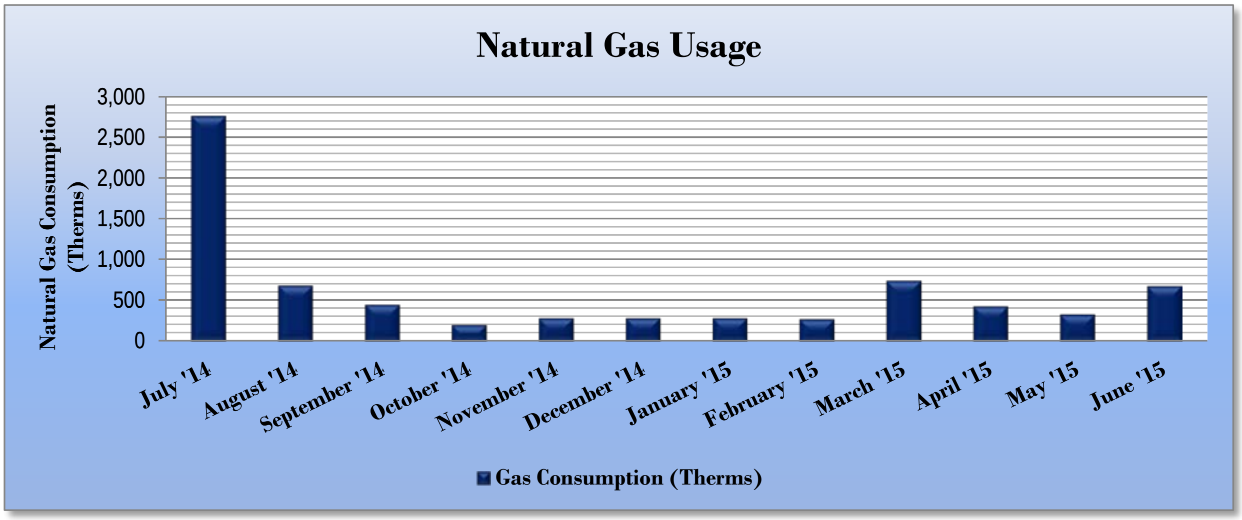


Figure 11 - Natural Gas Usage

Gas Billing Data for Robert J. Novins Planetarium Building				
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost	TRC Estimated Usage?
8/1/14	31	2,763	$2,438	Yes
9/1/14	29	685	$604	Yes
10/1/14	29	451	$398	Yes
11/1/14	32	203	$179	Yes
12/1/14	31	286	$252	Yes
1/1/15	32	286	$252	Yes
2/1/15	30	286	$252	Yes
3/1/15	29	272	$240	Yes
4/1/15	32	746	$658	Yes
5/1/15	30	431	$380	Yes
6/1/15	32	331	$292	Yes
7/1/15	30	678	$599	Yes
Totals	367	7,416	$6,544	12
Annual	365	7,375	$6,508	

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.

Due to the many uncertainties regarding electric and gas end-usage for buildings on master metered accounts (as discussed in Sections 3.2 and 3.3 above), we have provided a combined benchmarking (in kBTU/sq-ft) for all campus buildings that are served by master electric and gas accounts.

Figure 12 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Robert J. Novins Planetarium Building	National Median Building Type: Higher Education - Public
Source Energy Use Intensity (kBtu/ft^2)	139.6	262.6
Site Energy Use Intensity (kBtu/ft^2)	107.0	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		
	Robert J. Novins Planetarium Building	National Median Building Type: Higher Education - Public
Source Energy Use Intensity (kBtu/ft^2)	116.9	262.6
Site Energy Use Intensity (kBtu/ft^2)	99.7	130.7

Many buildings can also receive a 1 – 100 ENERGY STAR® 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 does not currently qualify to receive an ENERGY STAR® score.

Because final end-usage of energy could not be precisely apportioned for each building, we have provided a combined benchmarking score for the whole campus. While this does not qualify for an ENERGY STAR® score, it may be useful to compare this average campus score to EUI scores available for similar college campuses.

A Portfolio Manager® Statement of Energy Performance (SEP) was generated for this facility, see Appendix B: ENERGY STAR® Statement of Energy Performance.

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

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

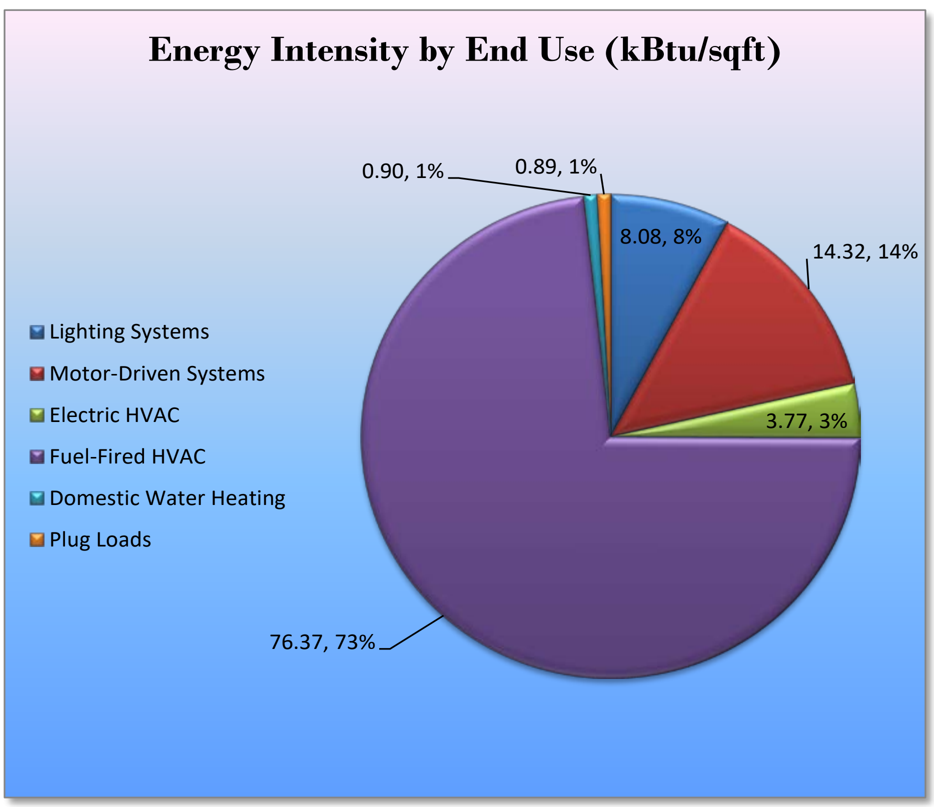
3.5 Energy End-Use Breakdown

In order to provide a complete overview of energy consumption across building systems, an energy balance was performed at this facility. An energy balance utilizes standard practice engineering methods to evaluate all components of the various electric and fuel-fired systems found in a building 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.

This breakdown of energy usage is based on both our estimates of the planetarium's shares of the total electric and gas loads as well as number and sizes of energy-using equipment on site.

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

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 J. Novins Planetarium (#13) 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		13,994	4.5	0.0	$2,293.03	$8,702.57	$825.00	$7,877.57	3.44	14,091
ECM 1	Install LED Fixtures	8,301	2.8	0.0	$1,360.18	$4,918.67	$295.00	$4,623.67	3.40	8,359
ECM 2	Retrofit Fixtures with LED Lamps	5,693	1.7	0.0	$932.85	$3,783.90	$530.00	$3,253.90	3.49	5,733
Lighting Control Measures		1,354	0.4	0.0	$221.86	$1,508.00	$260.00	$1,248.00	5.63	1,363
ECM 3	Install Occupancy Sensor Lighting Controls	1,354	0.4	0.0	$221.86	$1,508.00	$260.00	$1,248.00	5.63	1,363
Domestic Water Heating Upgrade		1,332	0.0	0.0	$218.24	$28.68	$0.00	$28.68	0.13	1,341
ECM 4	Install Low-Flow Domestic Hot Water Devices	1,332	0.0	0.0	$218.24	$28.68	$0.00	$28.68	0.13	1,341
TOTALS		16,679	4.9	0.0	$2,733.13	$10,239.25	$1,085.00	$9,154.25	3.35	16,796

* - 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 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		13,994	4.5	0.0	$2,293.03	$8,702.57	$825.00	$7,877.57	3.44	14,091
ECM 1	Install LED Fixtures	8,301	2.8	0.0	$1,360.18	$4,918.67	$295.00	$4,623.67	3.40	8,359
ECM 2	Retrofit Fixtures with LED Lamps	5,693	1.7	0.0	$932.85	$3,783.90	$530.00	$3,253.90	3.49	5,733

ECM 1: Install LED Fixtures

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	4,837	1.3	0.0	$792.56	$3,691.76	$60.00	$3,631.76	4.58	4,871
Exterior	3,464	1.5	0.0	$567.62	$1,226.91	$235.00	$991.91	1.75	3,488

Measure Description

This measure evaluates replacing existing fixtures containing fluorescent, HID, and incandescent lamps with new high performance LED light fixtures. 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 generally more than twice that of a fluorescent source and more than 10 times incandescent sources. Maintenance savings may be partially offset by the higher material costs associated with LED sources.

During planning and design for the installation of new fixtures, we recommend a holistic approach that considers both the technology of the lighting sources and how they are controlled.

ECM 2: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	5,693	1.7	0.0	$932.85	$3,783.90	$530.00	$3,253.90	3.49	5,733
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.00	0

Measure Description

This measure evaluates replacing linear 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.

During retrofit planning and design, we recommend a holistic approach that considers both the technology of the lighting sources and how they are controlled.

4.1.2 Lighting Control Measures

Our recommendations upgrades to lighting control measures are summarized in Figure 17 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		1,354	0.4	0.0	$221.86	$1,508.00	$260.00	$1,248.00	5.63	1,363
ECM 3	Install Occupancy Sensor Lighting Controls	1,354	0.4	0.0	$221.86	$1,508.00	$260.00	$1,248.00	5.63	1,363

ECM 3: Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,354	0.4	0.0	$221.86	$1,508.00	$260.00	$1,248.00	5.63	1,363

Measure Description

This measure evaluates installing occupancy sensors to control light fixtures that are currently manually controlled in classrooms and private offices. Sensors detect occupancy using ultrasonic and/or infrared wave technologies. Lighting systems are enabled when an occupant is detected. Fixtures are automatically turned off after an area has been vacant for a preset period. Occupants will also be able to manually turn off fixtures. Energy savings result 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. Ceiling-mounted or remote-mounted sensors require the use of low voltage switching relays or a wireless signal to the switch. In general, use wall switch replacement sensors for single occupant offices and other small rooms. Install ceiling-mounted or remote mounted sensors in locations without local switching, in situations where the existing wall switches are not in the line-of-sight of the main work area, and in large spaces. We recommend a holistic design approach that considers both the technology of the lighting sources and how they are controlled.

Maintenance savings are anticipated due to reduced lamp operation, however, additional maintenance costs may be incurred because the occupancy sensors may require periodic adjustment; it is anticipated that the net effect on maintenance costs will be negligible.

4.1.3 Domestic Water Heating Upgrade

Our recommendations for upgrades for domestic water heating measures are summarized in Figure 18 below.

Figure 18 - Summary of Domestic Water Heating 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)
Domestic Water Heating Upgrade		1,332	0.0	0.0	$218.24	$28.68	$0.00	$28.68	0.13	1,341
ECM 4	Install Low-Flow Domestic Hot Water Devices	1,332	0.0	0.0	$218.24	$28.68	$0.00	$28.68	0.13	1,341

ECM 4: Install Low-Flow DHW Devices

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,332	0.0	0.0	$218.24	$28.68	$0.00	$28.68	0.13	1,341

Measure Description

This measure evaluates the savings from installing low flow domestic water devices to reduce overall water flow in general and hot water flow in particular. Low flow faucet aerators reduce the water flow, relative to standard aerators, from the fixture.

All of the low flow devices reduce the overall water flow from the fixture which generally reduces the amount of hot water used resulting in energy and water savings.

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.

Close Doors and Windows

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

Perform Proper Lighting Maintenance

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

Develop a Lighting Maintenance Schedule

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

Ensure Lighting Controls Are Operating Properly

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

Perform Routine Motor Maintenance

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

Use Fans to Reduce Cooling Load

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

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.

Clean Evaporator/Condenser Coils on AC Systems

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

Clean and/or Replace HVAC Filters

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

Check for and Seal Duct Leakage

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

Perform Proper 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 (gpf) and toilets that use as little as 1.28 gpf (this is lower than the current 1.6 gpf federal standard).

Refer to Section 4.1.3 for any low-flow ECM recommendations.

6 SELF-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.

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 Planetarium Building has approximately 1,800 square feet of unshaded roof space available, representing about 1.6% of the total array. See rooftop image below.

We estimate that the available rooftop space could support up to 1,487 kW of solar generating capacity (~4,956 PV panels @300-WDC each). 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, 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.

Ocean County College could receive during the first 15 years of the solar project's lifetime, up $795,309 per year in Solar Renewable Energy Certificate (SREC) income (@ $235/MWh). We estimate that 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.

Figure 19 – Summary of Solar PV Array Analysis for OCC Campus

Total Installed Cost	**$5,203,450**	**$**
Value of Electric Generation per Year	**$326,719**	**$**
Annual Income from SRECS	**$468,590**	**$**
Total Economic Value per Year	**$795,309**	**$**
Simple Payback Period	**6.54**	**years**

Rebates are not available for solar projects, but owners of solar projects MUST register their projects in the SREC Registration Program (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. Refer to Section 8.3 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

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	Direct Install
ECM 1	Install LED Fixtures	x		x
ECM 2	Retrofit Fixtures with LED Lamps	x		x
ECM 3	Install Occupancy Sensor Lighting Controls	x		x
ECM 4	Install Low-Flow Domestic Hot Water Devices			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

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.**Prescriptive Equipment Incentives Available:**

Electric Chillers
Electric Unitary HVAC
Gas Cooling
Gas Heating
Gas Water Heating
Ground Source Heat Pumps
Lighting
Lighting Controls
Refrigeration Doors
Refrigeration Controls
Refrigerator/Freezer Motors
Food Service Equipment
Variable Frequency Drives

Most equipment sizes and types are served by this program. This program provides an effective mechanism for securing incentives for energy efficiency measures installed individually or as part of a package of energy upgrades.

Incentives

The SmartStart prescriptive incentive program provides fixed incentives for specific energy efficiency measures, whereas the custom SmartStart program provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentive offerings for specific devices.

Since your facility is an existing building, only the retrofit incentives have been applied in this report. Custom measure incentives are calculated at $0.16/kWh and $1.60/therm based on estimated annual savings, capped at 50% of the total installed incremental project cost, or a project cost buy down to a one year payback (whichever is less). Program incentives are capped at $500,000 per electric account and $500,000 per natural gas account, per fiscal year.

How to Participate

To participate in the SmartStart program you will need to submit an application for the specific equipment to be installed. Many applications are designed as rebates, although others require application approval prior to installation. Applicants may work with a contractor of their choosing and can also utilize internal personnel, which provides added flexibility to the program. Using internal personnel also helps improve the economics of the ECM by reducing the labor cost that is included in the tables in this report.

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

8.2 Direct Install

Overview

Direct Install is a turnkey program available to existing small to mid-sized facilities with a peak electric demand that did not exceed 200 kW in any of the preceding 12 months. You will work directly with a pre-approved contractor who will perform a free energy assessment at your facility, identify specific eligible measures, and install those measures. Energy efficiency measures may include lighting and lighting controls, refrigeration, HVAC, motors, variable speed drives and controls.

Incentives

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

How to Participate

To participate in the Direct Install program you will need to contact the participating contractor assigned to the county where your facility is located; a complete list is provided on the Direct Install website identified below. The contractor will be paid the program incentive directly which will pass on to you in the form of reduced material and implementation costs. This means up to 70% of eligible costs are covered by the program, subject to program caps mentioned above, and the remaining 30% of the cost is your responsibility to the contractor.

Since Direct Install offers a free assessment, LGEA applicants that do not meet the audit program eligibility requirements, but do meet the Direct Install requirements, may be moved directly into this program.

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

8.3 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.

8.4 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.

8.5 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
Exterior Lighting	7	Halogen Incandescent: PAR38 150W	Daylight Dimming	150	1,704	Fixture Replacement	No	7	LED - Fixtures: Downlight Solid State Retrofit	Daylight Dimming	11	1,704	0.79	1,874	0.0	$307.00	$445.56	$35.00	1.34
Exterior Lighting	2	Metal Halide: (1) 400W Lamp	Daylight Dimming	458	1,704	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	45	1,704	0.67	1,590	0.0	$260.62	$781.35	$200.00	2.23
Hallway	5	Halogen Incandescent: PAR38 150W	Wall Switch	150	2,880	Fixture Replacement	No	5	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	11	2,880	0.57	2,262	0.0	$370.63	$318.26	$25.00	0.79
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
Hallway	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,880	Relamp	Yes	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,016	0.44	1,764	0.0	$289.09	$876.50	$150.00	2.51
Hallway	4	CFL Screw-In Lamps: 32W Screen in CFL	Wall Switch	32	2,880	Fixture Replacement	No	4	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	7	2,880	0.08	325	0.0	$53.33	$254.60	$0.00	4.77
Waiting Room	7	CFL Screw-In Lamps: 13W CFL 2 pin	Wall Switch	26	2,304	Fixture Replacement	Yes	7	LED - Fixtures: Downlight Solid State Retrofit	Occupancy Sensor	7	1,613	0.12	385	0.0	$63.01	$561.56	$20.00	8.59
Waiting Room	5	Incandescent: 100W A Lamp	Wall Switch	100	2,304	Fixture Replacement	No	5	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	7	2,304	0.38	1,211	0.0	$198.38	$318.26	$25.00	1.48
Waiting Room	4	LED Screw-In Lamps: LED BR30 9W	Wall Switch	9	2,304	None	No	4	LED Screw-In Lamps: LED BR30 9W	Wall Switch	9	2,304	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Waiting Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,304	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,304	0.01	46	0.0	$7.47	$35.90	$5.00	4.14
Auditorium	33	CFL Screw-In Lamps: 13W CFL 2 pin	Wall Switch	13	2,304	Fixture Replacement	No	33	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	7	2,304	0.16	515	0.0	$84.47	$2,100.48	$0.00	24.87
Auditorium	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
Auditorium	2	Halogen Incandescent: PAR38 90W	Wall Switch	35	2,304	Fixture Replacement	No	2	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	7	2,304	0.05	146	0.0	$23.89	$127.30	$10.00	4.91
Auditorium	7	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,304	Relamp	No	7	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,304	0.17	529	0.0	$86.60	$442.40	$0.00	5.11
Auditorium	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,304	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,304	0.04	129	0.0	$21.12	$75.20	$15.00	2.85
Room 108	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,304	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,613	0.07	217	0.0	$35.58	$233.00	$40.00	5.42
Room 107	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,304	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,613	0.07	217	0.0	$35.58	$233.00	$40.00	5.42
Room 109	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,304	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,304	0.03	86	0.0	$14.08	$58.50	$10.00	3.44
Room 106	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,304	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,613	0.07	217	0.0	$35.58	$233.00	$40.00	5.42
Room 105	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,304	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,613	0.07	217	0.0	$35.58	$233.00	$40.00	5.42
Room 104	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,304	Relamp	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,613	0.02	57	0.0	$9.32	$151.90	$25.00	13.61
Women's Bathroom	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,386	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,670	0.14	450	0.0	$73.68	$350.00	$60.00	3.94
Men's Bathroom	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,386	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,670	0.14	450	0.0	$73.68	$350.00	$60.00	3.94
Room 117	2	CFL Screw-In Lamps: 13W CFL 2 pin	Wall Switch	13	2,304	Fixture Replacement	No	2	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	7	2,304	0.01	31	0.0	$5.12	$127.30	$0.00	24.87
Room 117	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,304	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,613	0.13	405	0.0	$66.38	$368.80	$20.00	5.25

	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 115	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,304	Relamp	Yes	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,613	0.05	163	0.0	$26.69	$191.20	$35.00	5.85
Room 114	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,304	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,613	0.47	1,520	0.0	$249.06	$935.00	$160.00	3.11
Room 116	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,304	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,613	0.17	543	0.0	$88.95	$408.50	$70.00	3.81
Room 116	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

Motor Inventory & Recommendations

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof Top	Exhaust Fan Motors	4	Exhaust Fan	0.3	65.8%	No	1,440	No	65.8%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 108	Pumps	2	Heating Hot Water Pump	3.0	86.0%	Yes	1,014	No	86.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 108	Building #13	1	Supply Fan	15.0	94.0%	Yes	1,728	No	94.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 108	Building #13	1	Return Fan	10.0	94.0%	Yes	1,728	No	94.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 109	Building #13	1	Chilled Water Pump	3.0	86.0%	Yes	936	No	86.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof Top	Building #13	3	Ductless Mini-Split HP	2.50	3.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Central Plant	Health Science Building	4	Condensing Hot Water Boiler	5,580.00	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
Room 108	Building #13	1	Storage Tank Water Heater (≤ 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Low-Flow Device Recommendations

	Recommedation Inputs				Energy Impact & Financial Analysis						
Location	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Women's Bathroom	2	Faucet Aerator (Lavatory)	2.20	1.00	0.00	666	0.0	$109.12	$14.34	$0.00	0.13
Men's Bathroom	2	Faucet Aerator (Lavatory)	2.20	1.00	0.00	666	0.0	$109.12	$14.34	$0.00	0.13

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Auditorium	4	Dell Desktop computer	191.0	Yes
Auditorium	1	Refrigerator 10.6 CuFt	60.0	Yes
Auditorium	1	Microwave	1,000.0	Yes
Auditorium	1	Office Coffee Maker	800.0	Yes

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)