CAMDEN COUNTY COLLEGE
CONNECTOR BUILDING
ENERGY ASSESSMENT

for

NEW JERSEY
BOARD OF PUBLIC UTILITIES

CHA PROJECT NO. 24364

November 2012

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REPORT DISCLAIMER

This audit was conducted in accordance with the standards developed by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) for a Level II audit. Cost and savings calculations for a given measure were estimated to within ±20%, and are based on data obtained from the owner, data obtained during site observations, professional experience, historical data, and standard engineering practice. Cost data does not include soft costs such as engineering fees, legal fees, project management fees, financing, etc.

A thorough walkthrough of the facility was performed, which included gathering nameplate information and operating parameters for all accessible equipment and lighting systems. Unless otherwise stated, model, efficiency, and capacity information included in this report were collected directly from equipment nameplates and /or from documentation provided by the owner during the site visit. Typical operation and scheduling information was obtained from interviewing facility staff and spot measurements taken in the field.

1.0 EXECUTIVE SUMMARY

The Camden County College recently engaged CHA to perform an energy audit in connection with the New Jersey Board of Public Utilities' Local Government Energy Audit Program. This report details the results of the energy audit conducted for:

Building Name	Address	Square Feet	Construction Date
Camden County College Connector Building	200 College Drive Building 1 Blackwood, New Jersey	50,500	Original: 2007

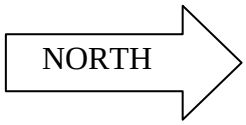
The Energy Conservation Measures (ECMs) identified in this report will allow for a more efficient use of energy and if pursued have the opportunity to qualify for the New Jersey SmartStart Buildings Program. Potential annual savings of $6,000 for the recommended ECMs may be realized with a payback of 9.5 years. A summary of the costs, savings, and paybacks for the recommended ECMs follows:

Summary of Energy Conservation Measures							
Energy Conservation Measure		Approx. Costs ($)	Approx. Savings ($/year)	Payback (Years) w/o Incentive	Potential Incentive ($)*	Payback (Years) w/ Incentive	Recommended For Implementation
ECM-1	Replace Domestic Water Heater (DWH)	4,900	1,800	2.7	200	2.6	X
2	HVAC Building Automation System Upgrade / Re-commissioning	25,300	1,100	>20	0	>20	
3	Daylight Controls Installation	10,700	1,100	9.7	0	9.7	X
4	Install Vending Miser	200 (per unit)	200 (average)	1.0	0	1.0	X
5	Replace Domestic Hot Water Pumps	300	200	1.5	0	1.5	X
4	Lighting Replacement Upgrades	37,700	1,500	>20	1,600	>20	
5	Install Lighting Controls (Occupancy Sensors)	2,900	1,800	1.6	500	1.4	X
6	Lighting Replacements with Lighting Controls (Occupancy Sensors)	40,700	2,700	15.1	2,100	14.3	X

2.0 INTRODUCTION AND BACKGROUND

New Jersey's Clean Energy Program, funded by the New Jersey Board of Public Utilities, supports energy efficiency and sustainability for Municipal and Local Government Energy Audits. Through the support of a utility trust fund, New Jersey is able to assist state and local authorities in reducing energy consumption while increasing comfort.

The Connector Building located on the Camden County College campus in Blackwood, NJ, is a 50,500 square foot three story building with a large open atrium and lounge, classrooms, meeting rooms, administrative offices, conference rooms, other miscellaneous areas and support spaces. HVAC air handling units are located in mechanical rooms; boilers in a mechanical room provide HVAC hot water, and rooftop chillers provide HVAC chilled water. The boilers and chillers also provide hot and chilled water utilities for HVAC equipment in the Community Center and Madison buildings. The building was constructed in 2007, and is located between the Community Center building (to its west) and Madison building (to its south) – connecting them into one overall structure. Occupancy includes approximately XXX students and XXX faculty and staff members. The building operates Monday through Friday from 8:00 am to approximately 8:00 pm. There is also some reduced occupancy on weekends, and occupancy levels are reduced in summer months between semesters for each school year.



3.0 EXISTING CONDITIONS

3.1 Building - General

Originally built in 2007, the Connector building is a 50,500 square foot, three-story building with a large open atrium and lounge; the atrium is a three story all tinted glass area with a lounge, Concierge/Information desk, meeting rooms and elevated glass walkways. The second and third floors contain classrooms, administrative offices, and conference rooms, other miscellaneous areas and support spaces. The glass atrium has entrances on the south, east and north sides; it is open to the community center on the west side of the building, and walkway and stairwells connect it to Madison Hall to the south.

The Connector building has approximately XXX students and XXX faculty and staff, and appears to be fully utilized during our field inspection. The building can be assumed to be fully occupied until 4:00 pm during the week, and by approximately one quarter of the occupants during the weekend. The cafeteria kitchen operates from 8:00 am to 1:00 pm, and the internet café operates from 8:00 am to 8:00 pm. The hours of operation are:

- Monday thru Friday 8:00 am to 8:00 pm.
- Saturday, Sunday 8:00 pm to 4:00 pm.

The building is constructed of steel framing with masonry walls and brick veneer with an air space between. Insulation is incorporated into the wall assembly for an improved envelope. The actual connector is a three story glass atrium having a space frame support system. The exterior glass panels are supported by this space frame which includes the roof, and the glass is low E coated double glazed panels
The east façade consists of a wave form wall with minimal windows (see photo above). The majority of the interior walls are 3-5/8" metal studs filled with fiberglass insulation finished with gypsum board. The flat roof system is comprised of a structural steel framing with a metal deck having rigid foam board insulation. The rooftop has a light-colored EPDM roof membrane system. Aside from the glass atrium, windows in exterior walls are minimal (<10%), and are double pane set in metal frames with tint; they occur on the brick wave form wall facing east. The entrance doors occur in the glass atrium area, and are all glass. The building has exposed walls facing the north, east and south directions, with a mostly uniform three story height; a mechanical room level rises above the remaining building. The majority of the two story building is 35' in height. The first floor has concrete slab-on-grade floor, and the remaining floors have reinforced concrete decks between floors.

3.2 Utility Usage

Utilities include electricity, natural gas, and potable water. Electricity is delivered and supplied by Atlantic City Electric. Natural gas is delivered by South Jersey Gas and supplied by South Jersey Gas. Potable water is provided by the municipally owned water department at a charge. See Appendix A for a detailed utility analysis.

The campus has a main electric meter. There was no installed sub-metering for this building from the main meter, therefore the following usage and costs rates were determined from square footage of the building. From June 2011 through April 2012, the electric usage for the building was 309,436 kWh at a cost of $41,319. Review of electricity bills during this period showed that the electricity was charged at the following rates: supply unit consumption cost of $0.119 per

kWh; demand unit cost of $5.94 per kW; and blended unit cost of $0.131 per kWh. Based on the square footage of the building it was estimated that the peak demand per month is approximately 109 kW from June 2011 through April 2012.

The facility has one natural gas meter. From July 2011 through May 20112, gas-fired equipment consumed 2,729 therms of natural gas. Based on the annual cost of $2,181, the price for natural gas was $0.80 per therm.

The delivery component of the electric and natural gas bills will always be the responsibility of the utility that connects the facility to the power grid or gas line; however, the supply can be purchased from a third party; as is currently the case with electricity and natural gas. The electricity or natural gas commodity supply entity will require submission of one to three years of past energy bills. Contract terms can vary among suppliers. According to the U.S. Energy Information Administration, the average commercial unit costs of electricity and natural gas in New Jersey during the same periods as those noted above was $0.141 per kWh and $0.959 per therm. The electrical supply rate charged by ACE for the 12 month period from June 2011 through April 2012 resulted in greater cost to the school district than having Hess supply (see table below). When compared to the average state values, it is recommended that the present natural gas be maintained and the present electricity be monitored and supply rate charge checked monthly.

Main Electric Costs – ACE vs. Meter Supply Hess

Month	ACE Supply Costs (For Comparison)	Hess Supply Costs (Actual)
June-11	$56,524	$0.00
July-11	$59,840	$65,404.53
August-11	$56,583	$61,844.82
September-11	$71,502	$64,413.68
October-11	$54,932	$49,486.97
November-11	$57,110	$51,448.28
December-11	$52,264	$47,082.95
January-12	$50,542	$45,800.14
February-12	$58,915	$53,387.07
March-12	$51,755	$46,899.02
April-12	$53,147	$48,160.52
Total	**$623,112.69**	**$533,927.98**
Extra Savings of using Hess for Electric Supply	$89,184.71	

A list of approved electrical and natural gas energy commodity suppliers can be found in Appendix A.

3.3 HVAC Systems

The systems and equipment described below serve the Connector building. Specifics on the mechanical equipment can be found within the equipment inventory located in Appendix B.

3.3.1 Cooling Chilled Water System

The building is cooled with two York and one Trane air cooled screw compressor chillers with factory control panels. The chillers were installed in 2007, and are located on the Connector Building rooftop. The chilled water system operates year round to provide cooling for HVAC systems in the Community Building. The chilled water system also provides cooling chilled water for HVAC systems in the Community Building and in Madison Hall. The chillers are piped to a primary loop pumping system with three 50 HP pumps that operate in lead-lag located in the third floor mechanical room. The primary pumps are variable speed with inverter duty rated motors for system control. Chilled water is provided to the air handling units throughout the building, to the Community Center Building and to Madison Hall. Chilled water system piping and valves appear to be insulated.

3.3.2 Heating Hot Water Systems

The building is heated with hot water supplied by two Smith cast iron sectional boilers and four Fulton condensing boilers. The boilers were installed in 2007, and are located in a third floor mechanical room. The hot water system operates year round to provide reheat for HVAC systems and for domestic hot water in the Connector Building. The hot water system also provides heating hot water for HVAC systems in the Community Building and in Madison Hall. The boilers are piped to a primary loop pumping system with three 20 HP pumps that operate in lead-lag also located in the third floor mechanical room. The primary pumps are variable speed with inverter duty rated motors for system control. Hot water is provided to the air handling units, variable volume air terminals throughout the building, to the Community Center Building and to Madison Hall. Hot water system piping and valves appear to be insulated.

3.3.3 Package Cooling and Heating Air Handling Units

Five 2010 chilled water cooling, hot water heating AHUs are located in mechanical rooms near the spaces/areas they are serving. Each AHU contains chilled water cooling coil, a hot water heating coil, return, relief/exhaust, and outside air; the units are ducted to the supply and return duct systems above the ceiling. The air handling units serve the level 1 connector atrium (AHU-1), the auditorium (AHU-2 & AHU-3) and connector building occupied spaces (AHU-4 and AHU-5).

3.3.4 Exhaust Systems

Constant volume exhaust fans are provided for toilet rooms and utility spaces. Exhaust system fans are integrated into the building automation system (BAS) and generally operate during building occupancy.

3.4 Control Systems

The building is controlled by a CM3 BAS. The system consists of DDC field devices and components. All and controls and field devices are integrated into a computerized front end operating the CM3 BAS software for equipment sequencing, scheduling, monitoring, and alarming. This includes the chillers/chilled water pumps, boilers/hot water pumps, AHUs and variable air volume terminals.

Buildings having the CM3 Digital Controls have programmed temperature set points; however, the occupants (staff) have the ability to adjust the space temperatures to suit their comfort which results in many areas being over cooled (and most likely over heated). The inconsistent occupancy schedules of the building does not allow for a normal unoccupied temperature set back of the buildings which results in increased energy usage.

3.5 Lighting/Electrical Systems

The building lighting consists of florescent fixtures having T-8 32 watt lamps and electronic ballasts as well as metal halide and compact florescent spot lights. The high bay atrium, mezzanine space and first floor lobby have 200 watt metal halide lights. With the exception of the atrium, lights are generally controlled by occupancy sensors.

Exterior lights consist of ground mounted metal halide fixtures and wall pack high pressure sodium fixtures which are controlled by daylight sensors and/or timers. The wall pack lights and ground lights are powered by the building's electrical system and are part of the lighting systems analysis.

3.6 Plumbing Systems

3.6.1 Domestic Hot Water System

The mechanical room contains one 80 gallon electric tank hot water heater installed in 2010. Hot water is provided to the toilets, janitor's closets, and the majority of hot water piping appears to be insulated. Water demand is primarily for the restrooms located within the connector building. Domestic hot water temperature is maintained at 140°F, and chemical disinfection soap is provided in the restrooms.

3.6.2 Plumbing Fixtures

The building's lavatories, water closets, and urinals are original and are lower flow plumbing fixtures, and do not require upgrades. These should be replaced thru attrition over the years with lavatories that are 2.5 GPM with push type faucets, water closets that are 1.6 GPF, and urinals that are 1.0 GPF.

4.0 ENERGY CONSERVATION MEASURES

4.1 ECM-1 Replace Domestic Water Heater

The building has one domestic hot water heater that provides hot water to the facility. The Lochinvar unit is a tank type electric water heater installed in 2010. During periods of little or no domestic hot water use, the units must still heat the water within their storage tank. Energy required maintaining the 80 gallons of hot water temperature setpoint during times of zero demand is known as standby losses; replacing these units with higher efficiency natural gas units was evaluated.

According to the U.S. Department of Energy, 2.5% of stored capacity is lost every hour during HW heater standby. This value was applied to the total volume of the existing DHW heater storage tank to determine the annual standby losses. Proposed efficiency was based on a typical tank type, high efficiency, condensing hot water heater; it was calculated that 16,100 kWh of electricity would be saved per year. The new water heater will require gas and water piping modifications, venting, and electrical connections.

Domestic hot water heaters have an expected life of 12 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 193,200 kWh and (-6,000 therms as the unit switched from electric to natural gas) and $22,000.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-1 Replace Domestic Water Heater (DWH)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
4,900	16,100	0	-500	1,800	0	1,800	3.5	200	2.7	2.6

* Incentive shown is per the New Jersey SmartStart Program. See section 5.0 for other incentive opportunities.

This measure is recommended.

4.2 ECM-2 HVAC Building Automation System Upgrade/Re-commissioning

The current BAS consists of a CM3 BAS for monitoring and sequencing all HVAC systems and equipment. Due to the condition of the system and software, HVAC system sequencing, monitoring, and scheduling are limited. Current system sequence of operation problems include water flow and air flow issues, system temperatures are too hot/too cold and cast iron boilers running at 180°F to provide re-heat when more efficient Fulton condensing boilers should be operating. During our field inspection, it was 72°F outside, and systems should be utilizing an economizer mode. To reduce the energy used by HVAC systems, the BAS software should be upgrades and the system re-commissioned with current software and functionality, and complete re-commissioning, testing and balancing of all HVAC systems. This should be coordinated with a complete systems testing and balancing effort that must occur prior to system re-commissioning efforts.

The new BAS should be capable of enabling the facility operator to:

- Re-commission all existing CM3 controls and verify that the input/ output data is actually controlling the valves, dampers, sensors, etc. within the HVAC systems and spaces. This should be done in concert with air and water flow testing and balancing.
- Institute a set building occupancy schedule and set occupied/ unoccupied temperatures. After hours use of the buildings that require heating/cooling should be restricted to certain areas only. Limit ventilation to these same schedules (No outdoor air and no exhaust , except for special chemical/fume applications)
- Institute set occupied space temperatures of 68°F - 72°F for heating and 74°F - 76°F for cooling and prohibit staff adjustment of the thermostats. This will require some education of the staff members on the actual cost of the building energy consumption.
- Institute a set time of the year when heating is turned on and when cooling is turned on through the control system. Economizer cooling should be used for shoulder weather whenever possible.
- Limit re-heat as much as possible. Institute discharge air reset, energy heat recovery and other strategies to reduce re-heat.

Additional benefits of this system are that it can provide useful trending information such as daily, monthly, and seasonal energy usage, and also provide alarm messages via the internet indicating that a piece of equipment needs repair or maintenance. The BAS should also allow the facility to monitor the energy consuming equipment in the building remotely in real-time, track the facility energy performance, and remotely adjust set points and schedules to optimize facility operation. Full color graphics and logical programming functions should also be provided.

The annual electrical and natural gas consumption is taken from the utility bills. Per the U.S. Energy Information Administration, the percent of a building's cooling and heating is 26% and 82%, respectively. Utilizing these numbers, the annual electrical and natural gas usage was found; based on project experience, retro-commissioning produces a 10% energy savings.

Commissioning can have an expected life of 10 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 74,000 kWh, 2,000 therms and $11,300. To continue to gain this annual saving, proper maintenance of equipment is required.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-2 HVAC Building Automation System Upgrade / Re-commissioning

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
25,300	7,400	0	200	1,100	0	1,100	-0.6	0	>20	>20

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is not recommended.

4.3 ECM-3 Daylight Controls Installation

The current Connector Building lighting in the glass atrium consists of twenty 200 watt metal halide fixtures. Lights are generally turned on in the morning and shut off at night. There is an opportunity to continue to reduce the electrical consumption by adding daylight controls that will automatically control the lights based on available daylight. A daylight control panel can be wall mounted near existing light switches, and sensors can be either wall or ceiling mounted at appropriate locations. The sensors will sense daylight levels, and the electric lighting level can then be adjusted to reduce electrical energy consumption, or simply turned off when possible. Daylight control systems are equipped with scheduling features and adjustable light level settings.

Energy savings for this measure were calculated by determining available daylight hours and applying daylight control to estimated times of operation. The difference between energy requirements for having lights on continuously and proposed time for having lights on resulted in a total annual savings of 8,700 kWh and $1,100. Supporting calculations, including assumptions for daylight hours available and annual energy usage for each fixture, are provided in the ECM calculation.

Lighting controls have an expected life of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 130,500 kWh and $17,200.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-3 Daylight Controls Installation

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
10,700	8,700	0	0	1,100	0	1,100	0.6	0	9.7	9.7

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is recommended.

4.4 ECM-4 Install Vending Miser

Vending machines are usually leased by building owners who are also required to pay for the electricity to run the machines. Snack machines typically draw 200 watts for lighting and electrical systems while beverage machines can draw around 400 watts to also maintain the cooling systems. Older vending machines may draw even more power. When the machines operate all year round, this can add up to some significant energy usage.

Occupancy sensors can be installed in-line with vending machines that allow the machines to operate with little to no power while a space is unoccupied. Snack machines will completely power down while beverage machines will only have to cycle a few minutes every couple hours to keep the drinks cold. Beverage machines that contain perishable items such as milk are not recommended for occupancy sensor installation.

The exact number of vending machines within the Connector building was unknown; therefore savings were calculated on a per unit basis.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-4 Install Vending Miser

Vending Type	Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
		Electric kWh	Electric kW	Nat Gas Therms	Total						
	$				$	$	$		$	Years	Years
Beverage	200	1,900	0	0	250	0	250	-	0	0.8	0.8
Snack	200	960	0	0	130	0	130	-	0	1.6	1.6
Dual	200	1,400	0	0	190	0	190	-	0	1.1	1.1

* No applicable incentive as per New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is recommended.

4.5 ECM-5 Replace Domestic Hot Water Pumps

Maintenance personnel at the Connector Building indicated that domestic hot water pumps were beyond their expected life and were no longer operating at ideal flow rates. Typically water pumps do not need to be upgraded as often as pump motors. This measure aims to address this complaint through the installation of higher output cartridge type pumps. It was assumed that the existing domestic hot water pump were 60% efficient B&G Series 100 1/6 HP motors. This measure proposes an equivalently efficient motor at a decreased HP such as a Taco 007 Series 1/25 HP cartridge motor.

The exact number of water pumps in the CIM building was unknown; therefore this calculation was performed on a per unit basis.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-5 Replace Domestic Hot Water Pumps

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	Nat Gas Therms	Total						
$				$	$	$		$	Years	Years
300	1,190	0	0	200	0	200	9.0	0	1.5	1.5

* No applicable incentive as per New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is recommended.

4.6 ECM-6 Lighting Replacement Upgrades

The Connector Building utilizes mainly 4 foot 32W T-8 fluorescent bulbs with electronic ballasts and recessed metal halide and compact florescent lamps. A comprehensive fixture survey was conducted of the entire building. Each switch and circuit was identified, and the number of fixtures, locations, and existing wattage established (Appendix C).

The existing exterior lighting system for this building consists of metal halide ground fixtures and high pressure sodium wall pack fixtures. These fixtures are utilized for building lighting during nighttime hours and are in operation from sun down until sun up. Alternative LED lighting solutions are available to replace these fixtures that will reduce the total wattage immensely. It is suggested to replace the existing metal halide wall pack fixtures on a one for one basis with LED. The reduction in per fixture wattage will result in a reduced total exterior lighting connected wattage, therefore resulting in electrical energy savings. However, maintenance savings were not calculated or included in the payback analysis below due to unknown labor rates and knowledge of existing required maintenance time.

Energy savings for this measure were calculated by applying the existing and proposed fixture wattages to estimated times of operation. The difference between energy requirements resulted in a total annual savings of 9,500 kWh with an electrical demand reduction of about 5 kW. Supporting calculations, including assumptions for lighting hours and annual energy usage for each fixture, are provided in Appendix C.

Lighting has an expected life of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 142,500 kWh and $22,000.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized as follows:

ECM-6 Lighting Replacement Upgrades

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	Nat Gas Therms	Total						
$				$	$	$		$	Years	Years
37,700	9,500	5	0	1,500	0	1,500	-0.4	1,600	>20	>20

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is not recommended in lieu of ECM-8.

4.7 ECM-7 Lighting Controls Installation

The current Connector Building lighting is mostly controlled by occupancy sensors. Lighting in the auditorium and large group instruction spaces have dimmable controls for the CFL fixtures. Lights in these spaces are generally turned on in the morning and shut off at night by the staff. During occupied times, there are rooms that are not occupied, however the lights remain on. Adding occupancy controls to the rooms that do not have occupancy sensors will provide energy savings. The occupancy sensor can be wall mounted near the switch or placed at the ceiling for

larger room coverage. All occupancy sensors are equipped with a manual override feature. These sensors are generally not recommended in public toilet rooms.

Lighting controls have an expected life of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 208,500 kWh and $27,400.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-7 Lighting Controls Installation (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
2,900	13,900	0	0	1,800	0	1,800	8.4	500	1.6	1.4

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is not recommended in lieu of ECM-8.

4.8 ECM-8 Lighting Replacements with Lighting Controls

Due to interactive effects, the energy and cost savings for occupancy sensors and lighting upgrades are not cumulative. This measure is a combination of ECM-5 and ECM-6 to reflect actual expected energy and demand reduction.

The lighting retrofits and controls have an expected lifetime of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 295,500 kWh and $40,100.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized as follows:

ECM-8 Lighting Replacements with Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
40,700	19,700	0	0	2,700	0	2,700	0.0	2,100	15.1	14.3

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is not recommended.

*Note – All exterior lighting in this building is accounted for in the Madison Hall Building report.

4.9 System Improvement Opportunities

The following items can be implemented by the owner to provide additional energy savings:

- It is recommended that vending misers be added to all college owned vending machines. It is also recommended the school requests vendor owned machines be upgraded or removed if they are not high efficiency equipment.

5.0 PROJECT INCENTIVES

5.1 Incentives Overview

5.1.1 New Jersey Pay For Performance Program

The facility will be eligible for incentives from the New Jersey Office of Clean Energy. The most significant incentives are available from the New Jersey Pay for Performance (P4P) Program. The P4P program is designed for qualified energy conservation projects applied to facilities whose demand in any of the preceding 12 months exceeds 100 kW. This average minimum has been waived for buildings owned by local governments or municipalities and non-profit organizations, however. Facilities that meet this criterion must also achieve a minimum performance target of 15% energy reduction by using the EPA Portfolio Manager benchmarking tool before and after implementation of the measure(s). If the participant is a municipal electric company customer, and a customer of a regulated gas New Jersey Utility, only gas measures will be eligible under the Program. Available incentives are as follows:

Incentive #1: Energy Reduction Plan – This incentive is designed to offset the cost of services associated with the development of the Energy Reduction Plan (ERP).

- Incentive Amount: $0.10/SF
- Minimum incentive: $5,000
- Maximum Incentive: $50,000 or 50% of Facility annual energy cost

The standard incentive pays $0.10 per square foot, up to a maximum of $50,000, not to exceed 50% of facility annual energy cost, paid after approval of application. For building audits funded by the New Jersey Board of Public Utilities, which receive an initial 75% incentive toward performance of the energy audit, facilities are only eligible for an additional $0.05 per square foot, up to a maximum of $25,000, rather than the standard incentive noted above.

Incentive #2: Installation of Recommended Measures – This incentive is based on projected energy savings as determined in Incentive #1 (Minimum 15% savings must be achieved), and is paid upon successful installation of recommended measures.

Electric

- Base incentive based on 15% savings: $0.09/ per projected kWh saved.
- For each % over 15% add: $0.005 per projected kWh saved.
- Maximum incentive: $0.11/ kWh per projected kWh saved

Gas

- Base incentive based on 15% savings: $0.90/ per projected Therm saved.
- For each % over 15% add: $0.05 per projected Therm saved.
- Maximum incentive: $1.25 per projected Therm saved

Incentive cap: 25% of total project cost

Incentive #3: Post-Construction Benchmarking Report – This incentive is paid after acceptance of a report proving energy savings over one year utilizing the Environmental Protection Agency (EPA) Portfolio Manager benchmarking tool.

Electric

- Base incentive based on 15% savings: $0.09/ per projected kWh saved.
- For each % over 15% add: $0.005 per projected kWh saved.

- Maximum incentive: $0.11/ kWh per projected kWh saved

Gas

- Base incentive based on 15% savings: $0.90/ per projected Therm saved.
- For each % over 15% add: $0.05 per projected Therm saved.
- Maximum incentive: $1.25 per projected Therm saved

If eligible, incentives #2 and #3 can be combined to yield additive savings.

Without existing sub meters in place, exact utility consumption for this building was unknown. Therefore, further analysis will need to take place before P4P incentives can be justified.

See Appendix D for calculations.

5.1.2 New Jersey Smart Start Program

For this program, specific incentives for energy conservation measures are calculated on an individual basis utilizing the 2011 New Jersey Smart Start incentive program. This program provides incentives dependent upon mechanical and electrical equipment. If applicable, incentives from this program are reflected in the ECM summaries and attached appendices.

If the complex qualifies and enters into the New Jersey Pay for Performance Program, all energy savings will be included in the total site energy reduction, and savings will be applied towards the Pay for Performance incentive. A project is not applicable for both New Jersey incentive programs.

5.1.3 Direct Install Program

The Direct Install Program targets small and medium sized facilities where the peak electrical demand does not exceed 150 kW in any of the previous 12 months. Buildings must be located in New Jersey and served by one of the state's public, regulated electric or natural gas utility companies. On a case-by-case basis, the program manager may accept a project for a customer that is within 10% of the 150 kW peak demand threshold.

Direct Install is funded through New Jersey's Clean Energy Program and is designed to provide capital for building energy upgrade projects to fast track implementation. The program will pay up to 70% of the costs for lighting, HVAC, motors, natural gas, refrigeration, and other equipment upgrades with higher efficiency alternatives. If a building is eligible for this funding, the Direct Install Program can significantly reduce the implementation cost of energy conservation projects.

The program pays 70% of each project cost up to $75,000 per electrical utility account; total funding for each year is capped at $250,000 per customer. Installations must be completed by a Direct Install participating contractor, a list of which can be found on the New Jersey Clean Energy Website at http://www.njcleanenergy.com. Contractors will coordinate with the applicant to arrange installation of recommended measures identified in a previous energy assessment, such as this document.

The facility is not eligible to receive funding from the Direct Install Program due to the monthly demand exceeding 150 kw.

5.1.4 Energy Savings Improvement Plans (ESIP)

The Energy Savings Improvement Program (ESIP) allows government agencies to make energy related improvements to their facilities and pay for the costs using the value of energy savings that result from the improvements. Under the recently enacted Chapter 4 of the Laws of 2009 (the law), the ESIP provides all government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources.

ESIP allows local units to use “energy savings obligations” to pay for the capital costs of energy improvements to their facilities. This can be done over a maximum term of 15 years. Energy savings obligations are not considered “new general obligation debt” of a local unit and do not count against debt limits or require voter approval. They may be issued as refunding bonds or leases. Savings generated from the installation of energy conservation measures pay the principal of and interest on the bonds; for that reason, the debt service created by the ESOs is not paid from the debt service fund, but is paid from the general fund.

For local governments interested in pursuing an ESIP, the first step is to perform an energy audit. Pursuing a Local Government Energy Audit through New Jersey's Clean Energy Program is a valuable first step to the ESIP approach. The “Local Finance Notice” outlines how local governments can develop and implement an ESIP for their facilities (see Appendix E). The ESIP can be prepared internally if the entity has qualified staff. If not, the ESIP must be implemented by an independent contractor and not by the energy savings company producing the Energy Reduction Plan.

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Local units should carefully consider all alternatives to develop an approach that best meets their needs.

6.0 ALTERNATIVE ENERGY SCREENING EVALUATION

6.1 Solar

6.1.1 Photovoltaic Rooftop Solar Power Generation

The facility was evaluated for the potential to install rooftop photovoltaic (PV) solar panels for power generation. Present technology incorporates the use of solar cell arrays that produce direct current (DC) electricity. This DC current is converted to alternating current (AC) with the use of an electrical device known as an inverter. The building's roof has sufficient room to install a large solar cell array. All rooftop areas have been replaced, and are in good condition. It is recommended to install a permanent PV array at this time.

The PVWATTS solar power generation model was utilized to calculate PV power generation. The closest city available in the model is Newark, New Jersey and a fixed tilt array type was utilized to calculate energy production. The PVWATT solar power generation model is provided in Appendix P.

Federal tax credits are also available for renewable energy projects up to 30% of installation cost. Since the facility is a non-profit organization, federal taxes are paid and this project is eligible for this incentive.

Installation of (PV) arrays in the state New Jersey will allow the owner to participate in the New Jersey solar renewable energy certificates program (SREC). This is a program that has been set up to allow entities with large amounts of environmentally unfriendly emissions to purchase credits from zero emission (PV) solar-producers. One SREC credit is equivalent to 1000 kilowatt hours of PV electrical production; these credits can be traded for period of 15 years from the date of installation. The average SREC value per credit is estimated to be about $120/ SREC per year based on current market data, and this number was utilized in the cash flow for this report.

The open roof area justifies the use of 84 kW PV solar array. The system costs for PV installations were derived from contractor budgetary pricing in the state of New Jersey for estimates of total cost of system installation. It should be noted that the cost of installation is currently about $4.00 per watt or $4,000 per kW of installed system. Other cost considerations will also need to be considered. PV panels have an approximate 20 year life span; however, the inverter device that converts DC electricity to AC has a life span of 10 to 12 years and will need to be replaced multiple times during the useful life of the PV system.

The implementation cost and savings related to this ECM are presented in Appendix E and summarized as follows:

Photovoltaic (PV) Rooftop Solar Power Generation – 84 kW System

Budgetary Cost	Annual Utility Savings				Total Savings	Federal Tax Credit *	New Jersey Renewable SREC**	Payback (without incentive)	Payback (with incentives)
	Electricity		Natural Gas	Total					
$	kW	kWh	Therms	$	$	$	$	Years	Years
$336,000	0.0	100,855	0	$13,200	$13,200	0	$9,581	>25	14.7

* 30% federal tax credit

** Solar Renewable Energy Certificate Program (SREC) for 2012 is $120/1000kwh

This measure is not recommended due to the long payback period.

6.1.2 Solar Thermal Hot Water Plant

Active solar thermal systems use solar collectors to gather the sun's energy to heat water, another fluid, or air. An absorber in the collector converts the sun's energy into heat. The heat is then transferred by circulating water, antifreeze, or sometimes air to another location for immediate use or storage for later utilization. Applications for active solar thermal energy include providing hot water, heating swimming pools, space heating, and preheating air in residential and commercial buildings.

A standard solar hot water system is typically composed of solar collectors, heat storage vessel, piping, circulators, and controls. Systems are typically integrated to work alongside a conventional heating system that provides heat when solar resources are not sufficient. The solar collectors are usually placed on the roof of the building, oriented south, and tilted around the site's latitude, to maximize the amount of radiation collected on a yearly basis.

Several options exist for using active solar thermal systems for space heating. The most common method involves using glazed collectors to heat a liquid held in a storage tank (similar to an active solar hot water system). The most practical system would transfer the heat from the panels to thermal storage tanks and transfer solar produced thermal energy to use for domestic hot water production. DHW is presently produced by gas-fired water heaters and, therefore, this measure would offer natural gas utility savings.

Currently, an incentive is not available for installation of thermal solar systems; a Federal tax credit of 30% of installation cost for the thermal applications is available.

The implementation cost and savings related to this ECM are presented in Appendix F and summarized as follows:

Solar Thermal Hot Water Plant

Budgetary Cost	Annual Utility Savings				Total Savings	Federal Tax Credit *	Payback (without incentive)	Payback (with incentives)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$	$	$	Years	Years
$15,000	0.0	18,100	0	$2,400	$2,400	4,500	6.3	4.3

* 30% federal tax credit

This measure is recommended, however further analysis should be performed to determine allowable roof space to implement a system.

6.2 Demand Response Curtailment

Presently, electricity is delivered by South Jersey Energy Company, which receives the electricity from regional power grid RFC. South Jersey Energy Company is a regional transmission organization (RTO) that coordinates the movement of wholesale electricity in all or parts of 13 states and the District of Columbia including the State of New Jersey.

Utility Curtailment is an agreement with the utility provider's regional transmission organization and an approved Curtailment Service Provider (CSP) to shed electrical load by either turning major equipment off or energizing all or part of a facility utilizing an emergency generator; therefore, reducing the electrical demand on the utility grid. This program is to benefit the utility company during high demand periods and utility provider offers incentives to the CSP to participate in this program. Enrolling in the program will require program participants to drop electrical load or turn on emergency generators during high electrical demand conditions or during emergencies. Part of the program also will require that program participants reduce their required load or run emergency generators with notice to test the system.

A pre-approved CSP will require a minimum of 100 kW of load reduction to participate in any curtailment program. From June 2011 through April 2012 the building had a maximum electricity demand of 108 kW.

This measure is not recommended because the facility is not operating year round and the building does not have back up/emergency generator power.

7.0 EPA PORTFOLIO MANAGER

The EPA Portfolio Manager benchmarking tool was used to assess the building's energy performance. Portfolio Manager provides a Site and Source Energy Use Intensity (EUI), as well as an Energy Star performance rating for qualifying building types. The EUIs are provided in kBtu/ft^2/year, and the performance rating represents how energy efficient a building is on a scale of 1 to 100, with 100 being the most efficient. In order for a building to receive and Energy Star label, the energy benchmark rating must be at least 75. As energy use decreases from implementation of the proposed ECMs, the Energy Star rating will increase.

The Site EUI is the amount of heat and electricity consumed by a building as reflected in utility bills. Site energy may be delivered to a facility in the form of primary energy, which is raw fuel burned to create heat or electricity (such as natural gas or oil), or as secondary energy, which is the product created from a raw fuel (such as electricity or district steam). Site EUI is a measure of a building's annual energy utilization per square foot. Site EUI is a good measure of a building's energy use and is utilized regularly for comparison of energy performance for similar building types.

$$\textbf{\textit{Site Energy Intensity}} = \frac{(\textit{Electric Usage in kBtu} + \textit{Natural Gas in kBtu})}{\textit{Building Square Footage}}$$

To provide an equitable comparison for different buildings with varying proportions of primary and secondary energy consumption, the Portfolio Manager uses the convention of Source EUIs. The source energy also accounts for all losses incurred in production, storage, transmission, and delivery of energy to the site; which provides an equivalent measure for various types of buildings with different energy sources.

$$\textbf{\textit{Source Energy Intensity}} = \frac{(\textit{Electric Usage in kBtu X Site/Source Ratio} + \textit{Natural Gas in kBtu X Site/Source Ratio})}{\textit{Building Square Footage}}$$

The EPA Score, Site EUI, and Source EUI for the Connector Building are as follows:

Energy Intensity	Camden County College Connector Building	National Average
EPA Score	N/A	N/A
Site (kBtu/sf/year)	62	104
Source (kBtu/sf/year)	207	244

The Connector Building does not qualify for performance benchmarking in Portfolio Manager because the program does not currently include this building type. However it is expected to begin benchmarking these buildings in the near future. It is suggested that the client check for updates in the future to see if any of their buildings qualify for an Energy Star label. For the building to qualify for the Energy Star label the EPA score is required to be above 75. There are several energy conservation measures recommended in this report, that if implemented will further reduce the energy use intensity and increase the EPA score of the facility.

The Portfolio Manager account can be accessed by entering the username and password shown below at the login screen of the Portfolio Manager website (https://www.energystar.gov/istar/pmpam/).

A full EPA Energy Star Portfolio Manager Report is located in Appendix G.

The user name ("[redacted]") and password ([redacted]) for the building's EPA Portfolio Manager Account have been provided to Ed Carney, Director of Public Safety for the Camden County College.

8.0 CONCLUSIONS & RECOMMENDATIONS

Summary of Energy Conservation Measures							
Energy Conservation Measure		**Approx. Costs ($)**	**Approx. Savings ($/year)**	**Payback (Years) w/o Incentive**	**Potential Incentive ($)***	**Payback (Years) w/ Incentive**	**Recommended For Implementation**
ECM-1	Replace Domestic Water Heater (DWH)	4,900	1,800	2.7	200	2.6	X
3	Daylight Controls Installation	10,700	1,100	9.7	0	9.7	X
4	Install Vending Miser	200 (per unit)	190 (average)	1.1	0	1.1	X
5	Replace Domestic Hot Water Pumps	300	200	1.5	0	1.5	X
6	Lighting Replacements with Lighting Controls (Occupancy Sensors)	40,700	2,700	15.1	2,100	14.3	X

APPENDIX A

Utility Usage Analysis, Energy Suppliers List

Main Electricity Meter Electricity Consumption (Excluding Central Power Plant)	4,626,006	kWh
Central Power Plant Electricity Consumption (Cooling Season)	1,161,896	
Main Electric Meter Demand	1,632.96	kW
Main Electric Meter Cost	$ 760,716	

Building Name	sq. ft	% of Total Area	Main or Dedicated Meter	Electric Cost ($)	~Electric Consumption (kWh)	~Electric Demand (kW)	Blended Rate ($/kWh)	Consumption Rate ($/kWh)	Demand Rate ($/kW)	Gas Meter Number	Gas Cost ($)	Gas Consumption Therm	Gas Rate $/Therm
Child Care	4,649	-	D	$ 1,806	14,235	1	$ 0.127	$ 0.121	$ 8.60	310674	$ 901.78	1,442.38	$ 0.80
CIM	63,869	-	D	$ 165,543	1,443,300	360	$ 0.115	$ 0.100	$ 6.01	497191	$ 16,056.35	19,436.98	$ 0.80
Community Center	56,612	11.9%	M	$ 73,678	551,776	195	$ 0.131	$ 0.119	$ 5.94	431186	$ 2,687.79	3,240.64	$ 0.80
Connector Building	31,748	6.7%	M	$ 41,319	309,436	109	$ 0.131	$ 0.119	$ 5.94		$ 2,180.98	2,729.25	$ 0.80
Criminal Justice Center	13,702	2.9%	M	$ 17,833	133,548	47	$ 0.131	$ 0.119	$ 5.94	180372	$ 941.28	1,177.91	$ 0.80
Helene Fuld	36,000	7.6%	M	$ 46,853	350,879	124	$ 0.131	$ 0.119	$ 5.94	341687	$ 2,473.08	3,094.78	$ 0.80
Jefferson Hall	9,495	2.0%	M	$ 12,357	92,544	33	$ 0.131	$ 0.119	$ 5.94	4393670	$ 2,752.49	3,868.58	$ 0.80
Laser Building	9,991	2.1%	M	$ 13,003	97,379	34	$ 0.131	$ 0.119	$ 5.94	199278	$ 686.35	858.89	$ 0.80
Lincoln Hall	41,504	8.7%	M	$ 54,016	404,524	143	$ 0.131	$ 0.119	$ 5.94	514828	$ 6,161.23	9,560.71	$ 0.80
Madison Hall	50,508	10.6%	M	$ 65,734	492,283	174	$ 0.131	$ 0.119	$ 5.94	453525	$ 3,469.73	4,341.98	$ 0.80
Papiano Gym	40,000	8.4%	M	$ 52,058	389,865	138	$ 0.131	$ 0.119	$ 5.94	180448	$ 21,522.08	58,276.13	$ 0.80
Taft Hall	42,387	8.9%	M	$ 207,875	994,078	146	$ 0.131	$ 0.119	$ 5.94	461792	$ 4,738.76	14,034.42	$ 0.80
Truman Hall	32,990	7.0%	M	$ 195,646	902,489	114	$ 0.131	$ 0.119	$ 5.94	411069	$ 17,416.69	47,343.31	$ 0.80
Wolverton Library	49,284	10.4%	*M*	$ 64,141	*480,353*	*170*	$ 0.131	$ 0.119	$ 5.94	430957	$ 6,752.35	9,307.28	$ 0.80
Wilson Hall East	*20,571*	*4.3%*	*M*	$ 26,772	*200,498*	*71*	$ 0.131	$ 0.119	$ 5.94				
Wilson Hall Center	*8,292*	*1.7%*	*M*	$ 10,792	*80,819*	*29*	$ 0.131	$ 0.119	$ 5.94				
Wilson Hall West	*16,857*	*3.6%*	*M*	$ 21,939	*164,299*	*58*	$ 0.131	$ 0.119	$ 5.94				
Roosevelt Hall	*14,685*	*3.1%*	*M*	$ 19,112	*143,129*	*51*	$ 0.131	$ 0.119	$ 5.94				
Central Power Plant	*6,200*	-	*M*	*$ 152,710*	*1,161,896*	-	$ 0.131	$ 0.119	$ 5.94				
Total sq. ft (Main Meter)	474,626	100.0%		$ 772,223	5,802,136	1,633.96	$ 0.131	$ 0.119	$ 6.09		$ 88,741	178,713.23	$ 0.80

Electric Heat

Electric
Delivery Atlantic City Electric
Supplier Hess

Gas
Delivery South Jersey Gas
Supplier Woodruff Energy

Notes
1. Values calculated based on square footage of each building related to the total square footage of all buildings on the main electric meter
2. Values calculated based on the average btu/sq. foot of each building
3. *Italics represent buildings that were not included in the scope of this project but use electricity off the main meter*

Electric Usage Comparison

Building	Lighting (kWh)	Total From Matrix
Child Care	23,577	14,235
CIM Building	N/A	N/A
Community Center	149,864	551,776
Connector Building	39,736	309,436
Criminal Justice	33,600	133,548
Helene Fuld	109,842	350,879
Jefferson Hall	52,614	92,544
Laser Building	34,977	97,379
Lincoln Hall	179,383	404,524
Madison Hall	119,776	492,283
Papiano Gym	73,095	389,865
Taft Hall	120,182	994,078
Truman Hall	103,919	902,489
Wolverton Library	*134,640*	480,353

Gas Breakdown Estimates Based on Max Annual Therm Usage

	sq. ft	Btu/sq ft	Est. Btu/sq ft	Est. Therms	Est. Cost
Child Care	4,649	10,056			
CIM	63,869	10,226			
Community Center	56,612	741			
Connector Building	31,748		8,597	2,729.25	$ 2,180.98
Criminal Justice Center	13,702		8,597	1,177.91	$ 941.28
Helene Fuld	36,000		8,597	3,094.78	$ 2,473.08
Jefferson Hall	9,495	9,911			
Laser Building	9,991		8,597	858.89	$ 686.35
Lincoln Hall	41,504	6,572			
Madison Hall	50,508		8,597	4,341.98	$ 3,469.73
Papiano Gym	40,000	15,426			
Taft Hall	42,387	4,942			
Truman Hall	32,990	15,426			
Wolverton Library	49,284	4,069			
	avg btu/sq ft	8,597			

Main Boiler Plant Electricity Usage (Cooling Season)

Electric Rate $ 0.131 $/kWh

Cooling Equipment Runtime		Comments
6	Months/Year	
30	Days (avg)/Month	
24	hrs/day	
0.25	Runtime multiplier	Estimated run hours as 1/4 of total hours between May-October
1,500	hrs	

Chiller		Comments
412	Tons	
1.5	COP (kW/Ton)	Based off an estimated 8 EER
618	kW	
927,000	kWh	
$ 121,838	Cost/year	

Chilled Water Pumps		Comments
3	# of Pumps	
50	HP	
112	kW	Calculated using 1 kW = 0.7457 HP
167,783	kWh	
$ 22,052	Cost/year	

Cooling Towers		Comments
4	# of Motors	
15	HP of Motors	
45	kW	
67,113	kWh	
$ 8,821	Cost/yr	

Notes

1. Calculated Values

Cooling System

Annual Electric Usage	Annual Cost
1,161,896 kWh	$ 152,710

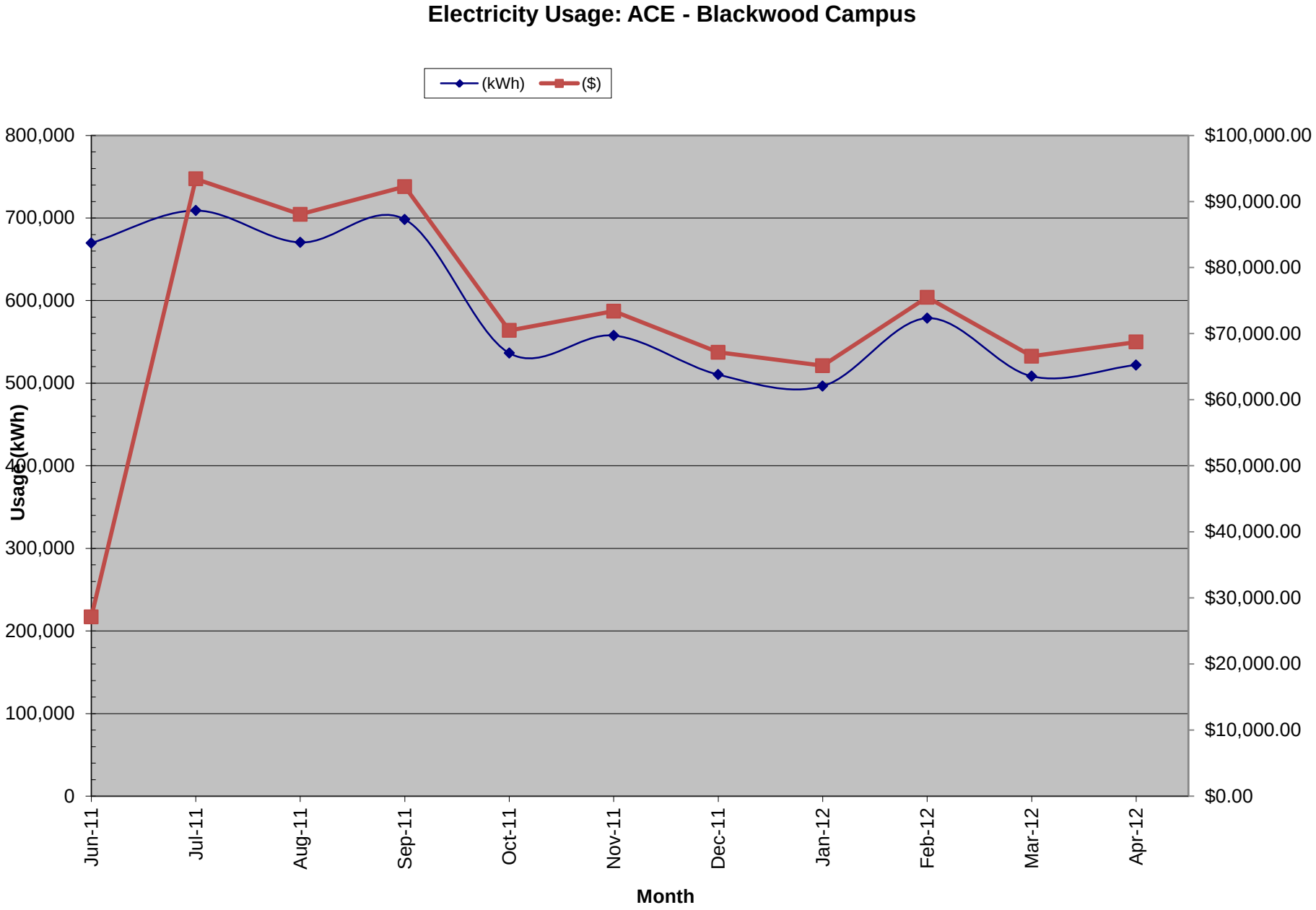
Building Name	~Electrical Consumption	Cost
Building		$ -
Taft Hall	580,947.75	$ 76,355
Truman Hall	580,947.75	$ 76,355

Camden County Community College
302 College Drive, Blackwood, NJ 08012

Electric Service
Delivery - ACE
Supplier - Hess

For Service at: **Blackwood Campus**
Account No.: 050767599934
Meter No.: 83431473

			Charges			Unit Costs		
Month	Consumption (kWh)	Demand (kW)	Total ($)	Delivery ($)	Supply ($)	Blended Rate ($/kWh)	Consumption ($/kWh)	Demand ($/kW)
June-11	669,721	1,560.96	$27,133.38	$ 27,133.38		$ 0.041	$ 0.027	$ 5.61
July-11	709,000	1,632.96	$93,414.28	$28,009.75	$65,404.53	$ 0.132	$ 0.119	$ 5.36
August-11	670,412	1,539.36	$88,047.34	$26,202.52	$61,844.82	$ 0.131	$ 0.120	$ 5.08
September-11	698,259	1,500.48	$92,240.86	$27,827.18	$64,413.68	$ 0.132	$ 0.120	$ 5.79
October-11	536,450	1,429.92	$70,486.53	$20,999.56	$49,486.97	$ 0.131	$ 0.118	$ 5.08
November-11	557,711	1,306.36	$73,398.01	$21,949.73	$51,448.28	$ 0.132	$ 0.118	$ 5.79
December-11	510,390	1,306.36	$67,167.13	$20,084.18	$47,082.95	$ 0.132	$ 0.118	$ 5.26
January-12	496,484	1,306.36	$65,141.43	$19,341.29	$45,800.14	$ 0.131	$ 0.118	$ 5.08
February-12	578,728	1,306.36	$75,496.79	$22,109.72	$53,387.07	$ 0.130	$ 0.118	$ 5.61
March-12	508,396	1,306.36	$66,585.12	$19,686.10	$46,899.02	$ 0.131	$ 0.118	$ 5.08
April-12	522,071	1,306.36	$68,738.63	$20,578.11	$48,160.52	$ 0.132	$ 0.119	$ 5.08
Total (All)	**5,787,901**	**1,632.96**	**$760,716.12**	**$226,788.14**	**$533,927.98**	**$ 0.131**	**$ 0.119**	**$ 5.94**


Electricity Usage: ACE - Blackwood Campus
(kWh)
($)
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
Usage(kWh)
$100,000.00
$90,000.00
$80,000.00
$70,000.00
$60,000.00
$50,000.00
$40,000.00
$30,000.00
$20,000.00
$10,000.00
$0.00
Jun-11
Jul-11
Aug-11
Sep-11
Oct-11
Nov-11
Dec-11
Jan-12
Feb-12
Mar-12
Apr-12
Month

Main Natural Gas Meter

		Cost ($)				129292 (Monkey House)				Usage (Therms) Meter Number **180448 (Papiano Gym)**				249260 (Roosevelt House)			
Month	**Total**	Delivery	Supply	Total Therms	Therm	Cost	% Tot	$/Therm		Therm	Cost	% Tot	$/Therm	Therm	Cost	% Tot	$/Therm
Jul-11	$ 3,604.91	$ 3,604.91		5,306.26	12.46	$ 8.46	0.23%	$	0.68	23.87	$ 16.22	0.45%	$ 0.68	43.6	$ 29.62	0.82%	$ 0.68
Aug-11	$ -			-		$ -	0.00%	#DIV/0!			#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
Sep-11	$ 3,402.14	$ 3,402.14		5,089.27		$ -	0.00%	#DIV/0!		21.86	$ 14.61	0.43%	$ 0.67	37.48	$ 25.06	0.74%	$ 0.71
Oct-11	$ 3,577.46	$ 3,577.46		4,611.32		$ -	0.00%	#DIV/0!		37.19	$ 28.85	0.81%	$ 0.78	49.58	$ 38.46	1.08%	$ 0.78
Nov-11	$ 9,843.06	$ 9,843.06		9,117.98		$ -	0.00%	#DIV/0!		29.84	$ 32.21	0.33%	$ 1.08	166.7	$ 179.96	1.83%	$ 0.40
Dec-11	$ 21,671.14	$ 21,671.14		23,331.55		$ -	0.00%	#DIV/0!		29.84	$ 27.72	0.13%	$ 0.93	938.45	$ 871.66	4.02%	$ 0.15
Jan-12	$ 32,847.20	$ 32,847.20		36,482.23		$ -	0.00%	#DIV/0!		35.81	$ 32.24	0.10%	$ 0.90	1322.74	$ 1,190.94	3.63%	$ 0.10
Feb-12	$ 15,880.61	$ 15,880.61		42,477.14		$ -	0.00%	#DIV/0!		34.06	$ 12.73	0.08%	$ 0.37	1607.86	$ 601.12	3.79%	$ 0.08
Mar-12	$ 13,557.55	$ 13,557.55		35,389.55		$ -	0.00%	#DIV/0!		42.35	$ 16.22	0.12%	$ 0.38	1318.11	$ 504.96	3.72%	$ 0.10
Apr-12	$ 38,795.86	$ 13,397.93	$ 25,397.93	36,285.87		$ -	0.00%	#DIV/0!		42.23	$ 45.15	0.12%	$ 1.07	834.3	$ 892.01	2.30%	$ 0.10
May-12	$ 20,089.02	$ 7,674.46	$ 12,414.56	17,736.60		$ -	0.00%	#DIV/0!		26.78	$ 30.33	0.15%	$ 1.13	545.9	$ 618.30	3.08%	$ 0.20
Total	$ 163,269	$ 125,456	$ 37,812	215,827.77	12.46					323.83	256.29			6,864.72			
Average											30.33						
											30.331854						
											$ 30.33						

Master Meter List

Unknown	Known	Used	Needed
362093	129292 (Monkey House)	**310674 (Child Care)**	Connector Building
470558	249260 (Roosevelt House)	**497191 (CIM)**	Criminal Justice Center (180372)
497759	268114 (Print Shop)	**431186 (Community Center)**	Helene Fuld (341687)
516533	307090 (Animal Barn)	**4393670 (Jefferson Hall)**	Laser Building (199278)
543578	450781 (Main Boiler Room)	**514828 (Lincoln Hall)**	Madison Hall (453525)
		180448 (Papiano Gym)	
		461792 (Taft Hall)	
		555971 (Taft Hall)	
		411069 (Truman Hall)	
		430957 (Wolverton)	

Building Meters and Totals

Building Name	Gas Meter	Therms	$/Therm	Secondary Meter #	Therms
Child Care	310674	1,442.38	$ 0.80		
CIM	497191	19,436.98	$ 0.80		
Community Cente	431186	3,240.64	$ 0.80		
Connector Building			$ 0.80		
Criminal Justice C	180372		$ 0.80		
Helene Fuld	341687		$ 0.80		
Jefferson Hall	4393670	3,868.58	$ 0.80		
Laser Building	199278		$ 0.80		
Lincoln Hall	514828	9,560.71	$ 0.80		
Madison Hall	453525		$ 0.80		
Papiano Gym	180448	29,299.98	$ 0.80		
Taft Hall	461792	7,040.50	$ 0.80	555971	6,993.92
Truman Hall	411069	23,702.06	$ 0.80		
Wolverton Library	430957	9,307.28	$ 0.80		

Main Boiler House

Therms	Cost
52,617.40	$ 38,630.26

	sq ft	% total	Therms	Cost
Papiano Gym	40,000	54.8%	28,835.40	$ 21,170.16
Truman Hall	32,990	45.2%	23,782.00	$ 17,460.09

Main Boiler House Gas Usage

	Main Boiler House		Papiano Gym				Truman Hall			
Month	MBH Therms	MBH Cost	Therms	Cost	DHW	HHW	Therms	Cost	DHW	HHW
Jul-11	311	$ 211.56	311.40	$ 211.56	311.40	-	-	$ -		
Aug-11	-	$ -	-				-	$ -		
Sep-11	-	$ -	-	$ -			-	$ -		
Oct-11	-	$ -	-	$ -			-	$ -		
Nov-11	3,087	$ 3,332.48	1,691.74	$ 1,826.27	1,168.43	523.30	1,395.26	$ 1,506.22	627.87	767.39
Dec-11	6,277	$ 5,830.20	3,439.87	$ 3,195.07	1,168.43	2,271.43	2,837.03	$ 2,635.13	627.87	2,209.16
Jan-12	9,207	$ 8,289.63	5,045.62	$ 4,542.89	1,168.43	3,877.19	4,161.38	$ 3,746.74	627.87	3,533.51
Feb-12	11,042	$ 4,128.34	6,051.46	$ 2,262.41	1,168.43	4,883.03	4,990.94	$ 1,865.93	627.87	4,363.07
Mar-12	11,260	$ 4,313.53	6,170.54	$ 2,363.90	1,168.43	5,002.11	5,089.16	$ 1,949.63	627.87	4,461.29
Apr-12	6,695	$ 7,158.11	3,669.00	$ 3,922.79	1,168.43	2,500.56	3,026.00	$ 3,235.32	627.87	2,398.14
May-12	4,738	$ 5,366.40	2,596.52	$ 2,940.90	1,168.43	1,428.09	2,141.48	$ 2,425.51	627.87	1,513.61
Total	52,617	$ 38,630	$ 28,976	$ 21,266	$ 8,490	$ 20,486	$ 23,641	$ 17,364	$ 4,395	$ 19,246

Usage (Therms)
Meter Number

	268114 (Print Shop)				307090 (Animal Barn)				**310674 (Child Care)**				362093				**411069 (Truman Hall)**				**430957 (Wolverton)**			
	Therm	Cost	% Tot	$/Therm	Therm	Cost	% Tot	$/Therm	Therm	Cost	% Tot	$/Therm	Therm	Cost	% Tot	$/Therm	Therm	Cost	% Tot	$/Therm	Therm	Cost	% Tot	$/Therm
	0	$ -	0.00%	#DIV/0!	36.33	$ 24.68	0.68%	$ 0.68	0	$ -	0.00%	#DIV/0!	26.99	$ 18.34	0.51%	$ 0.68	5.19	$ 3.53	0.10%	$ 0.68	104.84	$ 71.23	1.98%	$ 0.68
		#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
	0	$ -	0.00%	#DIV/0!	10.41	$ 6.96	0.20%	$ 0.67	0	$ -	0.00%	#DIV/0!	5.21	$ 3.48	0.10%	$ 0.67	1.04	$ 0.70	0.02%	$ 0.67	14.57	$ 9.74	0.29%	$ 0.67
	0	$ -	0.00%	#DIV/0!	46.49	$ 36.07	1.01%	$ 0.78	3.1	$ 2.40	0.07%	$ 0.78	0	$ -	0.00%	#DIV/0!	4.13	$ 3.20	0.09%	$ 0.78	23.76	$ 18.43	0.52%	$ 0.78
	1.03	$ 1.11	0.01%	$ 1.08	12.35	$ 13.33	0.14%	$ 1.08	0	$ -	0.00%	#DIV/0!	374.56	$ 404.35	4.11%	$ 1.08	7.2	$ 7.77	0.08%	$ 1.08	55.57	$ 59.99	0.61%	$ 1.08
	23.67	$ 21.99	0.10%	$ 0.93		$ -	0.00%	#DIV/0!	73.06	$ 67.86	0.31%	$ 0.93	912.72	$ 847.77	3.91%	$ 0.93	8.23	$ 7.64	0.04%	$ 0.93	1041.35	$ 967.24	4.46%	$ 0.93
	57.29	$ 51.58	0.16%	$ 0.90		$ -	0.00%	#DIV/0!	236.31	$ 212.76	0.65%	$ 0.90	1499.72	$ 1,350.29	4.11%	$ 0.90	4.09	$ 3.68	0.01%	$ 0.90	1954.95	$ 1,760.16	5.36%	$ 0.90
	107.33	$ 40.13	0.25%	$ 0.37		$ -	0.00%	#DIV/0!	467.5	$ 174.78	1.10%	$ 0.37	1732.73	$ 647.80	4.08%	$ 0.37	4.13	$ 1.54	0.01%	$ 0.37	2005.18	$ 749.66	4.72%	$ 0.37
	98.14	$ 37.60	0.28%	$ 0.38		$ -	0.00%	#DIV/0!	394.61	$ 151.17	1.12%	$ 0.38	1418.31	$ 543.35	4.01%	$ 0.38	7.23	$ 2.77	0.02%	$ 0.38	1929.64	$ 739.23	5.45%	$ 0.38
	48.41	$ 51.76	0.13%	$ 1.07		$ -	0.00%	#DIV/0!	165.83	$ 177.30	0.46%	$ 1.07	1038.24	$ 1,110.06	2.86%	$ 1.07	12.36	$ 13.21	0.03%	$ 1.07	1411.1	$ 1,508.71	3.89%	$ 1.07
	14.42	$ 16.33	0.08%	$ 1.13		$ -	0.00%	#DIV/0!	101.97	$ 115.49	0.57%	$ 1.13	610.79	$ 691.80	3.44%	$ 1.13	7.21	$ 8.17	0.04%	$ 1.13	766.32	$ 867.96	4.32%	$ 1.13
Total	350.29				105.58				1,442.38	901.78			7,619.27				60.81	52.22			9,307.28	$ 6,752.35		

Usage (Therms)
Meter Number

	431186 (Community Center)				**450781 (Main Boiler Room)**				**461792 (Taft Hall)**				470558				**497191 (CIM)**				497759			
	Therm	Cost	% Tot	$/Therm	Therm	Cost	% Tot	$/Therm	Therm	Cost	% Tot	$/Therm	Therm	Cost	% Tot	$/Therm	Therm	Cost	% Tot	$/Therm	Therm	Cost	% Tot	$/Therm
	162.97	$ 110.72	3.07%	$ 0.68	311.4	$ 211.56	5.87%	$ 0.68	8.3	$ 5.64	0.16%	$ 0.68	20.76	$ 14.10	0.39%	$ 0.68	1.04	$ 0.71	0.02%	$ 0.68	3684.9	$ 2,503.41	69.44%	$ 0.68
		#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
	224.86	$ 150.32	4.42%	$ 0.67	0	$ -	0.00%	#DIV/0!	7.29	$ 4.87	0.14%	$ 0.67	0	$ -	0.00%	#DIV/0!	195.52	$ 130.70	3.84%	$ 0.67	4528.35	$ 3,027.17	88.98%	$ 0.67
	363.62	$ 282.10	7.89%	$ 0.78	0	$ -	0.00%	#DIV/0!	30.99	$ 24.04	0.67%	$ 0.78	0	$ -	0.00%	#DIV/0!	169.41	$ 131.43	3.67%	$ 0.78	3842.76	$ 2,981.21	83.33%	$ 0.78
	382.79	$ 413.23	4.20%	$ 1.08	3087	$ 3,332.48	33.86%	$ 1.08	0	$ -	0.00%	#DIV/0!	0	$ -	0.00%	#DIV/0!	307.67	$ 332.14	3.37%	$ 1.08	4362.96	$ 4,709.91	47.85%	$ 1.08
	353.98	$ 328.79	1.52%	$ 0.93	6276.9	$ 5,830.20	26.90%	$ 0.93		$ -	0.00%	#DIV/0!	2315.25	$ 2,150.48	9.92%	$ 0.93	2215.44	$ 2,057.78	9.50%	$ 0.93	6698.79	$ 6,222.06	28.71%	$ 0.93
	333.5	$ 300.27	0.91%	$ 0.90	9207	$ 8,289.63	25.24%	$ 0.90		$ -	0.00%	#DIV/0!	3017.85	$ 2,717.16	8.27%	$ 0.90	3227.57	$ 2,905.98	8.85%	$ 0.90	9278.61	$ 8,354.10	25.43%	$ 0.90
	216.72	$ 81.02	0.51%	$ 0.37	11042.4	$ 4,128.34	26.00%	$ 0.37		$ -	0.00%	#DIV/0!	3653.28	$ 1,365.82	8.60%	$ 0.37	4468.56	$ 1,670.63	10.52%	$ 0.37	9731.76	$ 3,638.34	22.91%	$ 0.37
	419.4	$ 160.67	1.19%	$ 0.38	11259.7	$ 4,313.53	31.82%	$ 0.38		$ -	0.00%	#DIV/0!	0	$ -	0.00%	#DIV/0!	1046.43	$ 400.88	2.96%	$ 0.38	10619.24	$ 4,068.17	30.01%	$ 0.38
	408.91	$ 437.20	1.13%	$ 1.07	6695	$ 7,158.11	18.45%	$ 1.07		$ -	0.00%	#DIV/0!	5489.9	$ 5,869.65	15.13%	$ 1.07	6531.23	$ 6,983.01	18.00%	$ 1.07	9383.3	$ 10,032.37	25.86%	$ 1.07
	373.89	$ 423.48	2.11%	$ 1.13	4738	$ 5,366.40	26.71%	$ 1.13		$ -	0.00%	#DIV/0!	1246.3	$ 1,411.60	7.03%	$ 1.13	1274.11	$ 1,443.10	7.18%	$ 1.13	5737.1	$ 6,498.02	32.35%	$ 1.13
Total	3,240.64	$ 2,687.79			52,617.40	$ 38,630.26			46.58	$ 34.55			15,743.34				19,436.98	$ 16,056.35			67,867.77			

Usage (Therms)
Meter Number

	514828 (Lincoln Hall)				516533				543578				**4393670 (Jefferson)**				**555971 (Taft Hall)**			
	Therm	Cost	% Tot	$/Therm	Therm	Cost	% Tot	$/Therm	Therm	Cost	% Tot	$/Therm	Therm	Cost	% Tot	$/Therm	Therm	Cost	% Tot	$/Therm
	807.56	$ 548.63	15.22%	$ 0.68	56.05	$ 38.08	1.06%	$ 0.68	0	$ -	0.00%	#DIV/0!	0	$ -	0.00%	#DIV/0!		$ -	0.00%	#DIV/0!
		#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
	0	$ -	0.00%	#DIV/0!	42.68	$ 28.53	0.84%	$ 0.67	0	$ -	0.00%	#DIV/0!	0	$ -	0.00%	#DIV/0!		$ -	0.00%	#DIV/0!
	0	$ -	0.00%	#DIV/0!	40.29	$ 31.26	0.87%	$ 0.78	0	$ -	0.00%	#DIV/0!	0	$ -	0.00%	#DIV/0!		$ -	0.00%	#DIV/0!
	101.87	$ 109.97	1.12%	$ 1.08	89.52	$ 96.64	0.98%	$ 1.08	115.25	$ 124.41	1.26%	$ 1.08	23.67	$ 25.55	0.26%	$ 1.08		$ -	0.00%	#DIV/0!
	636.95	$ 591.62	2.73%	$ 0.93	315.9	$ 293.42	1.35%	$ 0.93	803.65	$ 746.46	3.44%	$ 0.93	419.83	$ 389.95	1.80%	$ 0.93	267.54	$ 248.50	1.15%	$ 0.93
	1443.45	$ 1,299.63	3.96%	$ 0.90	1547.8	$ 1,393.58	4.24%	$ 0.90	1511.99	$ 1,361.34	4.14%	$ 0.90	596.41	$ 536.98	1.63%	$ 0.90	1207.14	$ 1,086.86	3.31%	$ 0.90
	2727.58	$ 1,019.74	6.42%	$ 0.37	0	$ -	0.00%	#DIV/0!	1714.15	$ 640.86	4.04%	$ 0.37	868.94	$ 324.86	2.05%	$ 0.37	2094.96	$ 783.23	4.93%	$ 0.37
	2256.07	$ 864.29	6.37%	$ 0.38	676.62	$ 259.21	1.91%	$ 0.38	1351.16	$ 517.62	3.82%	$ 0.38	941.06	$ 360.52	2.66%	$ 0.38	1611.48	$ 617.35	4.55%	$ 0.38
	1109.31	$ 1,186.04	3.06%	$ 1.07	326.51	$ 349.10	0.90%	$ 1.07	833.27	$ 890.91	2.30%	$ 1.07	616.97	$ 659.65	1.70%	$ 1.07	1339	$ 1,431.62	3.69%	$ 1.07
	477.92	$ 541.31	2.69%	$ 1.13	169.95	$ 192.49	0.96%	$ 1.13	770.44	$ 872.62	4.34%	$ 1.13	401.7	$ 454.98	2.26%	$ 1.13	473.8	$ 536.64	2.67%	$ 1.13
Total	9,560.71	$ 6,161.23			3,265.32				7,099.91				3,868.58	$ 2,752.49			6,993.92	$ 4,704.20		

APPENDIX B

Equipment Inventory

New Jersey BPU Energy Audit Program
CHA #24364
Camden County College
Connector Building
Original Construction Date: 2007

Description	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size/Efficiency	Location	Areas/Equipment Served	Date Installed	Remaining Useful Life (years)	Other Info.
ACH-1	1	YORK	LATITUDE, MODEL YCAV0207EA6VABB XTOXBXXL	RASM017278	HVAC Chilled Water Cooling / Electric	2,400 MBH (200 tons) / 9.6 EER / 14.7 IPLV High Efficiency Chiller	Roof of Connector Bldgs	Connector Building Community Center & Madison Hall	2007	19	New Condition, Air Cooled Screw Compressor Chiller
ACH-2	1	YORK	LATITUDE, MODEL YCAV0207EA6VABB XTOXBXXL	RASM017211	HVAC Chilled Water Cooling / Electric	2,400 MBH (200 tons) / 9.6 EER / 14.7 IPLV High Efficiency Chiller	Roof of Connector Bldgs	Connector Building Community Center & Madison Hall	2007	19	New Condition, Air Cooled Screw Compressor
ACH-3	1	TRANE	R-SERIES MODEL RTAC2004UR0HUA FNL1TY1DDLNNOF N10N-NOEXN	L110F07635	HVAC Chilled Water Cooling / Electric	2400 MBH (200 tons) / 10.6 EER	Roof of Connector Bldgs	Connector Building Community Center & Madison Hall	2010	22	New Condition, Air Cooled Screw Compressor Chiller
P-3 P-4 P-4A	3	PACO Pumps	N/A	N/A	CHW Primary Loop Pump / Electric	50 HP / 3530 RPM / High Efficiency, 94%	Mechanical Room Level 3	Connector, Madison, & Community Center / Primary Loop HW System	2010	18	Good Condition
B-1 B-2	2	SMITH	28A series 28A-S/W-18	28A-18-070202 28A-18-070201	HVAC Hot Water Heating / Natural Gas	5,862 MBH Input / 4,690 MBH output / 80% Efficiency	Mechanical Room Level 3	Connector Building Community Center & Madison Hall	2007	30	Cast Iron Sectional w/ Power Flame Burners
B-3 B-4 B-5 B-6	4	FULTON	PHW-1000	012802 012799 012798 012797	HVAC Hot Water Heating / Natural Gas	1000 MBH Input / 900 MBH Output / 90% Efficiency	Mechanical Room Level 3	Connector, Madison, & Community Center	2010	33	Pulse Width Modulation Condensing w/ Modsync Factory Controls (Variable Flow Primary Loop)
P-1 P-2 P-2A	3	PACO Pumps	11251231A60011852 EE	197100431110 197100431111B 1971049027-1102	HW Primary Loop Pump / Electric	20 hp / 1765 RPM / High Efficiency, 93%	Mechanical Room Level 3	Connector, Madison, & Community Center / Primary Loop HW System	2010	18	Good Condition
DWH-1	1	Lochinvar	LSX030KK	BM7028834	Domestic Hot Water Heating / Electric	4.5 kW / 30 gallon	Mechanical Room 107B	Connector Building	2010	10	-
AHU-1	1	YORK	XTI-090X072-JENK146A	CKRMXT0142	HVAC / CHW Cooling, HW Heating	- CFM / CLG: - MBH HTG: - MBH 25 HPSF & 10 HP RF w/ VSDs	Level 1 Connector 107B Mech. Room	Level 1 Connector Atrium	2010	18	Good Condition
AHU-2	1	YORK	XTI-096X051-FEJG140A	CNRMXT033J	HVAC / CHW Cooling, HW Heating	- CFM / CLG: - MBH HTG: - MBH 7.5 HP SF, 3.0 HP RF w/ VSDs	Level 2 Connector 205 Lecture Hall Mech Rm.	Auditorium	2010	18	Good Condition

New Jersey BPU Energy Audit Program
CHA #24364
Camden County College
Connector Building
Original Construction Date: 2007

Description	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size/Efficiency	Location	Areas/Equipment Served	Date Installed	Remaining Useful Life (years)	Other Info.
AHU-3	1	YORK	XTI-078X036-FEHE146A	CNRMXT0336	HVAC / CHW Cooling, HW Heating	- CFM / CLG: - MBH HTG: - MBH 5 HP SF, 0.5 HP RF w/ VSDs	Level 2 Connector 205 Lecture Hall Mech Rm.	Auditorium	2010	18	Good Condition
AHU-4	1	YORK	XTI-090X072-JENL146A	CNRMXT0295	HVAC / CHW Cooling, HW Heating	- CFM / CLG: - MBH HTG: - MBH 20 HP SF, 10HP RF w/ VSDs	Mechanical Room Level 3	Connector Building	2010	18	Good Condition
AHU-5	1	YORK	XTI-090X072-JENL146A	CNRMXT0297	HVAC / CHW Cooling, HW Heating	- CFM / CLG: - MBH HTG: - MBH 25 HP SF,15 HP RF w/ VSDs	Mechanical Room Level 3	Connector Building	2010	18	Good Condition
VAVs	-	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	HVAC / Hot Water Heating	Various Size Variable Air Volume Terminals	Above Area Being Served	Ampitheater	2010	18	Good Condition
Emergency Generator	1	Cummins	DEFEG5775314	A070005857	Const. Speed Electric Emer. Power	300 kW / #2 Fuel Oil 52 gal Pay Tank	-	-		-	-

Energy Audit of Camden County College (Connector Building)

CHA Project No. 24364

Existing Lighting

Cost of Electricity: **$0.131** **$/kWh**

$5.94 **$/kW**

		EXISTING CONDITIONS									
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Retrofit Control**	**Annual kWh**	
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	Retrofit control device	(kW/space) * (Annual Hours)	Notes
9A	Mezzanine	8	**High Bay MH 200 35 Feet High**	MH200/1	232	1.86	SW	2500	None	4,640	
35A	Room - 352	9	**4' 3-LAMP T-8 (32W)**	F43ILL	32	0.29	SW	2500	None	720	
175A	Room - 352	3	**4' 2-LAMP T-8 (32W)**	F42ILL	32	0.10	SW	2500	None	240	
227	Room - 352	2	**W60CF1**	F81EL	60	0.12	SW	2125	C-OCC	255	
5A	Lobby Room - 351	7	**2' 2-LAMP T-8**	F22ILL	33	0.23	SW	2125	C-OCC	491	
180	Room - 351	4	**T 32 R F 4 (ELE)**	F44ILL	112	0.45	SW	2125	C-OCC	952	
180	Room - 351A	2	**T 32 R F 4 (ELE)**	F44ILL	112	0.22	SW	2500	None	560	
180	Room - 351B	1	**T 32 R F 4 (ELE)**	F44ILL	112	0.11	SW	2125	OCC	238	
180	Room - 351C	1	**T 32 R F 4 (ELE)**	F44ILL	112	0.11	SW	2125	OCC	238	
180	Room - 351D	2	**T 32 R F 4 (ELE)**	F44ILL	112	0.22	SW	2125	OCC	476	
180	Room - 351E	1	**T 32 R F 4 (ELE)**	F44ILL	112	0.11	SW	2250	C-OCC	252	
180	Room - 351F	2	**T 32 R F 4 (ELE)**	F44ILL	112	0.22	SW	2250	C-OCC	504	
35A	Room 356	9	**4' 3-LAMP T-8 (32W)**	F43ILL	32	0.29	SW	2125	OCC	612	
227	Lobby Room - 351	3	**W60CF1**	F81EL	60	0.18	SW	2125	OCC	383	
35A	Room - 358	9	**4' 3-LAMP T-8 (32W)**	F43ILL	32	0.29	SW	2125	OCC	612	
35A	Room - 354	9	**4' 3-LAMP T-8 (32W)**	F43ILL	32	0.29	SW	2000	OCC	576	
175A	3rd Floor Electrical Room - 300A	1	**4' 2-LAMP T-8 (32W)**	F42ILL	32	0.03	SW	2125	OCC	68	
180	Room - 360	7	**T 32 R F 4 (ELE)**	F44ILL	112	0.78		2125	OCC	1,666	
35A	Room - 360A	1	**4' 3-LAMP T-8 (32W)**	F43ILL	32	0.03		2125	OCC	68	
175A	Rm - 360B	18	**4' 2-LAMP T-8 (32W)**	F42ILL	32	0.58		2125	OCC	1,224	
227	Conference Overlook Room - 353	10	**W60CF1**	F81EL	60	0.60		2125	OCC	1,275	
9A	Glass Atrium	20	**High Bay MH 200 35 Feet High**	MH200/1	232	4.64		2125	OCC	9,860	
227	Theater Room - 205	14	**W60CF1**	F81EL	60	0.84		2125	OCC	1,785	
227A	Theater Room - 205	3	**8' 1-LAMP T-8**	F81ILL	58	0.17		2125	OCC	370	
35A	Theater Control Room - 205	1	**4' 3-LAMP T-8 (32W)**	F43ILL	32	0.03		2500	None	80	
175A	Theater Storage Room - 205	7	**4' 2-LAMP T-8 (32W)**	F42ILL	32	0.22		2125	OCC	476	
4A	1st Floor Lobby	12	**2-LAMP U-TUBE T-12**	FU2SS	95	1.14		2125	OCC	2,423	
227	1st Floor Lobby	25	**W60CF1**	F81EL	60	1.50		500	None	750	
142	1st Floor Lobby	5	**MH 100**	MH100/1	128	0.64		2125	OCC	1,360	
35A	Room - 107D	2	**4' 3-LAMP T-8 (32W)**	F43ILL	32	0.06		2500	None	160	
35A	Room - 103	2	**4' 3-LAMP T-8 (32W)**	F43ILL	32	0.06		2500	None	160	
35A	Room - 103	2	**4' 3-LAMP T-8 (32W)**	F43ILL	32	0.06		2500	None	160	
35A	Room - 105	3	**4' 3-LAMP T-8 (32W)**	F43ILL	32	0.10		2125	OCC	204	
35A	Room - 103C	2	**4' 3-LAMP T-8 (32W)**	F43ILL	32	0.06		1063	None	68	
35A	Room - 103D	2	**4' 3-LAMP T-8 (32W)**	F43ILL	32	0.06		2125	OCC	136	
175A	Room - 107B	6	**4' 2-LAMP T-8 (32W)**	F42ILL	32	0.19		1063	None	204	
142	Forum Room - 101	6	**MH 100**	MH100/1	128	0.77		1063	None	816	
234	Forum Room - 101	11	**SP 100 W I 2**	i100/2	200	2.20		2125	OCC	4,675	
	Total	**232**				**19.88**				**39,736**	

APPENDIX C

ECM Calculations

Summary of Energy Conservation Measures							
Energy Conservation Measure		**Approx. Costs ($)**	**Approx. Savings ($/year)**	**Payback (Years) w/o Incentive**	**Potential Incentive ($)***	**Payback (Years) w/ Incentive**	**Recommended For Implementation**
ECM-1	Replace Domestic Water Heater (DWH)	4,900	1,830	2.7	200	2.6	X
ECM-2	HVAC Building Automation System Upgrade / Re-commissioning	25,300	1,100	23.0	0	23.0	
ECM-3	Daylight Controls Installation	10,700	1,100	9.7	0	9.7	X
ECM-4	Vending Miser & Vending Machine Upgrade	600	600	1.0	0	1.0	X
ECM-5	DHW Pumps	300	200	1.5	0	1.5	X
ECM-6	Lighting Replacement Upgrades	37,700	1,500	25.1	1,586	24.1	
ECM-7	Lighting Controls Installation (Occupancy Sensors)	2,900	1,800	1.6	465	1.4	X
ECM-8	Lighting Replacements with Lighting Controls (Occupancy Sensors)	40,700	2,700	15.1	2,051	14.3	

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ECM Summary Sheet

ECM-1 Replace Domestic Water Heater (DWH)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
4,900	16,100	0	-500	1,800	0	1,800	3.5	200	2.7	2.6

ECM-2 HVAC Building Automation System Upgrade / Re-commissioning

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
25,300	7,400	0	200	1,100	0	1,100	-0.6	0	>20	>20

ECM-3 Daylight Controls Installation

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
10,700	8,700	0	0	1,100	0	1,100	0.6	0	9.7	9.7

ECM-4 Vending Miser & Vending Machine Upgrade

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
600	4,340	0	0	600	0	600	13.2	0	1.0	1.0

ECM-5 DHW Pumps

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
300	1,190	0	0	200	0	200	9.0	0	1.5	1.5

ECM-6 Lighting Replacement Upgrades

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
37,700	9,500	5	0	1,500	0	1,500	-0.4	1,586	>20	>20

ECM-7 Lighting Controls Installation (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
2,900	13,900	0	0	1,800	0	1,800	8.4	465	1.6	1.4

ECM-8 Lighting Replacements with Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
40,700	19,700	0	0	2,700	0	2,700	0.0	2,051	15.1	14.3

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Utility Costs		Yearly Usage	MTCDE	Building Area	Annual Utility Cost	
$ 0.131	$/kWh blended		0.00042021	50,500	Electric	Natural Gas
$ 0.119	$/kWh consumpt	309,436	0.00042021		$41,319	$2,181
$ 5.94	$/kW	109	0			
$ 0.80	$/Therm	2,729	0.00533471			
$ -	$/kgals	-	0			

Connector Building

	Item	Savings						Cost	Simple Payback	MTCDE	Life Expectancy	NJ Smart Start Incentives	Direct Install Eligible (Y/N)*	Direct Install Incentives**	Max Incentives	Payback w/ Incentives***	Simple Projected Lifetime Savings						ROI
		kW	kWh	therms	cooling kWh	kgal/yr	$										kW	kWh	therms	cooling	kgal/yr	$	
ECM-1	Replace Domestic Water Heater (DWH)	4.5	16,100	-500	0	0	$ 1,830	$ 4,900	2.7	4.1	12	$ 200	Y	$ 3,400	$ 200	2.6	54	193,200	-6,000	0	0	$ 22,000	3.5
ECM-2	HVAC Building Automation System Upgrade / Re-commissioning	0.0	7,400	200	0	0	$ 1,100	$ 25,300	23.0	4.2	10			$ -	$ -	23.0	0	74,000	2,000	0	0	$ 11,300	(0.6)
ECM-3	Daylight Controls Installation	0.0	8,700	0	0	0	$ 1,100	$ 10,700	9.7	3.7	15			$ -	$ -	9.7	0	130,500	0	0	0	$ 17,200	0.6
ECM-4	Vending Miser & Vending Machine Upgrade	0.0	4,336	0	0	0	$ 600	$ 600	1.0	1.8	15			$ -	$ -	1.0	0	65,043	0	0	0	$ 8,500	13.2
ECM-5	DHW Pumps	0.1	1,190	0	0	0	$ 200	$ 300	1.5	0.5	20			$ -	$ -	1.5	3	23,807	0	0	0	$ 3,000	9.0
ECM-6	Lighting Replacement Upgrades	4.7	9,500	0	0	0	$ 1,500	$37,700	25.1	4.0	15	$ 1,586		$ -	$ 1,586	24.1	71	142,500	0	0	0	$ 22,000	(0.4)
ECM-7	Lighting Controls Installation (Occupancy Sensors)	0.0	13,900	0	0	0	$ 1,800	$2,900	1.6	5.8	15	$ 465		$ -	$ 465	1.4	0	208,500	0	0	0	$ 27,400	8.4
ECM-8	Lighting Replacements with Lighting Controls (Occupancy Sensors)	4.7	19,700	0	0	0	$ 2,700	$40,700	15.1	8.3	15	$ 2,051	Y	$ 28,500	$ 2,051	14.3	71	295,500	0	0	0	$ 40,100	(0.0)
	Total (Does Not Include ECM-4 & ECM-5)	**9.4**	**57,426.5**	**(300.0)**	**0.0**	**0.0**	**7,530.0**	**82,500.0**	11.0		13	$ 2,251		$ 31,900	$ 2,251	10.7	**127.5**	**782,050**	**(4,000)**	**0**	**0**	**$ 102,100**	0.2
	Total Measures with Positive ROI	**4.5**	**24,800.0**	**(500.0)**	**0.0**	**0.0**	**2,930.0**	**15,600.0**	5.3		15.4	$ 200		$ 3,400	$ 200	5.3	**56.5**	**412,550**	**(6,000)**	**0**	**0**	**$ 50,700**	2.3
	% of Existing	**9%**	**19%**	**-11%**	**0%**	**-**																	

**Direct Install Incentives program provides70% of each project cost up to $75,000 per electrical utility account; total funding for each year is capped at $250,00

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ECM-1: Replace Electric DHW Heater w/ Condensing Gas-Fired DHW Heater

ECM Summary

During periods of little or no domestic hot water use, domestic hot water heaters must still heat the water within their storage tank. Energy required maintaining the hot water temperature setpoint during times of zero demand is known as standby losses. According to the U.S. Department of Energy, 2.5% of stored capacity is lost every hour during HW heater standby. This value was applied to the total volume of the existing DHW heater storage tank to determine the annual standby losses. Proposed efficiency was based on a tankless-type, high efficiency condensing hot water heater with an auxiliary storage tank for increased hot water recovery capacity.

Item	Value	Units	Formula/Comments
Occupied days per week	5	days/wk	
Water supply Temperature	60	˚F	Termperature of water coming into building
Hot Water Temperature	140	˚F	
Hot Water Usage per day	263	gal/day	Calculated from usage below
Annual Hot Water Energy Demand	45,482	MBTU/yr	Energy required to heat annual quantity of hot water to setpoint
Existing Tank Size	30	Gallons	Per manufacturer nameplate
Hot Water Temperature	140	˚F	Per building personnel
Average Room Temperature	70	˚F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	0.4	MBH	
Annual Standby Hot Water Load	3,833	MBTU/yr	
Total Annual Hot Water Demand (w/ standby losses)	49,314	Mbtu/yr	Building demand plus standby losses
Existing Water Heater Efficiency	90%		Per Manufacturer
Total Annual Energy Required	54,794	Mbtu/yr	
Total Annual Electric Required	**16,100**	**kWh/yr**	**Electrical Savings**
Average Annual Electric Demand	1.84	kW	
Peak Electric Demand	**4.50**	**kW**	**Per Manufacturer's Nameplate (Demand Savings)**
New Tank Size	0	Gallons	Based on Rinnai tankless water heater
Hot Water Temperature	140	˚F	
Average Room Temperature	70	˚F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	0.0	MBH	
Annual Standby Hot Water Load	0	MBTU/yr	
Prop Annual Hot Water Demand (w/ standby losses)	45,482	MBTU/yr	
Proposed Avg. Hot water heater efficiency	92%		Based on Rinnai instantaneous, tankless DHW heater
Proposed Total Annual Energy Required	49,437	MBTU/yr	
Proposed Fuel Use	**500**	**Therms/yr**	
Elec Utility Demand Unit Cost	$5.94	$/kW	
Elec Utility Supply Unit Cost	$0.12	$/kWh	
NG Utility Unit Cost	$0.80	$/Therm	
Existing Operating Cost of DHW	$2,230	$/yr	
Proposed Operating Cost of DHW	$400	$/yr	
Annual Utility Cost Savings	**$1,831**	**$/yr**	

Daily Hot Water Demand

			#USES PER DAY		FULL TIME OCCUPANTS**				
FIXTURE	*BASE WATER USE GPM	DURATION OF USE (MIN)	MALE	FEMALE	MALE	FEMALE	TOTAL GAL/DAY	% HOT WATER	TOTAL HW GAL/DAY
LAVATORY (Low-Flow Lavs use 0.5 GPM)	2.5	0.25	3	3	100	100	375	50%	188
SHOWER	2.5	5			0	2	0	75%	0
KITCHEN SINK	2.5	0.5	1	1	0		0	75%	0
MOP SINK	2.5	2	1	1	20		100	75%	75
Dishwasher (gal per use)	10	1		0	0		0	100%	0
						TOTAL	475		**263**

*GPM is per standard fixtures, adjust as necessary if actual GPM is known.
**These are the occupanct that use the fixtures. If fixture does not exist change to (0).

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ECM-1: Replace Electric DHW Heater w/ Condensing Gas-Fired DHW Heater - Cost

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Electric DHW Heater Removal	1	EA	$ -	$ 50		$ -	$ 68	$ -	$ 68	
High Efficiency Gas-Fired tankless DHW Heater	1	EA	$ 1,200	$ 300		$ 1,320	$ 405	$ -	$ 1,725	
Miscellaneous Electrical	1	EA	$ 50	$ 100		$ 55	$ 135	$ -	$ 190	
Venting Kit	1	EA	$ 450	$ 650		$ 495	$ 878	$ -	$ 1,373	
Miscellaneous Piping and Valves	1	LS	$ 300			$ 330	$ -	$ -	$ 330	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 3,685	Subtotal
$ 369	10% Contingency
$ 811	20% Contractor O&P
$ -	0% Engineering
$ 4,900	**Total**

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ECM-6: Re-commission Facility BAS and Integrate Existing HVAC Equipment

ECM Description Summary

The HVAC Building Automation System (BAS) controls consists of an outdated BAS for monitoring and sequencing all HVAC systems and equipment. Due to BAS condition and software, HVAC system sequencing, monitoring, scheduling and monitoring are limited; pneumatic control filed devices, instrument air tubing and compressor are also maintenance intensive. To reduce the energy used by HVAC systems, the BAS system requires replacement by a modern DDC control system with current software and functionality, and complete re-commissioning, Testing and Balancing of all HVAC systems.
This cost analysis provides simple payback time period by reducing HVAC system energy consumption during unoccupied hours.

50,500 Sq Footage

EXISTING CONDITIONS		
Existing Facility Total Electric usage	309,436	kWh
Existing Facility Total Gas usage	2,729	Therms
Existing Facility Cooling Electric usage	74,265	kWh[1]
Existing Facility Heating Natural Gas usage	2074.231515	Therms[2]
PROPOSED CONDITIONS		
Proposed Facility Cooling Electric Savings	7,426	kWh
Proposed Facility Natural Gas Savings	207.4231515	Therms
SAVINGS		
Retro-Commissioning Electric Savings	**7,400**	**kWh**
Retro-Commissioning Natural Gas Savings	**200**	**Therms**
Total cost savings	$ 1,132	
Estimated Total Project Cost	**$ 25,300**	[4]
Simple Payback	22.3	**years**

Assumptions

1	24%	of facility total electricity dedicated to Cooling; Source: E source, data from U.S. Energy Information Administration
2	76%	of facility total natural gas dedicated to Heating; Source: E source, data from U.S. Energy Information Administration
3	10%	Typical Savings associated with Retro-Commissioning of controls based on previous project experience
4	$ 25,250	Based on $0.50 / Sq Ft recommissioning cost

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ECM-3: Daylighting Control

ECM Description Summary

It is assumed the current light fixtures are generally turned on in the morning and shut off at night. Electrical consumption can be reduced by adding daylight controls that will automatically control to maintain minimum lighting levels. Electrical lighting will be adjusted based on available daylight by a daylight control panel mounted near existing light switches. Sensors can be either wall or ceiling mounted at appropriate locations, and will be located at appropriate locations. The electric lighting can then be dimmed or turned off whenever possible, and thus reduce electrical energy consumption,. Daylight control systems are equipped with scheduling features and adjustable light level settings.

EXISTING CONDITIONS		
Cost of Electricty	$ 0.13	$/kWh
Existing Light Fixture Count	20	total
Electrical Usage per Fixture	232	W
Existing Annual Operating Hours	3,120	hours [1]
Existing Lighting Fixtures Electric Usage	4,640	W
Existing Lighting Fixtures Annual Electrical Usage	14,477	kWh
Existing Annual Electrical Cost	$ 1,903	
PROPOSED CONDITIONS		
Available Annual Clear Solar Hours	1,874	hours [2,3]
Proposed Annual Operating Hours	1,246	hours
Proposed Lighting Fixtures Annual Electrical Usage	5,780	kWh
Proposed Annual Electrical Cost	$ 760	
SAVINGS		
Total Annual Electrical Savings	**8,700**	**kWh**
Total Annual Cost Savings	**$ 1,100**	
Estimated Total Project Cost	**$ 10,700**	[4]
Simple Payback	**9.7**	years

Assumptions

1	3,120	Hours of operation based on building schedule, 5 days a week, 52 weeks a year
2	2,499	Clear solar hours based on historical data for NJ from 1961 to 1990 fully clear solar days
3	75%	Reduction of available annual clear solar hours to account for partial dimming control
4	$ 10,700	Project cost is an estimate, includes adding a daylight control panel and two daylight sensors

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ECM-3: Daylighting Control - Cost

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Daylight Control Panel	1	EA	$ 3,000	$ 1,500		$ 3,300	$ 2,025	$ -	$ 5,325	
Daylight Sensor(s)	2	EA	$ 250	$ 200		$ 550	$ 540	$ -	$ 1,090	
Miscellaneous Electrical	1	EA	$ 300	$ 1,000		$ 330	$ 1,350	$ -	$ 1,680	

$ 8,095	Subtotal
$ 810	10% Contingency
$ 1,781	20% Contractor O&P
$ -	0% Engineering
$ 10,700	**Total**

ECM-4 Install Vending Machine Controls

Ex. Cold Beverage Vending Machine Electric usage	3,504	kWh[1,4,7]
Ex. Snack Vending Machine Electric usage	1,752	kWh[2,5,7]
Ex. Dual Vending Machine Electric Usage	2,628	kWh[3,6,7]
Total Vending Machine Electric Usage	7,884	kWh
Proposed Vending Machine Electric usage	3,548	kWh[8]
Vending Machine Controls Usage Savings	**4,336**	**kWh**
Total cost savings	**$ 570**	
Estimated Total Project Cost	**$ 600**	[9]
Simple Payback	**1.05**	**years**

Assumptions

1	1	Number of cold beverage vending machines
2	1	Number of snack vending machines
3	1	Number of dual snack/beverage vending machines
4	400	Average wattage, typical of cold beverage machines based on prior project experience
5	200	Average wattage, typical of snack machines based on prior project experience
6	300	Average wattage, typical of dual snack/beverage machines based on prior project experience
7	8760	Hours per year vending machine plugged in
8	55%	Typical savings for cold vending machines based on historical data for runtime savings
9	$200	Estimated installed cost per vending machine

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Demand Cost
$/kW-month
$ 5.94

Energy Cost
$/kWh
$ 0.13

Multipliers		
Material	Labor	Equipment
1.10	1.35	1.10

ECM-5: DHW Pumps

Savings Analysis

Cost Estimates

										New																			
			Existing	Load	Existing	Existing	Existing	Existing	New	Load	New	New	New	Demand	Demand	Annual	kW	kWh	$ kWh	Total $	Estimated	Payback	Unit Costs			Subtotal Costs				
#	Description	Location	HP	Factor	Hours	Efficiency$_a$	kW	kWh	HP$_b$	Factor	Efficiency$_a$	kW	kWh	Savings	Savings $	Hours	Savings	Savings	Savings	Savings	Cost	Years	Materials	Labor	Equipment	Materials	Labor	Equipment	Total Cost	Remarks
1			0.17	0.8	8760	0.600	0.2	1451.6	0.04	0.8	0.600	0.04	261.29	0.126	$ 9	6,570	0.13	1,190	$ 156	$ 165	$ 300	1.8	$ 175	$ 100	$ -	$ 193	$ 135	$ -	$ 328	

Notes
a Existing and new efficiencies should be entered if known. If not known, use provided curve fit based on "DOE Survey Installed Average" and NEMA Premium values, respectively.

b Same as existing HP unless resized to better match load

Assumptions:
a Existing pump is Bell & Gosset 100 series 1/6 HP pump w/ 60% efficiency

b Proposed pump is Taco 007 series cartridge circulator 1/25 HP at the same efficiency

ECM-4 Lighting Replacements

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
$	kW	kWh	therms	$	$	$	$	Years	Years
$37,700	**4.7**	**9,500**	**0**	**$1,586**	**0**	**$1,586**	**$1,625**	**23.8**	**22.7**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-5 Install Occupancy Sensors

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
$	kW	kWh	therms	$	$	$	$	Years	Years
$2,900	**0.0**	**13,900**	**0**	**$1,827**	**0**	**$1,827**	**$465**	**1.6**	**1.3**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-6 Lighting Replacements with Occupancy Sensors

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
$	kW	kWh	therms	$	$	$	$	Years	Years
$40,700	**4.7**	**19,700**	**0**	**$2,926**	**0**	**$2,926**	**$2,090**	**13.9**	**13.2**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

Energy Audit of Camden County College (Connector Building)

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ECM-4 Lighting Replacements

Cost of Electricity: **$0.131 $/kWh**

$5.94 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**	**Number of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
9A	Mezzanine	8	High Bay MH 200 35 Feet High	MH200/1	232	1.9	SW	2500	4,640	8	FXLED78	FXLED78/1	78	0.6	SW	2,500	1,560	3,080	1.2	$ 492.63	$ 6,772.80		13.7	13.7
35A	Room - 352	9	4' 3-LAMP T-8 (32W)	F43ILL	32	0.3	SW	2500	720	9	4' 3-LAMP T-8 (32W)	F43ILL	89	0.8	SW	2,500	2,003	(1,283)	(0.5)	$ (205.13)	$ -	$225		
175A	Room - 352	3	4' 2-LAMP T-8 (32W)	F42ILL	32	0.1	SW	2500	240	3	4' 2-LAMP T-8	F42ILL	59	0.2	SW	2,500	443	(203)	(0.1)	$ (32.39)	$ -			
227	Room - 352	2	W60CF1	F81EL	60	0.1	SW	2125	255	2	CF42W	CF42/1-L	48	0.1	SW	2,125	204	51	0.0	$ 8.41	$ 360.00		42.8	42.8
5A	Lobby Room - 351	7	2' 2-LAMP T-8	F22ILL	33	0.2	SW	2125	491	7	2' 2-LAMP T-8	F22ILL	33	0.2	SW	2,125	491	-	0.0	$ -	$ -			
180	Room - 351	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	2125	952	4	T 28 C F 4	F43SSILL	72	0.3	SW	2,125	612	340	0.2	$ 56.09	$ 408.00	$100	7.3	5.5
180	Room - 351A	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	2500	560	2	T 28 C F 4	F43SSILL	72	0.1	SW	2,500	360	200	0.1	$ 31.99	$ 204.00	$50	6.4	4.8
180	Room - 351B	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	2125	238	1	T 28 C F 4	F43SSILL	72	0.1	SW	2,125	153	85	0.0	$ 14.02	$ 102.00		7.3	7.3
180	Room - 351C	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	2125	238	1	T 28 C F 4	F43SSILL	72	0.1	SW	2,125	153	85	0.0	$ 14.02	$ 102.00	$25	7.3	5.5
180	Room - 351D	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	2125	476	2	T 28 C F 4	F43SSILL	72	0.1	SW	2,125	306	170	0.1	$ 28.05	$ 204.00		7.3	7.3
180	Room - 351E	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	2250	252	1	T 28 C F 4	F43SSILL	72	0.1	SW	2,250	162	90	0.0	$ 14.68	$ 102.00		6.9	6.9
180	Room - 351F	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	2250	504	2	T 28 C F 4	F43SSILL	72	0.1	SW	2,250	324	180	0.1	$ 29.36	$ 204.00		6.9	6.9
35A	Room 356	9	4' 3-LAMP T-8 (32W)	F43ILL	32	0.3	SW	2125	612	9	4' 3-LAMP T-8 (32W)	F43ILL	89	0.8	SW	2,125	1,702	(1,090)	(0.5)	$ (179.85)	$ -			
227	Lobby Room - 351	3	W60CF1	F81EL	60	0.2	SW	2125	383	3	CF42W	CF42/1-L	48	0.1	SW	2,125	306	77	0.0	$ 12.62	$ 540.00		42.8	42.8
35A	Room - 358	9	4' 3-LAMP T-8 (32W)	F43ILL	32	0.3	SW	2125	612	9	4' 3-LAMP T-8 (32W)	F43ILL	89	0.8	SW	2,125	1,702	(1,090)	(0.5)	$ (179.85)	$ -			
35A	Room - 354	9	4' 3-LAMP T-8 (32W)	F43ILL	32	0.3	SW	2000	576	9	4' 3-LAMP T-8 (32W)	F43ILL	89	0.8	SW	2,000	1,602	(1,026)	(0.5)	$ (171.42)	$ -			
175A	3rd Floor Electrical Room - 300A	1	4' 2-LAMP T-8 (32W)	F42ILL	32	0.0	SW	2125	68	1	4' 2-LAMP T-8	F42ILL	59	0.1	SW	2,125	125	(57)	(0.0)	$ (9.47)	$ -			
180	Room - 360	7	T 32 R F 4 (ELE)	F44ILL	112	0.8		2125	1,666	7	T 28 C F 4	F43SSILL	72	0.5		2,125	1,071	595	0.3	$ 98.16	$ 714.00		7.3	7.3
35A	Room - 360A	1	4' 3-LAMP T-8 (32W)	F43ILL	32	0.0		2125	68	1	4' 3-LAMP T-8 (32W)	F43ILL	89	0.1		2,125	189	(121)	(0.1)	$ (19.98)	$ -			
175A	Rm - 360B	18	4' 2-LAMP T-8 (32W)	F42ILL	32	0.6		2125	1,224	18	4' 2-LAMP T-8	F42ILL	59	1.1		2,125	2,257	(1,033)	(0.5)	$ (170.38)	$ -			
227	Conference Overlook Room - 353	10	W60CF1	F81EL	60	0.6		2125	1,275	10	CF42W	CF42/1-L	48	0.5		2,125	1,020	255	0.1	$ 42.07	$ 1,800.00		42.8	42.8
9A	Glass Atrium	20	High Bay MH 200 35 Feet High	MH200/1	232	4.6		2125	9,860	20	FXLED78	FXLED78/1	78	1.6		2,125	3,315	6,545	3.1	$ 1,079.78	$ 16,932.00	$500	15.7	15.2
227	Theater Room - 205	14	W60CF1	F81EL	60	0.8		2125	1,785	14	CF42W	CF42/1-L	48	0.7		2,125	1,428	357	0.2	$ 58.90	$ 2,520.00		42.8	42.8
227A	Theater Room - 205	3	8' 1-LAMP T-8	F81ILL	58	0.2		2125	370	3	8' 1-LAMP T-8	F81ILL	58	0.2		2,125	370	-	0.0	$ -	$ -			
35A	Theater Control Room - 205	1	4' 3-LAMP T-8 (32W)	F43ILL	32	0.0		2500	80	1	4' 3-LAMP T-8 (32W)	F43ILL	89	0.1		2,500	223	(143)	(0.1)	$ (22.79)	$ -			
175A	Theater Storage Room - 205	7	4' 2-LAMP T-8 (32W)	F42ILL	32	0.2		2125	476	7	4' 2-LAMP T-8	F42ILL	59	0.4		2,125	878	(402)	(0.2)	$ (66.26)	$ -			
4A	1st Floor Lobby	12	2-LAMP U-TUBE T-12	FU2SS	95	1.1		2125	2,423	12	F17T8	F22ILL	33	0.4		2,125	842	1,581	0.7	$ 260.83	$ 1,080.00		4.1	4.1
227	1st Floor Lobby	25	W60CF1	F81EL	60	1.5		500	750	25	CF42W	CF42/1-L	48	1.2		500	600	150	0.3	$ 41.10	$ 4,500.00	$625	109.5	94.3
142	1st Floor Lobby	5	MH 100	MH100/1	128	0.6		2125	1,360	5	FXLED39	FXLED39/1	39	0.2		2,125	414	946	0.4	$ 156.01	$ -		0.0	0.0
35A	Room - 107D	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1		2500	160	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2		2,500	445	(285)	(0.1)	$ (45.58)	$ -			
35A	Room - 103	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1		2500	160	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2		2,500	445	(285)	(0.1)	$ (45.58)	$ -	$50		
35A	Room - 103	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1		2500	160	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2		2,500	445	(285)	(0.1)	$ (45.58)	$ -	$50		
35A	Room - 105	3	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1		2125	204	3	4' 3-LAMP T-8 (32W)	F43ILL	89	0.3		2,125	567	(363)	(0.2)	$ (59.95)	$ -			
35A	Room - 103C	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1		1062.5	68	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2		1,063	189	(121)	(0.1)	$ (24.05)	$ -			
35A	Room - 103D	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1		2125	136	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2		2,125	378	(242)	(0.1)	$ (39.97)	$ -			
175A	Room - 107B	6	4' 2-LAMP T-8 (32W)	F42ILL	32	0.2		1062.5	204	6	4' 2-LAMP T-8	F42ILL	59	0.4		1,063	376	(172)	(0.2)	$ (34.17)	$ -			
142	Forum Room - 101	6	MH 100	MH100/1	128	0.8		1062.5	816	6	FXLED39	FXLED39/1	39	0.2		1,063	249	567	0.5	$ 112.64	$ -		0.0	0.0
234	Forum Room - 101	11	SP 100 W I 2	i100/2	200	2.2		2125	4,675	11	WP 42 1	CF42/2-L	100	1.1		2,125	2,338	2,338	1.1	$ 385.64	$ 1,188.00		3.1	3.1
	Total	**232**				**19.9**			**39,736**	**232**			**2,637**	**15.2**			**30,245**	**9,491**	**4.7**	**$1,585**	**$37,700**	**$1,625**		
																		Demand Savings		**4.7**	**$337**			
																		kWh Savings		**9,500**	**$1,249**			
																		Total savings			**$1,586**		**23.8**	**22.7**

Energy Audit of Camden County College (Connector Building)

CHA Project No. 24364

ECM-5 Install Occupancy Sensors

Cost of Electricity: **$0.131 $/kWh**

$5.94 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**	**Number of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kW Saved) * ($/kWh)	Cost for renovations to lighting system		Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
9A	Mezzanine	8	High Bay MH 200 35 Feet High	MH200/1	232	1.9	SW	2500	4,640.0	8	High Bay MH 200 35 Feet High	MH200/1	232	1.9	None	2500	4,640.0	0.0	0.0	$0.00	$0.00	$0.00		
35A	Room - 352	9	4' 3-LAMP T-8 (32W)	F43ILL	32	0.3	SW	2500	720.0	9	4' 3-LAMP T-8 (32W)	F43ILL	32	0.3	None	2500	720.0	0.0	0.0	$0.00	$0.00	$0.00		
175A	Room - 352	3	4' 2-LAMP T-8 (32W)	F42ILL	32	0.1	SW	2500	240.0	3	4' 2-LAMP T-8 (32W)	F42ILL	32	0.1	None	2500	240.0	0.0	0.0	$0.00	$0.00	$0.00		
227	Room - 352	2	W60CF1	F81EL	60	0.1	SW	2125	255.0	2	W60CF1	F81EL	60	0.1	C-OCC	1200	144.0	111.0	0.0	$14.59				
5A	Lobby Room - 351	7	2' 2-LAMP T-8	F22ILL	33	0.2	SW	2125	490.9	7	2' 2-LAMP T-8	F22ILL	33	0.2	C-OCC	1200	277.2	213.7	0.0	$28.08	$180.00	$35.00	1.9	1.5
180	Room - 351	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	2125	952.0	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	C-OCC	1200	537.6	414.4	0.0	$54.47				
180	Room - 351A	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	2500	560.0	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	None	2500	560.0	0.0	0.0	$0.00	$0.00	$0.00		
180	Room - 351B	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	2125	238.0	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	OCC	1200	134.4	103.6	0.0	$13.62	$114.00	$20.00	8.4	6.9
180	Room - 351C	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	2125	238.0	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	OCC	1200	134.4	103.6	0.0	$13.62	$114.00	$20.00	8.4	6.9
180	Room - 351D	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	2125	476.0	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	OCC	1200	268.8	207.2	0.0	$27.23	$114.00	$20.00	4.2	3.5
180	Room - 351E	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	2250	252.0	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	C-OCC	1000	112.0	140.0	0.0	$18.40	$180.00	$35.00	9.8	7.9
180	Room - 351F	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	2250	504.0	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	C-OCC	1000	224.0	280.0	0.0	$36.80	$180.00	$35.00	4.9	3.9
35A	Room 356	9	4' 3-LAMP T-8 (32W)	F43ILL	32	0.3	SW	2125	612.0	9	4' 3-LAMP T-8 (32W)	F43ILL	32	0.3	OCC	1200	345.6	266.4	0.0	$35.01	$114.00	$20.00	3.3	2.7
227	Lobby Room - 351	3	W60CF1	F81EL	60	0.2	SW	2125	382.5	3	W60CF1	F81EL	60	0.2	OCC	1200	216.0	166.5	0.0	$21.88	$114.00	$20.00	5.2	4.3
35A	Room - 358	9	4' 3-LAMP T-8 (32W)	F43ILL	32	0.3	SW	2125	612.0	9	4' 3-LAMP T-8 (32W)	F43ILL	32	0.3	OCC	1200	345.6	266.4	0.0	$35.01	$114.00	$20.00	3.3	2.7
35A	Room - 354	9	4' 3-LAMP T-8 (32W)	F43ILL	32	0.3	SW	2000	576.0	9	4' 3-LAMP T-8 (32W)	F43ILL	32	0.3	OCC	1000	288.0	288.0	0.0	$37.85	$114.00	$0.00	3.0	3.0
175A	3rd Floor Electrical Room - 300A	1	4' 2-LAMP T-8 (32W)	F42ILL	32	0.0	SW	2125	68.0	1	4' 2-LAMP T-8 (32W)	F42ILL	32	0.0	OCC	1200	38.4	29.6	0.0	$3.89	$114.00	$20.00	29.3	24.2
180	Room - 360	7	T 32 R F 4 (ELE)	F44ILL	112	0.8		2125	1,666.0	7	T 32 R F 4 (ELE)	F44ILL	112	0.8	OCC	1200	940.8	725.2	0.0	$95.31	$114.00	$20.00	1.2	1.0
35A	Room - 360A	1	4' 3-LAMP T-8 (32W)	F43ILL	32	0.0		2125	68.0	1	4' 3-LAMP T-8 (32W)	F43ILL	32	0.0	OCC	1200	38.4	29.6	0.0	$3.89	$114.00	$20.00	29.3	24.2
175A	Rm - 360B	18	4' 2-LAMP T-8 (32W)	F42ILL	32	0.6		2125	1,224.0	18	4' 2-LAMP T-8 (32W)	F42ILL	32	0.6	OCC	1200	691.2	532.8	0.0	$70.03	$114.00	$20.00	1.6	1.3
227	Conference Overlook Room - 353	10	W60CF1	F81EL	60	0.6		2125	1,275.0	10	W60CF1	F81EL	60	0.6	OCC	1200	720.0	555.0	0.0	$72.94	$114.00	$20.00	0.2	0.1
9A	Glass Atrium	20	High Bay MH 200 35 Feet High	MH200/1	232	4.6		2125	9,860.0	20	High Bay MH 200 35 Feet High	MH200/1	232	4.6	OCC	1200	5,568.0	4,292.0	0.0	$564.11				
227	Theater Room - 205	14	W60CF1	F81EL	60	0.8		2125	1,785.0	14	W60CF1	F81EL	60	0.8	OCC	1200	1,008.0	777.0	0.0	$102.12	$114.00	$20.00	1.1	0.9
227A	Theater Room - 205	3	8' 1-LAMP T-8	F81ILL	58	0.2		2125	369.8	3	8' 1-LAMP T-8	F81ILL	58	0.2	OCC	1200	208.8	161.0	0.0	$21.15	$114.00	$20.00	5.4	4.4
35A	Theater Control Room - 205	1	4' 3-LAMP T-8 (32W)	F43ILL	32	0.0		2500	80.0	1	4' 3-LAMP T-8 (32W)	F43ILL	32	0.0	None	2500	80.0	0.0	0.0	$0.00	$0.00	$0.00		
175A	Theater Storage Room - 205	7	4' 2-LAMP T-8 (32W)	F42ILL	32	0.2		2125	476.0	7	4' 2-LAMP T-8 (32W)	F42ILL	32	0.2	OCC	1200	268.8	207.2	0.0	$27.23	$114.00	$20.00	4.2	3.5
4A	1st Floor Lobby	12	2-LAMP U-TUBE T-12	FU2SS	95	1.1		2125	2,422.5	12	2-LAMP U-TUBE T-12	FU2SS	95	1.1	OCC	1000	1,140.0	1,282.5	0.0	$168.56	$114.00	$20.00	0.7	0.6
227	1st Floor Lobby	25	W60CF1	F81EL	60	1.5		500	750.0	25	W60CF1	F81EL	60	1.5	None	500	750.0	0.0	0.0	$0.00	$0.00	$0.00		
142	1st Floor Lobby	5	MH 100	MH100/1	128	0.6		2125	1,360.0	5	MH 100	MH100/1	128	0.6	OCC	1200	768.0	592.0	0.0	$77.81	$114.00	$20.00	1.5	1.2
35A	Room - 107D	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1		2500	160.0	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1	None	2500	160.0	0.0	0.0	$0.00	$0.00	$0.00		
35A	Room - 103	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1		2500	160.0	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1	None	2500	160.0	0.0	0.0	$0.00	$0.00	$0.00		
35A	Room - 103	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1		2500	160.0	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1	None	2500	160.0	0.0	0.0	$0.00	$0.00	$0.00		
35A	Room - 105	3	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1		2125	204.0	3	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1	OCC	1200	115.2	88.8	0.0	$11.67	$114.00	$0.00	9.8	9.8
35A	Room - 103C	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1		1062.5	68.0	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1	None	1062.5	68.0	0.0	0.0	$0.00	$0.00	$0.00		
35A	Room - 103D	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1		2125	136.0	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1	OCC	1200	76.8	59.2	0.0	$7.78	$114.00	$20.00	14.7	12.1
175A	Room - 107B	6	4' 2-LAMP T-8 (32W)	F42ILL	32	0.2		1062.5	204.0	6	4' 2-LAMP T-8 (32W)	F42ILL	32	0.2	None	1062.5	204.0	0.0	0.0	$0.00	$0.00	$0.00		
142	Forum Room - 101	6	MH 100	MH100/1	128	0.8		1062.5	816.0	6	MH 100	MH100/1	128	0.8	None	1062.5	816.0	0.0	0.0	$0.00	$0.00	$0.00		
234	Forum Room - 101	11	SP 100 W I 2	i100/2	200	2.2		2125	4,675.0	11	SP 100 W I 2	i100/2	200	2.2	OCC	1200	2,640.0	2,035.0	0.0	$267.46	$114.00	$20.00	0.4	0.4
	Total	**232**				**19.9**			**39,736**	**232**				**20**			**25,808**	**13,928**	**0**	**$1,831**	**$2,900**	**465**		
																		Demand Savings		**0.0**	**$0**			
																		kWh Savings		**13,900**	**$1,827**			
																		Total Savings			**$1,827**		**1.6**	**1.3**

Energy Audit of Camden County College (Connector Building)

CHA Project No. 24364

ECM-6 Lighting Replacements with Occupancy Sensors

Cost of Electricity: **$0.131 $/kWh**

$5.94 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**	**Number of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
Field Code	Unique description of the location - Room number//Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
9A	Mezzanine	8	High Bay MH 200 35 Feet High	MH200/1	232	1.9	SW	2500	4,640	8	FXLED78	FXLED78/1	78	0.6	None	2,500	1,560	3,080	1.2	$ 492.63	$ 6,772.80	$ -	13.7	13.7
35A	Room - 352	9	4' 3-LAMP T-8 (32W)	F43ILL	32	0.3	SW	2500	720	9	4' 3-LAMP T-8 (32W)	F43ILL	89	0.8	None	2,500	2,003	(1,283)	(0.5)	$ (205.13)	$ -	$ 225		
175A	Room - 352	3	4' 2-LAMP T-8 (32W)	F42ILL	32	0.1	SW	2500	240	3	4' 2-LAMP T-8	F42ILL	59	0.2	None	2,500	443	(203)	(0.1)	$ (32.39)	$ -	$ -		
227	Room - 352	2	W60CF1	F81EL	60	0.1	SW	2125	255	2	CF42W	CF42/1-L	48	0.1	C-OCC	1,200	115	140	0.0	$ 20.09	$ 540.00	$ 35	26.9	25.1
5A	Lobby Room - 351	7	2' 2-LAMP T-8	F22ILL	33	0.2	SW	2125	491	7	2' 2-LAMP T-8	F22ILL	33	0.2	C-OCC	1,200	277	214	0.0	$ 28.08	$ -	$ -	0.0	0.0
180	Room - 351	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	2125	952	4	T 28 C F 4	F43SSILL	72	0.3	C-OCC	1,200	346	606	0.2	$ 91.11	$ 408.00	$ 100	4.5	3.4
180	Room - 351A	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	2500	560	2	T 28 C F 4	F43SSILL	72	0.1	None	2,500	360	200	0.1	$ 31.99	$ 204.00	$ 50	6.4	4.8
180	Room - 351B	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	2125	238	1	T 28 C F 4	F43SSILL	72	0.1	OCC	1,200	86	152	0.0	$ 22.78	$ 216.00	$ 20	9.5	8.6
180	Room - 351C	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	2125	238	1	T 28 C F 4	F43SSILL	72	0.1	OCC	1,200	86	152	0.0	$ 22.78	$ 216.00	$ 45	9.5	7.5
180	Room - 351D	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	2125	476	2	T 28 C F 4	F43SSILL	72	0.1	OCC	1,200	173	303	0.1	$ 45.55	$ 318.00	$ 20	7.0	6.5
180	Room - 351E	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	2250	252	1	T 28 C F 4	F43SSILL	72	0.1	C-OCC	1,000	72	180	0.0	$ 26.51	$ 282.00	$ 35	10.6	9.3
180	Room - 351F	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	2250	504	2	T 28 C F 4	F43SSILL	72	0.1	C-OCC	1,000	144	360	0.1	$ 53.02	$ 384.00	$ 35	7.2	6.6
35A	Room 356	9	4' 3-LAMP T-8 (32W)	F43ILL	32	0.3	SW	2125	612	9	4' 3-LAMP T-8 (32W)	F43ILL	89	0.8	OCC	1,200	961	(349)	(0.5)	$ (82.46)	$ 114.00	$ 20		
227	Lobby Room - 351	3	W60CF1	F81EL	60	0.2	SW	2125	383	3	CF42W	CF42/1-L	48	0.1	OCC	1,200	173	210	0.0	$ 30.13	$ 654.00	$ 20	21.7	21.0
35A	Room - 358	9	4' 3-LAMP T-8 (32W)	F43ILL	32	0.3	SW	2125	612	9	4' 3-LAMP T-8 (32W)	F43ILL	89	0.8	OCC	1,200	961	(349)	(0.5)	$ (82.46)	$ 114.00	$ 20		
35A	Room - 354	9	4' 3-LAMP T-8 (32W)	F43ILL	32	0.3	SW	2000	576	9	4' 3-LAMP T-8 (32W)	F43ILL	89	0.8	OCC	1,000	801	(225)	(0.5)	$ (66.14)	$ 114.00	$ -		
175A	3rd Floor Electrical Room - 300A	1	4' 2-LAMP T-8 (32W)	F42ILL	32	0.0	SW	2125	68	1	4' 2-LAMP T-8	F42ILL	59	0.1	OCC	1,200	71	(3)	(0.0)	$ (2.29)	$ 114.00	$ 20		
180	Room - 360	7	T 32 R F 4 (ELE)	F44ILL	112	0.8		2125	1,666	7	T 28 C F 4	F43SSILL	72	0.5	OCC	1,200	605	1,061	0.3	$ 159.44	$ 828.00	$ 20	5.2	5.1
35A	Room - 360A	1	4' 3-LAMP T-8 (32W)	F43ILL	32	0.0		2125	68	1	4' 3-LAMP T-8 (32W)	F43ILL	89	0.1	OCC	1,200	107	(39)	(0.1)	$ (9.16)	$ 114.00	$ 20		
175A	Rm - 360B	18	4' 2-LAMP T-8 (32W)	F42ILL	32	0.6		2125	1,224	18	4' 2-LAMP T-8	F42ILL	59	1.1	OCC	1,200	1,274	(50)	(0.5)	$ (41.27)	$ 114.00	$ 20		
227	Conference Overlook Room - 353	10	W60CF1	F81EL	60	0.6		2125	1,275	10	CF42W	CF42/1-L	48	0.5	OCC	1,200	576	699	0.1	$ 100.43	$ 1,914.00	$ 20	19.1	18.9
9A	Glass Atrium	20	High Bay MH 200 35 Feet High	MH200/1	232	4.6		2125	9,860	20	FXLED78	FXLED78/1	78	1.6	OCC	1,200	1,872	7,988	3.1	$ 1,269.43	$ 17,046.00	$ 500	13.4	13.0
227	Theater Room - 205	14	W60CF1	F81EL	60	0.8		2125	1,785	14	CF42W	CF42/1-L	48	0.7	OCC	1,200	806	979	0.2	$ 140.60	$ 2,634.00	$ 20	18.7	18.6
227A	Theater Room - 205	3	8' 1-LAMP T-8	F81ILL	58	0.2		2125	370	3	8' 1-LAMP T-8	F81ILL	58	0.2	OCC	1,200	209	161	0.0	$ 21.15	$ 114.00	$ 20	5.4	4.4
35A	Theater Control Room - 205	1	4' 3-LAMP T-8 (32W)	F43ILL	32	0.0		2500	80	1	4' 3-LAMP T-8 (32W)	F43ILL	89	0.1	None	2,500	223	(143)	(0.1)	$ (22.79)	$ -	$ -		
175A	Theater Storage Room - 205	7	4' 2-LAMP T-8 (32W)	F42ILL	32	0.2		2125	476	7	4' 2-LAMP T-8	F42ILL	59	0.4	OCC	1,200	496	(20)	(0.2)	$ (16.05)	$ 114.00	$ 20		
4A	1st Floor Lobby	12	2-LAMP U-TUBE T-12	FU2SS	95	1.1		2125	2,423	12	F17T8	F22ILL	33	0.4	OCC	1,000	396	2,027	0.7	$ 319.38	$ 1,194.00	$ 20	3.7	3.7
227	1st Floor Lobby	25	W60CF1	F81EL	60	1.5		500	750	25	CF42W	CF42/1-L	48	1.2	None	500	600	150	0.3	$ 41.10	$ 4,500.00	$ 625	109.5	94.3
142	1st Floor Lobby	5	MH 100	MH100/1	128	0.6		2125	1,360	5	FXLED39	FXLED39/1	39	0.2	OCC	1,200	234	1,126	0.4	$ 179.71	$ 114.00	$ 20	0.6	0.5
35A	Room - 107D	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1		2500	160	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	2,500	445	(285)	(0.1)	$ (45.58)	$ -	$ -		
35A	Room - 103	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1		2500	160	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	2,500	445	(285)	(0.1)	$ (45.58)	$ -	$ 50		
35A	Room - 103	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1		2500	160	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	2,500	445	(285)	(0.1)	$ (45.58)	$ -	$ 50		
35A	Room - 105	3	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1		2125	204	3	4' 3-LAMP T-8 (32W)	F43ILL	89	0.3	OCC	1,200	320	(116)	(0.2)	$ (27.49)	$ 114.00	$ -		
35A	Room - 103C	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1		1062.5	68	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	1,063	189	(121)	(0.1)	$ (24.05)	$ -	$ -		
35A	Room - 103D	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1		2125	136	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1,200	214	(78)	(0.1)	$ (18.33)	$ 114.00	$ 20		
175A	Room - 107B	6	4' 2-LAMP T-8 (32W)	F42ILL	32	0.2		1062.5	204	6	4' 2-LAMP T-8	F42ILL	59	0.4	None	1,063	376	(172)	(0.2)	$ (34.17)	$ -	$ -		
142	Forum Room - 101	6	MH 100	MH100/1	128	0.8		1062.5	816	6	FXLED39	FXLED39/1	39	0.2	None	1,063	249	567	0.5	$ 112.64	$ -	$ -	0.0	0.0
234	Forum Room - 101	11	SP 100 W I 2	i100/2	200	2.2		2125	4,675	11	WP 42 1	CF42/2-L	100	1.1	OCC	1,200	1,320	3,355	1.1	$ 519.37	$ 1,302.00	$ 20	2.5	2.5
	Total	**232**				**19.9**			**39,736**	**232**				**15.2**			**20,032**		**4.7**	**$2,927**	**$40,700**	**2,090**		
																		Demand Savings		**4.7**	**$337**			
																		kWh Savings		**19,700**	**$2,589**			
																		Total Savings			**$2,926**		**13.9**	**13.2**

APPENDIX D

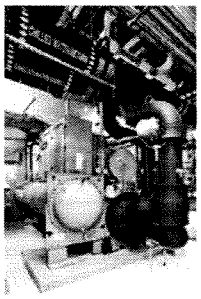
New Jersey Pay For Performance Incentive Program

Pay for Performance - Existing Buildings

Download program applications and incentive forms.

The Greater the Savings, the Greater Your Incentives

Take a comprehensive, whole-building approach to saving energy in your existing facilities and earn incentives that are directly linked to your savings. Pay for Performance relies on a network of program partners who provide technical services under direct contract to you. Acting as your energy expert, your partner will develop an energy reduction plan for each project with a whole-building technical component of a traditional energy audit, a financial plan for funding the energy efficient measures and a construction schedule for installation.



Eligibility

Existing commercial, industrial and institutional buildings with a peak demand over 100 kW for any of the preceding twelve months are eligible to participate including hotels and casinos, large office buildings, multi-family buildings, supermarkets, manufacturing facilities, schools, shopping malls and restaurants. Buildings that fall into the following five customer classes are not required to meet the 100 kW demand in order to participate in the program: hospitals, public colleges and universities, 501(c)(3) non-profits, affordable multifamily housing, and local governmental entities. Your energy reduction plan must define a comprehensive package of measures capable of reducing the existing energy consumption of your building by 15% or more.

Exceptions to the 15% threshold requirement may be made for certain industrial, manufacturing, water treatment and datacenter building types whose annual energy consumption is heavily weighted on process loads. Details are available in the high energy intensity section of the FAQ page.

ENERGY STAR Portfolio Manager

Pay for Performance takes advantage of the ENERGY STAR Program with Portfolio Manager, EPA's interactive tool that allows facility managers to track and evaluate energy and water consumption across all of their buildings. The tool provides the opportunity to load in the characteristics and energy usage of your buildings and determine an energy performance benchmark score. You can then assess energy management goals over time, identify strategic opportunities for savings, and receive EPA recognition for superior energy performance.

This rating system assesses building performance by tracking and scoring energy use in your facilities and comparing it to similar buildings. That can be a big help in locating opportunities for cost-justified energy efficiency upgrades. And, based on our findings, you may be invited to participate in the Building Performance with ENERGY STAR initiative and receive special recognition as an industry leader in energy efficiency.

Incentives

Pay for Performance incentives are awarded upon the satisfactory completion of three program milestones:

Incentive #1 - Submittal of complete energy reduction plan prepared by an approved program partner - Contingent on moving forward, incentives will be between $5,000 and $50,000 based on approximately $.10 per square foot, not to exceed 50% of the facility's annual energy expense.

Incentive #2 - Installation of recommended measures - Incentives are based on the projected level of electricity and natural gas savings resulting from the installation of comprehensive energy-efficiency measures.

Incentive #3 - Completion of Post-Construction Benchmarking Report - A completed report verifying energy reductions based on one year of post-implementation results. Incentives for electricity and natural gas savings will be paid based on actual savings, provided that the minimum performance threshold of 15% savings has been achieved.

CONTACT US

A detailed Incentive Structure document is available on the applications and forms page.

Energy Efficiency Revolving Loan Fund (EE RLF)

New Jersey-based commercial, institutional or industrial entities (including 501(c)(3) organizations) that have received an approved energy reduction plan under Pay for Performance may be eligible for supplemental financing through the EE RLF. The financing, in the form of low-interest loans, can be used to support up to 80% of total eligible project costs, not to exceed $2.5 million or 100% of total eligible project costs from all public state funding sources. Visit the NJ EDA website for details.

Steps to Participation

Click here for a step-by-step description of the program.

New Jersey's Clean Energy PROGRAM
Your Power to Save
njcleanenergy.com

New Jersey SmartStart BUILDINGS®

BPU

2012 PAY FOR PERFORMANCE PROGRAM
Existing Buildings Incentive Structure

Incentive #1: Energy Reduction Plan

Incentive Amount: ..... $0.10 per sq ft
Minimum Incentive: $5,000
Maximum Incentive:: ..... $50,000 or 50% of facility annual energy cost (whichever is less)

This incentive is designed to offset the cost of services associated with the development of the Energy Reduction Plan (ERP) and is paid upon ERP approval. Incentive is contingent on implementation of recommended measures outlined in the ERP.

Incentive #2: Installation of Recommended Measures

Minimum Performance Target: 15%

Electric Incentives

Base Incentive based on 15% savings: ..... $0.09 per projected kWh saved
For each % over 15% add: ..... $0.005 per projected kWh saved
Maximum Incentive: ..... $0.11 per projected kWh saved

Gas Incentives

Base Incentive based on 15% savings: ..... $0.90 per projected Therm saved
For each % over 15% add: ..... $0.05 per projected Therm saved
Maximum Incentive: ..... $1.25 per projected Therm saved

Incentive Cap: ..... 25% of total project cost

This incentive is based on projected energy savings outlined in the ERP. Incentive is paid upon successful installation of recommended measures.

Incentive #3: Post-Construction Benchmarking Report

Minimum Performance Target: 15%

Electric Incentives

Base Incentive based on 15% savings: ..... $0.09 per actual kWh saved
For each % over 15% add: ..... $0.005 per actual kWh saved
Maximum Incentive: ..... $0.11 per actual kWh saved

Gas Incentives

Base Incentive based on 15% savings: ..... $0.90 per actual Therm saved
For each % over 15% add: ..... $0.05 per actual Therm saved
Maximum Incentive: ..... $1.25 per actual Therm saved

Incentive Cap: ..... 25% of total project cost

This incentive will be released upon submittal of a Post-Construction Benchmarking Report that verifies that the level of savings actually achieved by the installed measures meets or exceeds the minimum performance threshold. To validate the savings and achievement of the Energy Target, the EPA Portfolio Manager shall be used. Savings should be rounded to the nearest percent. Total value of Incentive #2 and Incentive #3 may not exceed 50% of the total project cost. Incentives will be limited to $1 million per gas and electric account per building; maximum of $2 million per project. See Participation Agreement for details.

Camden County College Blackwood Campus- NJBPU
CHA Project #24364
Connector Building

New Jersey Pay For Performance Incentive Program

Note: The following calculation is based on the New Jersey Pay For Performance Incentive Program per April, 2012.
Building must have a minimum average electric demand of 100 kW. This minimum is waived for buildings owned by local governements or non-profit organizations.
Values used in this calculation are for measures with a positive return on investment (ROI) only.

Total Building Area (Square Feet)	50,500
Is this audit funded by NJ BPU (Y/N)	Yes

Board of Public Utilites (BPU)

Incentive #1		
Audit is funded by NJ BPU	$0.10	$/sqft

	Annual Utilities	
	kWh	Therms
Existing Cost (from utility)	$41,319	$2,181
Existing Usage (from utility)	309,436	2,729
Proposed Savings	24,800	-500
Existing Total MMBtus	1,329	
Proposed Savings MMBtus	35	
% Energy Reduction	**2.6%**	
Proposed Annual Savings	$2,930	

	Min (Savings = 15%)		Increase (Savings > 15%)		Max Incentive		Achieved Incentive	
	$/kWh	$/therm	$/kWh	$/therm	$/kWh	$/therm	$/kWh	$/therm
Incentive #2	$0.09	$0.90	$0.005	$0.05	$0.11	$1.25	$0.00	$0.00
Incentive #3	$0.09	$0.90	$0.005	$0.05	$0.11	$1.25	$0.00	$0.00

	Incentives $		
	Elec	Gas	Total
Incentive #1	$0	$0	$5,050
Incentive #2	$0	$0	$0
Incentive #3	$0	$0	$0
Total All Incentives	**$0**	**$0**	**$5,050**

Total Project Cost	$15,600

		Allowable Incentive
% Incentives #1 of Utility Cost*	11.6%	$5,050
% Incentives #2 of Project Cost**	0.0%	$0
% Incentives #3 of Project Cost**	0.0%	$0
Total Eligible Incentives***	**$5,050**	
Project Cost w/ Incentives	$10,550	

Project Payback (years)	
w/o Incentives	w/ Incentives
5.3	3.6

* Maximum allowable incentive is 50% of annual utility cost if not funded by NJ BPU, and %25 if it is.

** Maximum allowable amount of Incentive #2 is 25% of total project cost.
Maximum allowable amount of Incentive #3 is 25% of total project cost.

*** Maximum allowable amount of Incentive #1 is $50,000 if not funded by NJ BPU, and $25,000 if it is.
Maximum allowable amount of Incentive #2 & #3 is $1 million per gas account and $1 million per electric account; maximum 2 million per project

APPENDIX E

Energy Savings Improvement Plan (ESIP)

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

- PROGRAMS
  - NJ SMARTSTART BUILDINGS
  - PAY FOR PERFORMANCE
  - COMBINED HEAT & POWER AND FUEL CELLS
  - LOCAL GOVERNMENT ENERGY AUDIT
  - LARGE ENERGY USERS PILOT
  - ENERGY SAVINGS IMPROVEMENT PLAN
  - DIRECT INSTALL
  - ENERGY BENCHMARKING
  - T-12 SCHOOLS LIGHTING INITIATIVE
  - OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS
  - EDA PROGRAMS
  - TEACH
  - ARRA
- TECHNOLOGIES
- TOOLS AND RESOURCES
- PROGRAM UPDATES
- CONTACT US

Home » Commercial & Industrial » Programs

Energy Savings Improvement Plan

A new State law allows government agencies to make energy related improvements to their facilities and pay for the costs using the value of energy savings that result from the improvements. Under the recently enacted Chapter 4 of the Laws of 2009 (the law), the "Energy Savings Improvement Program" (ESIP), provides all government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources.

This Local Finance Notice outlines how local governments can develop and implement an ESIP for their facilities. Below are two sample RFPs:

- Local Government
- School Districts (K-12)

The Board also adopted protocols to measure energy savings.

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Local units should carefully consider all alternatives to develop an approach that best meets their needs. Local units considering an ESIP should carefully review the Local Finance Notice, the law, and consult with qualified professionals to determine how they should approach the task.

FIRST STEP – ENERGY AUDIT

For local governments interested in pursuing an ESIP, the first step is to perform an energy audit. As explained in the Local Finance Notice, this may be done internally if an agency has qualified staff to conduct the audit. If not, the audit must be implemented by an independent contractor and not by the energy savings company producing the Energy Reduction Plan.

Pursuing a Local Government Energy Audit through New Jersey's Clean Energy Program is a valuable first step to the ESIP approach - and it's free. **Incentives provide 100% of the cost of the audit.**

ENERGY REDUCTION PLANS

If you have an ESIP plan you would like to submit to the Board of Public Utilities, please email it to ESIP@bpu.state.nj.us. Please limit the file size to 3MB (or break it into smaller files).

- Frankford Township School District
- Northern Hunterdon-Voorhees Regional High School
- Manalapan Township ***(180 MB** - Right Click, Save As)*

Program Updates

- Board Order - Standby Charges for Distributed Generation Customers
- T-12 Schools Lighting Replacement Initiative - Funding Allocation Reached

Other updates posted.

APPENDIX F

Solar Photovoltaic Analysis

Camden County College
Connector Building

Cost of Electricity	$0.131	/kWh
Electricity Usage	309,436	kWh/yr
System Unit Cost	$4,000	/kW

Photovoltaic (PV) Solar Power Generation - Screening Assessment

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	Federal Tax Credit	New Jersey Renewable ** SREC	Payback (without incentive)	Payback (with incentive)
$	kW	kWh	therms	$	$	$	$	$	Years	Years
$80,000	**20.0**	**25,556**	**0**	**$3,348**	**0**	**$3,348**	**$0**	**$2,096**	**23.9**	**14.7**

** Estimated Solar Renewable Energy Certificate Program (SREC) SREC for 15 Years= $82 /1000kwh

Area Output*
549 m2
5,909 ft2

Perimeter Output*
76 m
249 ft

Available Roof Space for PV:
(Area Output - 10 ft x Perimeter) x 85%
2,904 ft2

Approximate System Size: Is the roof flat? (Yes/No) Yes

8	watt/ft2	
23,228	DC watts	
20	kW	Enter into PV Watts

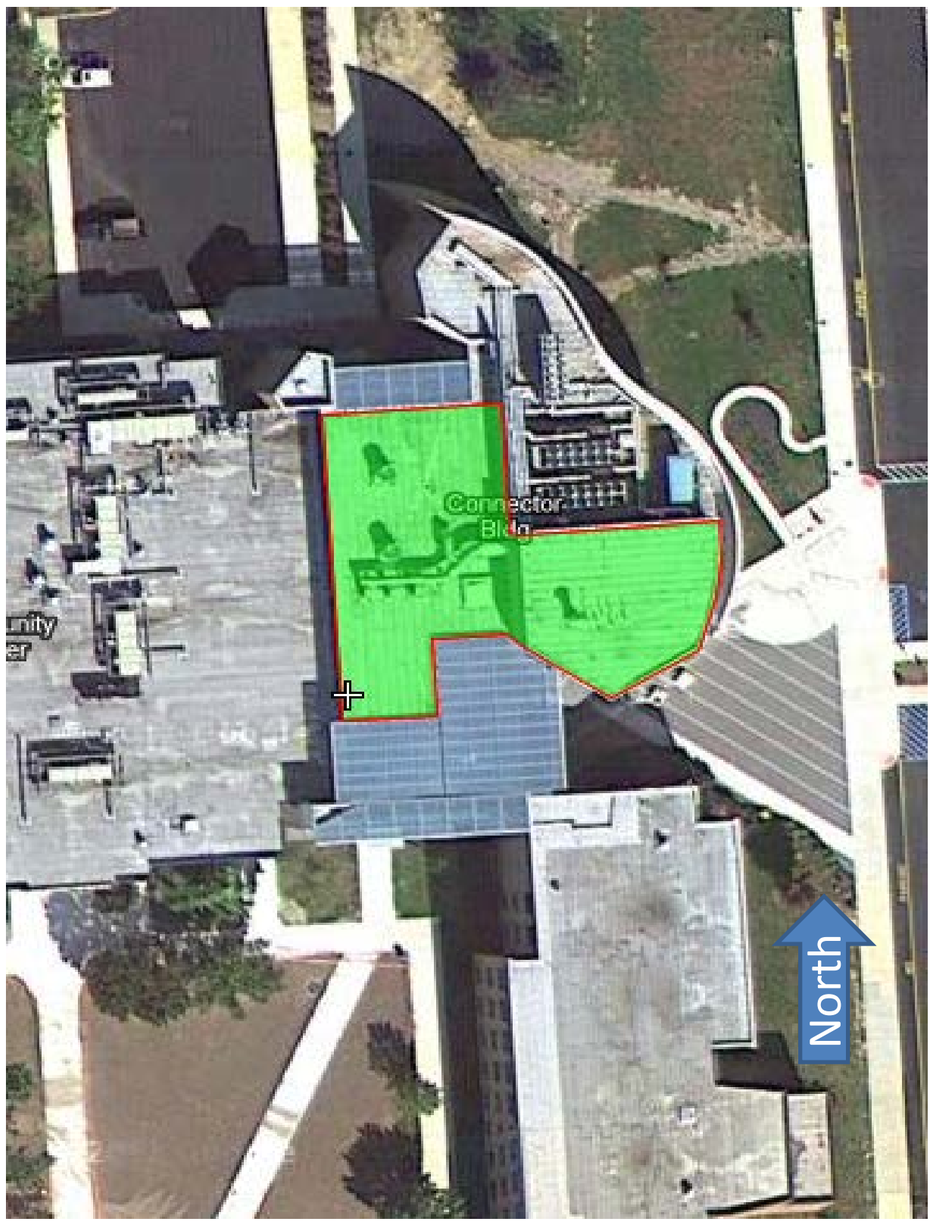
PV Watts Inputs*

Array Tilt Angle	20	Enter into PV Watts (always 20 if flat, if pitched - enter estimated roof angle)
Array Azimuth	180	Enter into PV Watts (default)
Zip Code	08012	Enter into PV Watts
DC/AC Derate Factor	0.83	Enter info PV Watts

PV Watts Output
25,556 annual kWh calculated in PV Watts program

% Offset Calc

Usage	309,436	(from utilities)
PV Generation	25,556	(generated using PV Watts)
% offset	8%	



* http://www.freemaptools.com/area-calculator.htm
**http://www.flettexchange.com

AC Energy & Cost Savings

Cautions for Interpreting the Results

Connector Building (Camden County College)

Station Identification

Cell ID:	0267373
State:	New Jersey
Latitude:	39.8 ° N
Longitude:	74.8 ° W

PV System Specifications

DC Rating:	20.0 kW
DC to AC Derate Factor:	0.830
AC Rating:	16.6 kW
Array Type:	Fixed Tilt
Array Tilt:	20.0 °
Array Azimuth:	180.0 °

Energy Specifications

Cost of Electricity:	13.1 ¢/kWh

Results

Month	Solar Radiation (kWh/m²/day)	AC Energy (kWh)	Energy Value ($)
1	2.71	1401	183.53
2	3.50	1650	216.15
3	4.81	2418	316.76
4	5.27	2500	327.50
5	5.81	2775	363.53
6	6.13	2744	359.46
7	5.76	2640	345.84
8	5.63	2570	336.67
9	5.03	2272	297.63
10	4.04	1956	256.24
11	2.90	1395	182.75
12	2.46	1235	161.79
Year	4.51	25556	3347.84

Output Hourly Performance Data

(Gridded data is monthly, hourly output not available.)

Output Results as Text

Saving Text from a Browser

Run PVWATTS v.2 for another location

Run PVWATTS v.1

Please send questions and comments to Webmaster

Disclaimer and copyright notice.

RReDC home page (http://rredc.nrel.gov)

APPENDIX G

EPA Portfolio Manager

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Connector Building

Building ID: 3251831
For 12-month Period Ending: April 30, 2012[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: November 08, 2012

Facility
Connector Building
College Drive
Blackwood, NJ 08012

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 2007
Gross Floor Area (ft²): 31,748

Energy Performance Rating[2] (1-100) N/A

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	1,965,154
Natural Gas - (kBtu)[4]	0
Total Energy (kBtu)	1,965,154

Energy Intensity[4]

Site (kBtu/ft²/yr)	62
Source (kBtu/ft²/yr)	207

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	278

Electric Distribution Utility
Atlantic City Electric Co [Pepco Holdings Inc]

National Median Comparison

National Median Site EUI	104
National Median Source EUI	244
% Difference from National Median Source EUI	-15%
Building Type	College/University (Campus-Level)

Stamp of Certifying Professional

Based on the conditions observed at the time of my visit to this building, I certify that the information contained within this statement is accurate.

Certifying Professional
N/A

Meets Industry Standards[5] **for Indoor Environmental Conditions:**

Ventilation for Acceptable Indoor Air Quality	**N/A**
Acceptable Thermal Environmental Conditions	**N/A**
Adequate Illumination	**N/A**

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Values represent energy intensity, annualized to a 12-month period.
5. Based on Meeting ASHRAE Standard 62 for ventilation for acceptable indoor air quality, ASHRAE Standard 55 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

ENERGY STAR® Data Checklist for Commercial Buildings

In order for a building to qualify for the ENERGY STAR, a Professional Engineer (PE) or a Registered Architect (RA) must validate the accuracy of the data underlying the building's energy performance rating. This checklist is designed to provide an at-a-glance summary of a property's physical and operating characteristics, as well as its total energy consumption, to assist the PE or RA in double-checking the information that the building owner or operator has entered into Portfolio Manager.

Please complete and sign this checklist and include it with the stamped, signed Statement of Energy Performance.
NOTE: You must check each box to indicate that each value is correct, OR include a note.

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Connector Building	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	College/University (Campus-Level)	Is this an accurate description of the space in question?		☐
Location	College Drive, Blackwood, NJ 08012	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of a hospital, k-12 school, hotel and senior care facility) nor can they be submitted as representing only a portion of a building.		☐
Building (Other)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	31,748 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Number of PCs	N/A(Optional)	Is this the number of personal computers in the space?		☐
Weekly operating hours	N/A(Optional)	Is this the total number of hours per week that the space is 75% occupied? This number should exclude hours when the facility is occupied only by maintenance, security, or other support personnel. For facilities with a schedule that varies during the year, "operating hours/week" refers to the total weekly hours for the schedule most often followed.		☐
Workers on Main Shift	N/A(Optional)	Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100.		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: Atlantic City Electric Co [Pepco Holdings Inc]

Fuel Type: Electricity		
Meter: Electricity (kWh (thousand Watt-hours)) **Space(s):** Entire Facility **Generation Method:** Grid Purchase		
Start Date	**End Date**	**Energy Use (kWh (thousand Watt-hours))**
03/26/2012	04/25/2012	42,762.52
02/26/2012	03/25/2012	41,642.41
01/26/2012	02/25/2012	47,403.26
12/26/2011	01/25/2012	40,666.70
11/26/2011	12/25/2011	41,805.74
10/26/2011	11/25/2011	45,681.77
09/26/2011	10/25/2011	43,940.30
08/26/2011	09/25/2011	57,193.97
07/26/2011	08/25/2011	54,913.04
06/26/2011	07/25/2011	58,073.76
05/26/2011	06/25/2011	54,856.44
Electricity Consumption (kWh (thousand Watt-hours))		**528,939.91**
Electricity Consumption (kBtu (thousand Btu))		**1,804,742.97**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**1,804,742.97**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Additional Fuels	
Do the fuel consumption totals shown above represent the total energy use of this building? Please confirm there are no additional fuels (district energy, generator fuel oil) used in this facility.	☐

On-Site Solar and Wind Energy	
Do the fuel consumption totals shown above include all on-site solar and/or wind power located at your facility? Please confirm that no on-site solar or wind installations have been omitted from this list. All on-site systems must be reported.	☐

Certifying Professional

(When applying for the ENERGY STAR, the Certifying Professional must be the same PE or RA that signed and stamped the SEP.)

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

Please keep this Facility Summary for your own records; do not submit it to EPA. Only the Statement of Energy Performance (SEP), Data Checklist and Letter of Agreement need to be submitted to EPA when applying for the ENERGY STAR.

Facility
Connector Building
College Drive
Blackwood, NJ 08012

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Connector Building	
Gross Floor Area Excluding Parking: (ft^2)	31,748
Year Built	2007
For 12-month Evaluation Period Ending Date:	April 30, 2012

Facility Space Use Summary

Building	
Space Type	Other - College/University (Campus-Level)
Gross Floor Area (ft^2)	31,748
Number of PCs °	N/A
Weekly operating hours °	N/A
Workers on Main Shift °	N/A

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 04/30/2012)	**Baseline** (Ending Date 04/30/2012)	**Rating of 75**	**Target**	**National Median**
Energy Performance Rating	N/A	N/A	75	N/A	N/A
Energy Intensity					
Site (kBtu/ft²)	62	62	0	N/A	104
Source (kBtu/ft²)	207	207	0	N/A	244
Energy Cost					
$/year	$ 64,902.70	$ 64,902.70	N/A	N/A	$ 109,044.92
$/ft²/year	$ 2.04	$ 2.04	N/A	N/A	$ 3.43
Greenhouse Gas Emissions					
$MtCO_2e$/year	278	278	0	N/A	467
$kgCO_2e/ft^2$/year	9	9	0	N/A	15

More than 50% of your building is defined as College/University (Campus-Level). This building is currently ineligible for a rating. Please note the National Median column represents the CBECS national median data for College/University (Campus-Level). This building uses 15% less energy per square foot than the CBECS national median for College/University (Campus-Level).

Notes:
o - This attribute is optional.
d - A default value has been supplied by Portfolio Manager.