Local Government Energy Audit:
Energy Audit Report

Automotive Technology

Brookdale Community College

765 Newman Springs Road

Lincroft, NJ 07738

March 26, 2018

Final Report by:

TRC Energy Services

Disclaimer

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

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

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

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

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1 Executive Summary

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Automotive Technology.

The goal of an LGEA report is to provide you with information on how your facility uses energy, identify energy conservation measures (ECMs) that can reduce your energy use, and provide information and assistance to help facilities implement ECMs. The LGEA report also contains valuable information on financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing ECMs.

This study was conducted by TRC Energy Services (TRC), as part of a comprehensive effort to assist New Jersey higher education institutions in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

1.1 Facility Summary

Automotive Technology at Brookdale Community College is a 16,610 square foot, one-story building constructed in 1974. Interior lighting consists mainly of linear fluorescent fixtures with T8 lamps and electronic ballasts. The cooling and heating systems consist of rooftop packaged units that are equipped with chilled and hot water coils. The chilled and hot water are supplied by the Central Utility Plant. The building receives electric power via the campus main account (with JCP&L) and has no separate utility meters or submeters.

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

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated five measures which together represent an opportunity for Automotive Technology to reduce annual energy costs by $4,584 and annual greenhouse gas emissions by 41,097 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 8.3 years. The breakdown of existing and potential utility costs after project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce Automotive Technology's annual energy use by 11%.

Figure 1 – Previous 12 Month Utility Costs

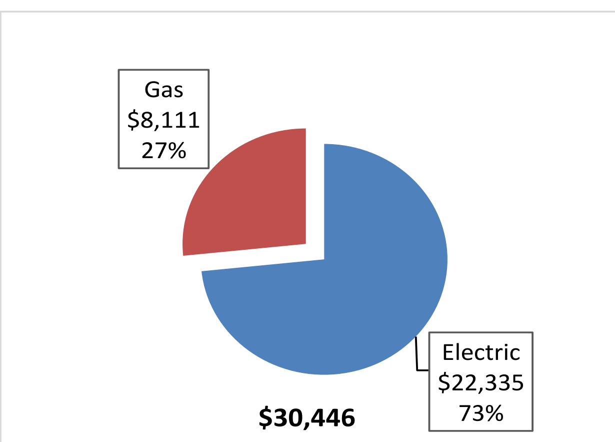
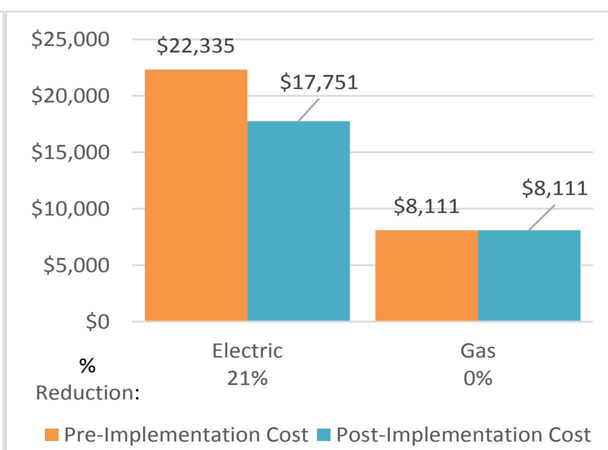


Figure 2 – Potential Post-Implementation Costs



A detailed description of Automotive Technology's existing energy use can be found in Section 3.

Estimates of the total cost, energy savings, and financial incentives for the proposed energy efficient upgrades are summarized below in Figure 3. A brief description of each category can be found below and a description of savings opportunities can be found in Section 4.

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**38,075**	**12.7**	**$4,276.76**	**$38,984.12**	**$3,050.00**	**$35,934.12**	**8.4**	**38,341**
ECM 1	Install LED Fixtures	Yes	13,027	4.3	$1,463.28	$19,438.84	$170.00	$19,268.84	13.2	13,118
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	1,263	0.4	$141.86	$1,319.67	$40.00	$1,279.67	9.0	1,272
ECM 3	Retrofit Fixtures with LED Lamps	Yes	23,785	7.9	$2,671.61	$18,225.61	$2,840.00	$15,385.61	5.8	23,951
Lighting Control Measures			**2,737**	**0.9**	**$307.44**	**$2,564.00**	**$230.00**	**$2,334.00**	**7.6**	**2,756**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	2,274	0.8	$255.43	$2,164.00	$230.00	$1,934.00	7.6	2,290
ECM 5	Install High/Low Lighitng Controls	Yes	463	0.2	$52.01	$400.00	$0.00	$400.00	7.7	466
TOTALS			**40,812**	**13.6**	**$4,584.19**	**$41,548.12**	**$3,280.00**	**$38,268.12**	**8.3**	**41,097**

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

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

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

Lighting Controls measures generally involve the installation of automated controls to turn off lights or reduce light output when not needed. Automated control reduces reliance on occupant behavior for adjusting lights. These measures save energy by reducing the amount of time lights are on.

Energy Efficient Practices

TRC also identified 14 low cost (or no cost) energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral or operational adjustments and by performing better routine maintenance on building systems. These practices can extend equipment lifetime, improve occupant comfort, provide better health and safety, as well as reduce annual energy and O&M costs. Potential opportunities identified at Automotive Technology include:

- Close Doors and Windows
- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Turn Off Unneeded Motors
- Reduce Motor Short Cycling
- Perform Routine Motor Maintenance
- Use Fans to Reduce Cooling Load
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Ensure Economizers are Functioning Properly
- Clean and/or Replace HVAC Filters
- Check for and Seal Duct Leakage
- Install Plug Load Controls
- Water Conservation

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

On-Site Generation Measures

TRC evaluated the potential for installing on-site generation for Automotive Technology. Based on the configuration of the site and its loads there is a low potential for installing any PV and combined heat and power self-generation measures.

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

1.3 Implementation Planning

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

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

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

- SmartStart
- Energy Savings Improvement Program (ESIP)

For facilities wanting to pursue only selected individual measures (or planning to phase implementation of selected measures over multiple years), incentives are available through the SmartStart program. To participate in this program you may utilize internal resources, or an outside firm or contractor, to do the final design of the ECM(s) and do the installation. Program pre-approval is required for some SmartStart incentives, so only after receiving pre-approval should you proceed with ECM installation. The incentive estimates listed above in Figure 3 are based on the SmartStart program. More details on this program and others are available in Section 8.

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the Energy Savings Improvement Program (ESIP). Supported directly by the NJBPU, ESIP provides government agencies with project development, design, and implementation support services, as well as, attractive financing for implementing ECMs. An LGEA report (or other approved energy audit) is required for participation in ESIP. Please refer to Section 8.2 for additional information on the ESIP Program.

The Demand Response Energy Aggregator is a (non-NJCEP) program designed to reduce electric loads at commercial facilities, when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak power demand. Demand Response (DR) service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability. By enabling grid operators to call upon commercial facilities to reduce their electric usage during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment Service Providers provide regular payments to medium and large consumers of electric power for their participation in DR programs. Program participation is voluntary and facilities receive payments whether or not they are called upon to curtail their load during times of peak demand. Refer to Section 7 for additional information on this program.

Additional information on relevant incentive programs is located in Section 8 or: www.njcleanenergy.com/ci.

2 Facility Information and Existing Conditions

2.1 Project Contacts

Figure 4 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Timothy Drury	Director of Facilities Management and Construction	tdrury@brookdalecc.edu	(732) 224-2217
Designated Representative			
Christopher Otis	Manager,Fire Safety & Environmental Compliance	cotis@brookdalecc.edu	(732) 224-2217
TRC Energy Services			
Moussa Traore	Auditor	mtraore@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On December 13, 2016, TRC performed an energy audit at Automotive Technology located in Lincroft, New Jersey. TRC's auditor met with Christopher Otis, Manager of Fire Safety & Environmental Compliance, to review the facility operations and help focus our investigation on specific energy-using systems.

Automotive Technology is a 16,610 square foot building constructed in 1974 and is comprised of classrooms, administrative offices, conference, repair bay areas, storage room, and lunch room.

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

2.3 Building Occupancy

The building is open Monday through Friday and the typical schedule is presented in the table below. During a typical day, the facility is occupied by approximately 120 students and staff.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Automotive Techology Building	Weekday	7:00 AM - 7:00 PM
Automotive Techology Building	Weekend	Closed

2.4 Building Envelope

The building has a conventional, reinforced concrete foundation. Portions of the foundation walls are accented decorative stone block. The building has a center flat roof covered with a black membrane and surrounded by hip roofs covered with metal standing seam that is in good condition. Exterior walls are constructed of concrete block with wood siding. The windows throughout the building are glass double pane with metal frames and are in good condition.

2.5 On-Site Generation

Automotive Technology does not have any on-site electric generation capacity.

2.6 Energy-Using Systems

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

Lighting System

Lighting at the facility is provided mostly by linear fluorescent lamps with electronic ballasts as well as some metal halide lamps, and compact fluorescent lamps (CFL). Most of the fluorescent fixtures have two 4-foot lamps. The classrooms, bay areas, and the tool rooms are lit with a combination of 32-Watt linear fluorescent T8 lamps and 250-Watt metal halide lamps. Interior lighting control is provided by both occupancy sensors and manual walls switches. Exit signs throughout the building use LED lamps. Exterior lighting consists of fixtures with metal halide lamps, CFL, and 8-foot long linear fluorescent T12 lamps. They are controlled with photocells.

Hot Water Heating System

The building is served by the campus's central hot water plant. The central hot water plant is comprised of eight 2,850 MBh condensing hot water boilers. The boilers are included in this report to facilitate the development of an energy balance for Automotive Technology. See the Central Utility Plant report for a full description of the hot water system.

The ventilation system consists of one variable air volume (VAV) Carrier air handler unit (AHU) and one Annex Air energy recovery unit (ERU) all located on the center flat roof. They are equipped with hot water coils for heating and chilled water coils for cooling. There are 11 VAV reheat coils located in the ceiling throughout the building. The AHU and the ERU appeared in good condition. Wall and roof mounted exhaust fans are used to exhaust the air in common areas.

Chilled Water Air Conditioning System (CHW)

The building is served by the campus's central chilled water plant. The central chilled water plant is comprised of three 740 ton water cooled centrifugal chillers. The chillers are included in this report to facilitate the development of an energy balance for Automotive Technology. See the Central Utility Plant report for a full description of the chilled water system. The operation and scheduling of all chillers is controlled from the Central Utility Plant.

Domestic Hot Water Heating System

The domestic water heating system is supplied through a heat exchanger. Cold water is heated in the heat exchanger via the Central Utility Plant's heating water.

Building Plug Load

The building has approximately 31 computers with LCD monitors that are used daily. The computers and monitors all seemed to be recent models designed with power management software to reduce power when they sit idle for more than a few minutes.

The facility has a no refrigerated beverage vending machines.

2.7 Water-Using Systems

There are several restrooms at this facility. A sampling of restrooms found that the faucets are rated as low flow.

3 SITE ENERGY USE AND COSTS

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

Prorated utility data for electricity and natural gas was evaluated to determine the annual energy performance metrics for the building in energy cost per square foot and energy usage per square foot. These metrics are an estimate of the relative energy efficiency of this building. There are a number of factors that could cause the energy use of this building to vary from the "typical" energy usage profile for facilities with similar characteristics. Local weather conditions, building age and insulation levels, equipment efficiency, daily occupancy hours, changes in occupancy throughout the year, equipment operating hours, and energy efficient behavior of occupants all contribute to benchmarking scores. Please refer to the Benchmarking section within Section 3.4 for additional information.

3.1 Total Cost of Energy

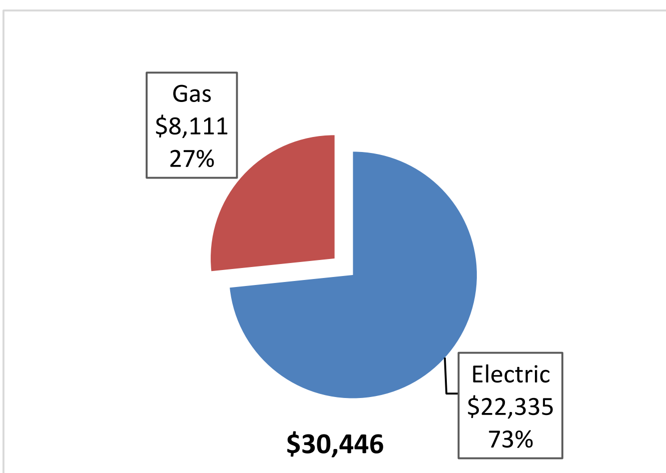
The following energy consumption and cost data is prorated from the last 12-month period of master meter utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 6 - Utility Summary

Utility Summary for Automotive Technology		
Fuel	**Usage**	**Cost**
Electricity	198,840 kWh	$22,335
Natural Gas	6,169 Therms	$8,111
Total		**$30,446**

The current annual energy cost for this facility is $30,446 as shown in the chart below.

Figure 7 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by JCP&L. It is supplied via the main electric account for the campus and distributed from the Central Utility Plant to the Automotive Technology building. The average electric cost over the past 12 months on the main account was $0.112/kWh. This is a blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The monthly estimated electricity consumption and peak demand are shown in the chart below.

Figure 8 - Electric Usage & Demand

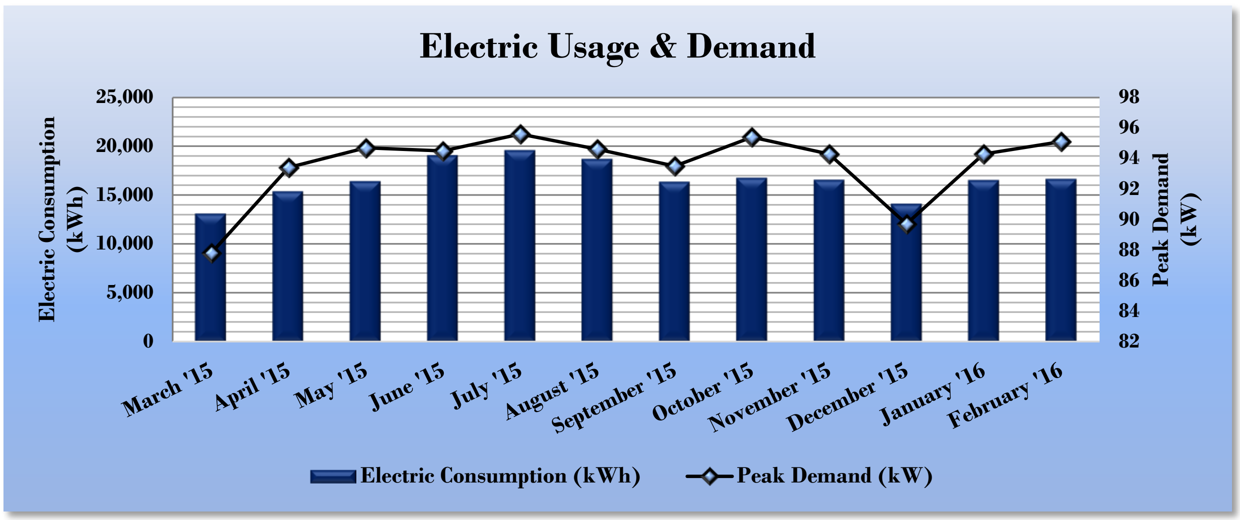


Figure 9 - Electric Usage & Demand

Electric Billing Data for Automotive Technology						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
4/13/15	30	13,084	88		$1,470	Yes
5/12/15	31	15,362	93		$1,725	Yes
6/11/15	30	16,379	95		$1,840	Yes
7/13/15	31	19,027	95		$2,137	Yes
8/12/15	30	19,546	96		$2,196	Yes
9/11/15	31	18,658	95		$2,096	Yes
10/13/15	30	16,315	94		$1,833	Yes
11/12/15	30	16,737	95		$1,880	Yes
12/14/15	31	16,522	94		$1,856	Yes
1/13/16	30	14,088	90		$1,582	Yes
2/11/16	31	16,513	94		$1,855	Yes
3/11/16	30	16,609	95		$1,866	Yes
Totals	**365**	**198,840**	**95.6**	**$0**	**$22,335**	12
Annual	**365**	**198,840**	**95.6**	**$0**	**$22,335**	

3.3 Natural Gas Usage

Natural Gas is provided by New Jersey Natural Gas. It is supplied to the boilers at the Central Utility Plant. The gas fired boilers distributes hot water to many campus buildings, including the Automotive Technology building. From the main gas account, we determined the average gas cost for the most recent 12-month billing period to be $1.315/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

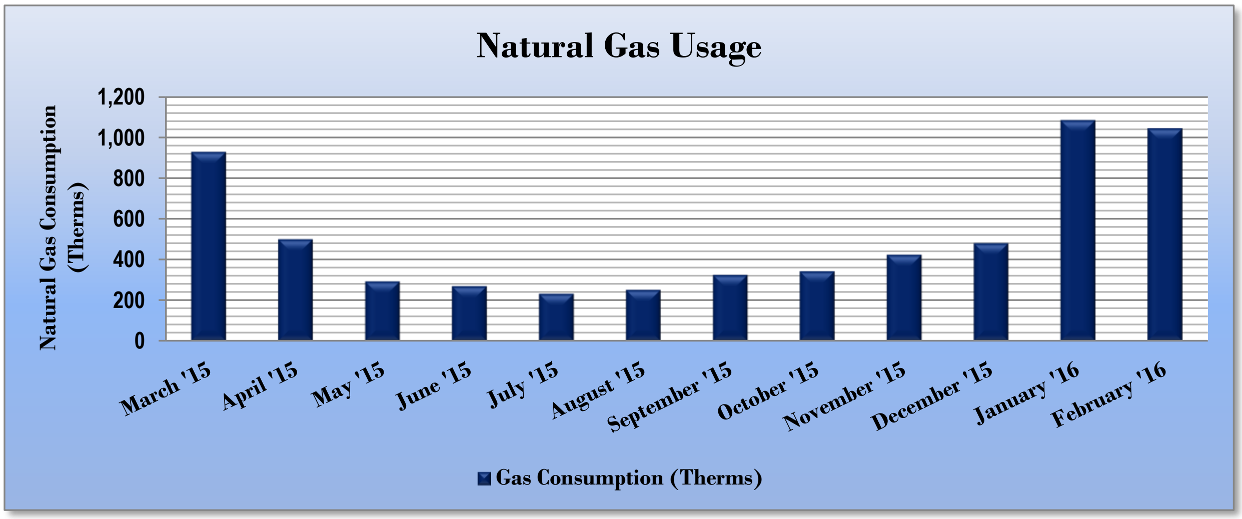


Figure 11 - Natural Gas Usage

Gas Billing Data for Automotive Technology				
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost	TRC Estimated Usage?
4/1/15	31	928	$1,146	Yes
5/1/15	30	499	$624	Yes
6/1/15	31	292	$435	Yes
7/1/15	30	268	$408	Yes
8/1/15	31	231	$365	Yes
9/1/15	31	251	$388	Yes
10/1/15	30	324	$472	Yes
11/1/15	31	342	$492	Yes
12/1/15	30	423	$586	Yes
1/1/16	31	480	$648	Yes
2/1/16	31	1,084	$1,282	Yes
3/1/16	28	1,044	$1,267	Yes
Totals	**365**	**6,169**	**$8,111**	12
Annual	**365**	**6,169**	**$8,111**	

3.4 Benchmarking

This facility was benchmarked using Portfolio Manager, an online tool created and managed by the United States Environmental Protection Agency (EPA) through the ENERGY STAR® program. Portfolio Manager analyzes your building's consumption data, cost information, and operational use details and then compares its performance against a national median for similar buildings of its type. Metrics provided by this analysis are Energy Use Intensity (EUI) and an ENERGY STAR® score for select building types.

The EUI is a measure of a facility's energy consumption per square foot, and it is the standard metric for comparing buildings' energy performance. Comparing the EUI of a building with the national median EUI for that building type illustrates whether that building uses more or less energy than similar buildings of its type on a square foot basis. EUI is presented in terms of "site energy" and "source energy." Site energy is the amount of fuel and electricity consumed by a building as reflected in utility bills. Source energy includes fuel consumed to generate electricity consumed at the site, factoring in electric production and distribution losses for the region.

Figure 12 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Automotive Technology	National Median Building Type: Higher Education - Public
Source Energy Use Intensity (kBtu/ft^2)	167.2	262.6
Site Energy Use Intensity (kBtu/ft^2)	78.0	130.7

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

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

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Automotive Technology	National Median Building Type: Higher Education - Public
Source Energy Use Intensity (kBtu/ft^2)	140.9	262.6
Site Energy Use Intensity (kBtu/ft^2)	69.6	130.7

Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. This building is not eligible to receive a 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 the building is not eligible 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 the campus, 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.

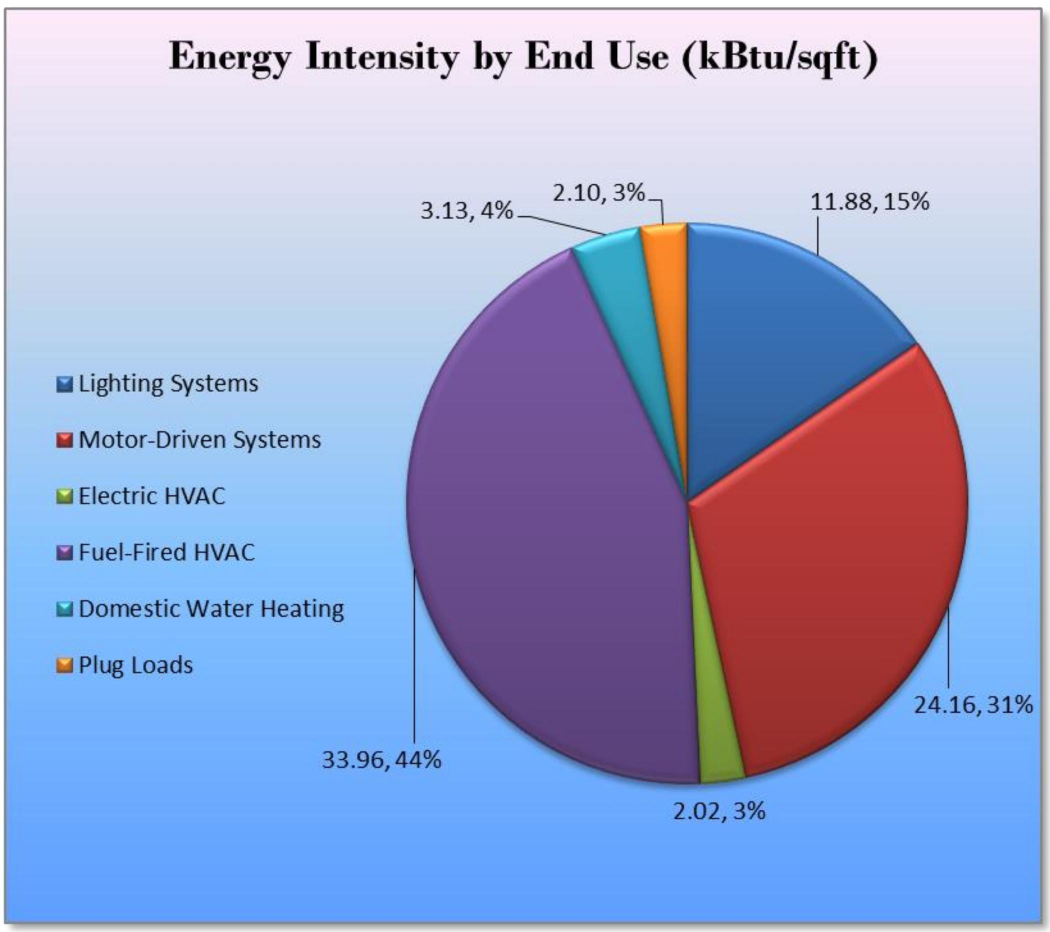
3.5 Energy End-Use Breakdown

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. The Central Utility Plant chillers and boilers are included in the analysis but the operating hours were scaled to be consistent with the prorated historical energy use.

The breakdown of energy usage is based on both our estimates of the Automotive Technology Building'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 Automotive Technology 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		**38,075**	**12.7**	**0.0**	**$4,276.76**	**$38,984.12**	**$3,050.00**	**$35,934.12**	**8.4**	**38,341**
ECM 1	Install LED Fixtures	13,027	4.3	0.0	$1,463.28	$19,438.84	$170.00	$19,268.84	13.2	13,118
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	1,263	0.4	0.0	$141.86	$1,319.67	$40.00	$1,279.67	9.0	1,272
ECM 3	Retrofit Fixtures with LED Lamps	23,785	7.9	0.0	$2,671.61	$18,225.61	$2,840.00	$15,385.61	5.8	23,951
Lighting Control Measures		**2,737**	**0.9**	**0.0**	**$307.44**	**$2,564.00**	**$230.00**	**$2,334.00**	**7.6**	**2,756**
ECM 4	Install Occupancy Sensor Lighting Controls	2,274	0.8	0.0	$255.43	$2,164.00	$230.00	$1,934.00	7.6	2,290
ECM 5	Install High/Low Lighitng Controls	463	0.2	0.0	$52.01	$400.00	$0.00	$400.00	7.7	466
TOTALS		**40,812**	**13.6**	**0.0**	**$4,584.19**	**$41,548.12**	**$3,280.00**	**$38,268.12**	**8.3**	**41,097**

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

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

4.1.1 Lighting Upgrades

Recommended upgrades to existing lighting fixtures are summarized in Figure 16 below.

Figure 16 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		38,075	12.7	0.0	$4,276.76	$38,984.12	$3,050.00	$35,934.12	8.4	38,341
ECM 1	Install LED Fixtures	13,027	4.3	0.0	$1,463.28	$19,438.84	$170.00	$19,268.84	13.2	13,118
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	1,263	0.4	0.0	$141.86	$1,319.67	$40.00	$1,279.67	9.0	1,272
ECM 3	Retrofit Fixtures with LED Lamps	23,785	7.9	0.0	$2,671.61	$18,225.61	$2,840.00	$15,385.61	5.8	23,951

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

ECM 1: Install LED Fixtures

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	11,636	3.9	0.0	$1,307.03	$18,865.98	$125.00	$18,740.98	14.3	11,718
Exterior	1,391	0.5	0.0	$156.25	$572.86	$45.00	$527.86	3.4	1,401

Measure Description

We recommend replacing existing fixtures containing metal halide lamps with new high performance LED light fixtures. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	521	0.2	0.0	$58.53	$323.67	$40.00	$283.67	4.8	525
Exterior	742	0.2	0.0	$83.33	$996.00	$0.00	$996.00	12.0	747

Measure Description

We recommend retrofitting existing fluorescent T12 fixtures by removing fluorescent tubes and ballasts and replacing them with LEDs and LED drivers (if necessary), which are designed to be used retrofitted fluorescent fixtures. The measure uses the existing fixture housing but replaces the rest of the components with more efficient lighting technology. This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of a fluorescent tubes.

ECM 3: 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	21,219	7.1	0.0	$2,383.42	$17,473.07	$2,840.00	$14,633.07	6.1	21,367
Exterior	2,566	0.9	0.0	$288.19	$752.54	$0.00	$752.54	2.6	2,584

Measure Description

We recommend retrofitting existing linear fluorescent, compact fluorescent, and halogen lamps with LED lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed while leaving the fluorescent fixture ballast in place. LED bulbs can be used in existing fixtures as a direct replacement for most other lighting technologies. This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space.

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

4.1.2 Lighting Control Measures

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		**2,737**	**0.9**	**0.0**	**$307.44**	**$2,564.00**	**$230.00**	**$2,334.00**	**7.6**	**2,756**
ECM 4	Install Occupancy Sensor Lighting Controls	2,274	0.8	0.0	$255.43	$2,164.00	$230.00	$1,934.00	7.6	2,290
ECM 5	Install High/Low Lighitng Controls	463	0.2	0.0	$52.01	$400.00	$0.00	$400.00	7.7	466

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 4: 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)
2,274	0.8	0.0	$255.43	$2,164.00	$230.00	$1,934.00	7.6	2,290

Measure Description

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

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

ECM 5: Install High/Low 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)
463	0.2	0.0	$52.01	$400.00	$0.00	$400.00	7.7	466

Measure Description

We recommend installing occupancy sensors to provide dual level lighting control for lighting fixtures in spaces that are infrequently occupied but may require some level of continuous lighting for safety or security reasons. Typical areas for such lighting control are interior corridors. Lighting fixtures with these controls operate at default low levels when the area is not occupied to provide minimal lighting to meet security or safety requirements. Sensors detect occupancy using ultrasonic and/or infrared sensors. The lighting systems are switched to full lighting levels whenever an occupant is detected. Fixtures are automatically switched back to low level after an area has been vacant for a preset period of time. Energy savings results from only providing full lighting levels when it is required.

For this type of measure the occupancy sensors will generally be ceiling or fixture mounted. Sufficient sensor coverage needs to be provided to ensure that lights turn on in each area as an occupant approaches.

Additional savings from reduced lighting maintenance may also result from this measure, due to reduced lamp operation.

5 Energy Efficient Practices

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

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.

Turn Off Unneeded Motors

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

Reduce Motor Short Cycling

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

Perform Routine Motor Maintenance

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

Use Fans to Reduce Cooling Load

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

Practice Proper Use of Thermostat Schedules and Temperature Resets

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

Ensure Economizers are Functioning Properly

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

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.

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.

6 On-Site Generation Measures

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

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

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

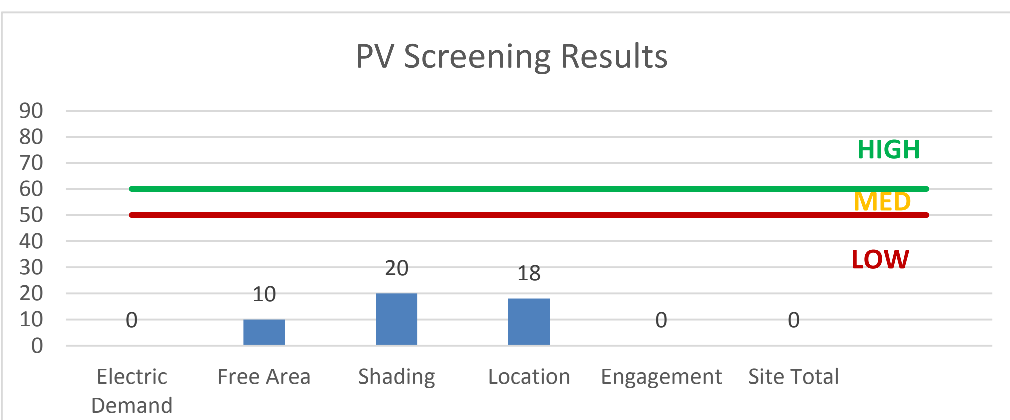
6.1 Photovoltaic

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

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

In order to be cost-effective, a solar PV array needs certain minimum criteria, such as flat or south-facing rooftop or other unshaded space on which to place the PV panels. In our opinion, the facility does appear not meet these minimum criteria for cost-effective PV installation.

Figure 18 - Photovoltaic Screening



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

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

6.2 Combined Heat and Power

Combined heat and power (CHP) is the on-site generation of electricity along with the recovery of heat energy, which is put to beneficial use. Common technologies for CHP include reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines. Electric generation from a CHP system is typically interconnected to local power distribution systems. Heat is recovered from exhaust and ancillary cooling systems and interconnected to the existing hot water (or steam) distribution systems.

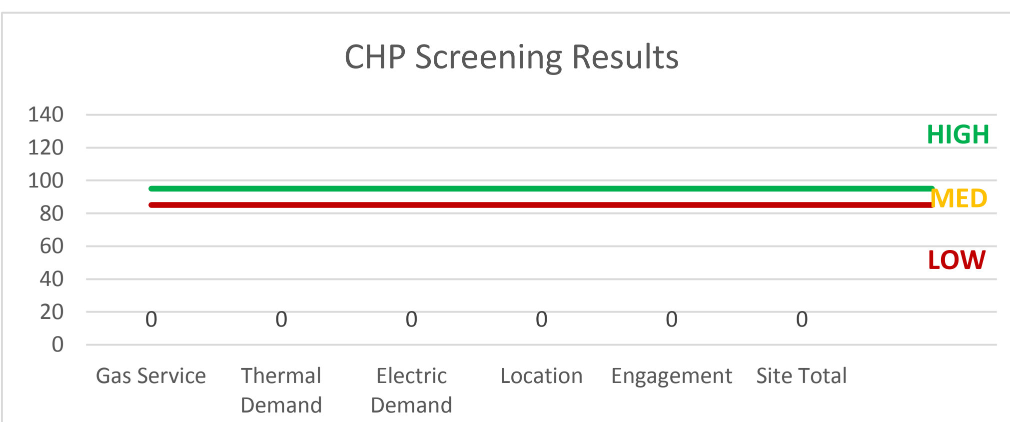
CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste heat can also be routed through absorption chillers for the purpose of space cooling. The key criteria used for screening, however, is the amount of time the system operates at full load and the facility's ability to use the recovered heat. Facilities with continuous use for large quantities of waste heat are the best candidates for CHP.

A preliminary screening based on heating and electrical demand, siting, and interconnection shows that the facility has a Low potential for installing a cost-effective CHP system.

Lack of gas service, low or infrequent thermal load, and lack of space near the existing boilers are the most significant factors contributing to the low potential for CHP at the site. In our opinion, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation.

For a list of qualified firms in New Jersey specializing in commercial CHP cost assessment and installation, go to: http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/.

Figure 19 - Combined Heat and Power Screening



7 Demand Response

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

By enabling grid operators to call upon Curtailment Service Providers and commercial facilities to reduce electric usage during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment Service Providers provide regular payments to medium and large consumers of electric power for their participation in DR programs. Program participation is voluntary and participants receive payments whether or not their facility is called upon to curtail their electric usage.

Typically an electric customer needs to be capable of reducing their electric demand, within minutes, by at least 100 kW or more in order to participate in a DR program. Customers with a greater capability to quickly curtail their demand during peak hours will receive higher payments. Customers with back-up generators onsite may also receive additional DR payments for their generating capacity if they agree to run the generators for grid support when called upon. Eligible customers who have chosen to participate in a DR programs often find it to be a valuable source of revenue for their facility because the payments can significantly offset annual electric costs.

Participating customers can often quickly reduce their peak load through simple measures, such as temporarily raising temperature set points on thermostats, so that air conditioning units run less frequently, or agreeing to dim or shut off less critical lighting. This usually requires some level of building automation and controls capability to ensure rapid load reduction during a DR curtailment event. DR program participants may need to install smart meters or may need to also sub-meter larger energy-using equipment, such as chillers, in order to demonstrate compliance with DR program requirements.

DR does not include the reduction of electricity consumption based on normal operating practice or behavior. For example, if a company's normal schedule is to close for a holiday, the reduction of electricity due to this closure or scaled-back operation is not considered a demand response activity in most situations.

The first step toward participation in a DR program is to contact a Curtailment Service Provider. A list of these providers is available on PJM's website and it includes contact information for each company, as well as the states where they have active business (http://www.pjm.com/markets-and-operations/demand-response/csps.aspx). PJM also posts training materials that are developed for program members interested in specific rules and requirements regarding DR activity (http://www.pjm.com/training/training%20material.aspx), along with a variety of other DR program information.

Curtailment Service Providers typically offer free assessments to determine a facility's eligibility to participate in a DR program. They will provide details regarding program rules and requirements for metering and controls, assess a facility's ability to temporarily reduce electric load, and provide details on payments to be expected for participation in the program. Providers usually offer multiple options for DR to larger facilities and may also install controls or remote monitoring equipment of their own to help ensure compliance with all terms and conditions of a DR contract.

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

8 PROJECT FUNDING / INCENTIVES

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

Figure 20 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom
ECM 1	Install LED Fixtures	x	
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	x	
ECM 3	Retrofit Fixtures with LED Lamps	x	
ECM 4	Install Occupancy Sensor Lighting Controls	x	
ECM 5	Install High/Low Lighitng Controls		

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

Generally, the incentive values provided throughout the report assume the SmartStart program is utilized because it provides a consistent basis for comparison of available incentives for various measures, though in many cases incentive amounts may be higher through participation in other programs.

Brief descriptions of all relevant financing and incentive programs are located in the sections below. Further information, including most current program availability, requirements, and incentive levels can be found at: [www.njcleanenergy.com/ci.](http://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.

<u>Equipment with Prescriptive Incentives Currently Available</u>:

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

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

Incentives

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

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

How to Participate

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

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

8.2 Energy Savings Improvement Program

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

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

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

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

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

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

9 Energy Purchasing and Procurement Strategies

9.1 Retail Electric Supply Options

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

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

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

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

9.2 Retail Natural Gas Supply Options

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

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

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

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

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Flat Bay Area	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,920	Relamp	No	11	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,920	0.27	802	0.0	$90.03	$643.50	$110.00	5.93
Bay 1-6 Area	7	Metal Halide: (1) 250W Lamp	Wall Switch	295	1,920	Fixture Replacement	No	7	LED - Fixtures: Downlight Pendant	Wall Switch	125	1,920	0.88	2,628	0.0	$295.14	$4,260.06	$35.00	14.32
Bay 1-6 Area	19	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,920	Relamp	No	19	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,920	0.46	1,384	0.0	$155.50	$1,111.50	$190.00	5.93
Room 109A	14	Linear Fluorescent - T5: 4' T5 (28W) - 2L	Wall Switch	60	1,920	Relamp	No	14	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,920	0.32	958	0.0	$107.64	$819.00	$140.00	6.31
Room 109B (Tools Room)	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,920	Relamp	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,920	0.24	729	0.0	$81.84	$585.00	$100.00	5.93
Room 109B (Tools Room)	2	Metal Halide: (1) 250W Lamp	Wall Switch	295	1,920	Fixture Replacement	No	2	LED - Fixtures: Downlight Pendant	Wall Switch	125	1,920	0.25	751	0.0	$84.32	$1,217.16	$10.00	14.32
Room 109C	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,920	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,920	0.02	73	0.0	$8.18	$58.50	$10.00	5.93
Room 109D	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,920	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,920	0.07	219	0.0	$24.55	$175.50	$30.00	5.93
Room 109E (Server Room)	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,920	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,920	0.02	73	0.0	$8.18	$58.50	$10.00	5.93
Hallway	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,920	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,920	0.05	146	0.0	$16.37	$117.00	$20.00	5.93
Bay 7-12 Area	6	Metal Halide: (1) 250W Lamp	Wall Switch	295	1,920	Fixture Replacement	No	6	LED - Fixtures: Downlight Pendant	Wall Switch	125	1,920	0.75	2,252	0.0	$252.97	$3,651.48	$0.00	14.43
Bay 7-12 Area	25	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,920	Relamp	No	25	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,920	0.61	1,822	0.0	$204.61	$1,462.50	$250.00	5.93
Bay 7-12 Area	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	1,920	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	1,920	0.04	106	0.0	$11.90	$144.60	$30.00	9.63
Lunch Room	15	Compact Fluorescent: Recessed 26W 4-pin	Wall Switch	26	1,920	Relamp	Yes	15	LED - Fixtures: Downlight Solid State Retrofit	Occupancy Sensor	15	1,344	0.17	513	0.0	$57.66	$1,070.75	$20.00	18.22
Hallway	6	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	1,920	Relamp	No	6	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	1,920	0.07	212	0.0	$23.81	$289.20	$60.00	9.63
Hallway	21	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,920	Relamp	Yes	21	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,344	0.64	1,934	0.0	$217.19	$1,428.50	$210.00	5.61
Hallway	2	Compact Fluorescent: Recessed 26W 4-pin	Wall Switch	26	1,920	Relamp	No	2	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	15	1,920	0.02	49	0.0	$5.46	$127.30	$0.00	23.33
Front Entrance	6	Halogen Incandescent: PAR38 70W	Wall Switch	70	1,920	Relamp	Yes	6	LED Screw-In Lamps: Downlight Solid State Retrofit	High/Low Control	15	1,344	0.26	788	0.0	$88.54	$522.52	$30.00	5.56
Room 101	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,920	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,920	0.36	1,093	0.0	$122.77	$877.50	$150.00	5.93
Room 101A (Conference Room)	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,920	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,920	0.05	146	0.0	$16.37	$117.00	$20.00	5.93
Room 101A (Conference Room)	6	Compact Fluorescent: Recessed 26W 4-pin	Occupancy Sensor	26	1,920	Relamp	No	6	LED - Fixtures: Downlight Solid State Retrofit	Occupancy Sensor	15	1,920	0.05	146	0.0	$16.37	$381.90	$0.00	23.33
Room 101B	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	1,920	Relamp	No	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,920	0.05	141	0.0	$15.87	$192.80	$40.00	9.63
Room 101C	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	1,920	Relamp	No	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,920	0.05	141	0.0	$15.87	$192.80	$40.00	9.63
Room 101D	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	1,920	Relamp	No	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,920	0.05	141	0.0	$15.87	$192.80	$40.00	9.63
Room 101E	6	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	1,920	Relamp	No	6	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,920	0.07	212	0.0	$23.81	$289.20	$60.00	9.63

	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 101F	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	1,920	Relamp	No	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,920	0.05	141	0.0	$15.87	$192.80	$40.00	9.63
Room 102A Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,920	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,344	0.12	368	0.0	$41.37	$350.00	$40.00	7.49
Room 105A Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,920	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,344	0.12	368	0.0	$41.37	$350.00	$40.00	7.49
Room 103 Classroom	9	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	1,920	Relamp	Yes	9	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,344	0.14	419	0.0	$47.10	$549.80	$110.00	9.34
Room 103 Classroom	4	Metal Halide: (1) 250W Lamp	Wall Switch	295	1,920	Fixture Replacement	No	4	LED - Fixtures: Downlight Pendant	Wall Switch	125	1,920	0.50	1,501	0.0	$168.65	$2,434.32	$20.00	14.32
Room 104 Classroom	9	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	1,920	Relamp	Yes	9	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,344	0.14	419	0.0	$47.10	$549.80	$110.00	9.34
Room 104 Classroom	4	Metal Halide: (1) 250W Lamp	Wall Switch	295	1,920	Fixture Replacement	No	4	LED - Fixtures: Downlight Pendant	Wall Switch	125	1,920	0.50	1,501	0.0	$168.65	$2,434.32	$20.00	14.32
Room 102 Classroom	12	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	1,920	Relamp	Yes	12	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,344	0.19	559	0.0	$62.80	$694.40	$140.00	8.83
Room 102 Classroom	4	Metal Halide: (1) 250W Lamp	Wall Switch	295	1,920	Fixture Replacement	No	4	LED - Fixtures: Downlight Pendant	Wall Switch	125	1,920	0.50	1,501	0.0	$168.65	$2,434.32	$20.00	14.32
Room 105 Classroom	12	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	1,920	Relamp	Yes	12	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,344	0.19	559	0.0	$62.80	$694.40	$140.00	8.83
Room 105 Classroom	4	Metal Halide: (1) 250W Lamp	Wall Switch	295	1,920	Fixture Replacement	No	4	LED - Fixtures: Downlight Pendant	Wall Switch	125	1,920	0.50	1,501	0.0	$168.65	$2,434.32	$20.00	14.32
Men Restroom	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,920	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,344	0.28	829	0.0	$93.08	$796.50	$125.00	7.21
Women Restroom	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,920	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,344	0.28	829	0.0	$93.08	$796.50	$125.00	7.21
Room 104 Engine Room	22	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,920	Relamp	Yes	22	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,344	1.18	3,531	0.0	$396.67	$1,403.00	$240.00	2.93
Room 104 Engine Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,920	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,344	0.12	368	0.0	$41.37	$350.00	$60.00	7.01
Room 107A Compressor Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,920	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,920	0.05	146	0.0	$16.37	$117.00	$20.00	5.93
Room 107 Storage	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,920	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,344	0.37	1,105	0.0	$124.11	$818.00	$120.00	5.62
Room 100B	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,920	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,344	0.03	92	0.0	$10.34	$174.50	$10.00	15.91
Room 108	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,920	Relamp	Yes	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,344	0.59	1,766	0.0	$198.34	$759.50	$130.00	3.17
Room 108A Storage	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,920	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,344	0.18	552	0.0	$62.05	$467.00	$60.00	6.56
Exterior Perimeter Light	3	Compact Fluorescent: Wall pack 2x54W Screw-in	Daylight Dimming	108	1,920	Relamp	No	3	LED Screw-In Lamps: Downlight Solid State Retrofit	Daylight Dimming	25	1,920	0.18	550	0.0	$61.76	$161.26	$0.00	2.61
Exterior Perimeter Light	9	Metal Halide: (1) 70W Lamp	Daylight Dimming	95	1,920	Fixture Replacement	No	9	LED - Fixtures: Downlight Solid State Retrofit	Daylight Dimming	25	1,920	0.46	1,391	0.0	$156.25	$572.86	$45.00	3.38
Storage Room	2	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	1,920	Relamp & Reballast	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,344	0.20	598	0.0	$67.16	$439.67	$40.00	5.95
Back Building - Exterior	11	Compact Fluorescent: Wall pack 2x54W Screw-in	Daylight Dimming	108	1,920	Relamp	No	11	LED Screw-In Lamps: Downlight Solid State Retrofit	Daylight Dimming	25	1,920	0.67	2,016	0.0	$226.44	$591.28	$0.00	2.61
Back Building - Exterior	6	Linear Fluorescent - T12: 8' T12 (75W) - 1L	Daylight Dimming	92	1,920	Relamp & Reballast	No	6	LED - Linear Tubes: (1) 8' Lamp	Daylight Dimming	36	1,920	0.25	742	0.0	$83.33	$996.00	$0.00	11.95

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Bay 1-6 Area	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 109B (Tools Room)	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
Bay 7-12 Area	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 103 Classroom	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
Room 104 Classroom	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
Room 102 Classroom	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
Room 105 Classroom	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	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
Garage	Bay 1-6 Area	1	Other	2.0	84.0%	No	360	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Garage	Bay 1-6 Area	5	Other	2.0	84.0%	No	360	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Garage	Bay 7-12 Area	5	Other	2.0	84.0%	No	360	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 103 Classroom	Room 103 Classroom	1	Other	2.0	84.0%	No	360	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 104 Classroom	Room 104 Classroom	1	Other	2.0	84.0%	No	360	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 107A Compressor Room	Room 107A Compressor Room	2	Air Compressor	20.0	92.0%	No	720	No	92.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 107	Facility	1	Exhaust Fan	3.0	86.0%	No	2,280	No	86.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Facility	2	Exhaust Fan	0.2	72.0%	No	1,440	No	72.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Facility	3	Exhaust Fan	0.3	72.0%	No	1,440	No	72.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Facility	1	Exhaust Fan	0.8	72.0%	No	1,440	No	72.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Facility	2	Exhaust Fan	0.5	72.0%	No	1,440	No	72.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	ERV	2	Supply Fan	10.0	92.0%	No	1,560	No	92.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	ERV	2	Exhaust Fan	7.5	90.0%	No	1,560	No	90.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	ERV	1	Other	5.0	81.0%	No	1,560	No	81.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Carrier Air Handler	2	Supply Fan	7.5	95.0%	Yes	1,560	No	95.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Carrier Air Handler	2	Return Fan	3.0	89.0%	Yes	1,560	No	89.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Garage	Garage	10	Other	1.5	82.0%	No	360	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Tunnel	Heating system	1	Heating Hot Water Pump	10.0	91.7%	Yes	1,560	No	91.7%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Tunnel	Cooling system	1	Chilled Water Pump	15.0	91.0%	Yes	1,560	No	91.0%	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
Central Utility Plant	Campus Buildings	3	Water-Cooled Centrifugal Chiller	740.00	No							0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Central Plant	Automotive Tech	8	Condensing Hot Water Boiler	2,850.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

DHW Inventory & Recommendations

		Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical Room	Building	1	Indirect System	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?
Facility	31	Desktop with LCD Monitor	191.0	Yes
Facility	1	Copy machine	800.0	Yes
Facility	1	Printer	460.0	Yes
Facility	3	Microwave	1,000.0	No
Facility	2	Refrigerator	150.0	Yes
Facility	1	Coffe Maker	900.0	No
Facility	1	Toaster	950.0	No

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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N/A

ENERGY STAR® Score[1]

Brookdale Community College - Lincroft Campus

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

For Year Ending: February 29, 2016
Date Generated: June 28, 2017

1. The ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.

Property & Contact Information

Property Address
Brookdale Community College - Lincroft Campus
765 Newman Springs Road
Lincroft, New Jersey 07738

Property Owner
Brookdale Community College
765 Newman Springs Road
Lincroft, NJ 07738
(732) 224-2217

Primary Contact
Timothy Drury
765 Newman Springs Road
Lincroft, NJ 07738
(732) 224-2217
tdrury@brookdalecc.edu

Property ID: 5733170

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
95.4 kBtu/ft²

Annual Energy by Fuel

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

Source EUI
211.9 kBtu/ft²

National Median Comparison

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

Annual Emissions

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

Signature & Stamp of Verifying Professional

I _________________ (Name) verify that the above information is true and correct to the best of my knowledge.

Signature: ______________________Date: ___________

Licensed Professional

____ ________

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(____)____-______
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Professional Engineer Stamp (if applicable)