CAMDEN COUNTY COLLEGE
JEFFERSON HALL
ENERGY ASSESSMENT

for

NEW JERSEY
BOARD OF PUBLIC UTILITIES

CHA PROJECT NO. 24364

November 2012

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TABLE OF CONTENTS

APPENDICES

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 Jefferson Hall	200 College Drive Building 11 Blackwood, New Jersey	9,500	Original: 1950's

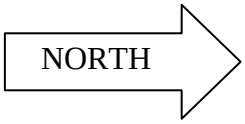
The Energy Conservation Measures (ECMs) identified in this report will allow for a more efficient use of energy and if pursued have the opportunity to qualify for the New Jersey SmartStart Buildings Program. Potential annual savings of $4,300 for the recommended ECMs may be realized with a payback of 4.6 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	HVAC Condensing Boilers Addition	66,800	600	>20	3,000	>20	
2	Replace Domestic Water Heater (DWH)	4,900	2,000	2.5	200	2.4	X
3	HVAC Install Variable Speed Drives, High Efficiency Motor	25,900	1,200	>20	2,000	19.9	
4	HVAC Building Automation System Upgrade / Re-commissioning	4,800	500	9.6	0	9.6	X
5	Air Handling Units Replacement	35,400	900	>20	0	>20	
6	HVAC Cooling Tower Replacement	34,800	900	>20	0	>20	
7	Lighting Replacement Upgrades	6,500	400	16.2	2,200	10.8	X
8	Install Lighting Controls (Occupancy Sensors)	4,000	1,500	2.7	600	2.3	X
9	Lighting Replacements with Lighting Controls (Occupancy Sensors)	10,500	1,800	5.8	2,700	4.3	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.

Jefferson Hall located on the Camden County College campus in Blackwood, NJ, is a 9,500 square foot three story brick building with administrative offices, meeting rooms and classrooms and support spaces. HVAC air handling units are located in mechanical closets on first floor, second floor and attic; boilers in a mechanical room provide HVAC hot water, and a water cooled chiller in the same mechanical room along with a forced draft cooling tower (on grade behind building) provides HVAC chilled water. 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 the 1950's, Jefferson hall is a 9,500 square foot, three story brick building with administrative offices, meeting rooms and classrooms and support spaces. The building has undergone renovations, which included window replacement recently. The two entrances are on the east face towards the ends.

Jefferson Hall 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 8:00 pm during the week, and by approximately one quarter of the occupants during the weekend. 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 a three story structure with brick wall construction and a brick veneer. Insulation has been added to the walls and attic for an improved envelope during renovation. The first floor contains offices and meeting rooms, and the second and third floors contain classrooms and related offices. The interior walls are a mix of masonry block construction and 3-5/8" metal studs filled with fiberglass insulation finished with gypsum board. The building has a Dutch Colonial Gambrel gabled roof made of wood and frame construction, finished with a slate (or synthetic slate) roofing shingle. Windows occur on all floors, and on all sides of the building (~40%), and are double hung, double pane windows installed during renovations. The main entrance doors are part glass, and part metal panel with metal frames. The building has exposed walls facing the north, east, south and west directions, with a uniform three story height of approximately 30' (see photo above). There is substantial shading to the west, southwest side of the building which consists of mature trees at or above the building roof height. The first floor has concrete slab-on-grade floor, and the remaining floors have wood frame decks between floors.

3.2 Utility Usage

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

The campus has one 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 92,544 kWh at a cost of $13,003. 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. From June 2011 through April 2012, the facility had a maximum electricity demand of 33 kW. Electrical usage was generally higher in the summer months when air conditioning equipment was operational.

The facility has one natural gas meter. From July 2011 through May 2012, gas-fired equipment consumed about 3,869 therms of natural gas. Based on the annual cost of $2,752, the blended price for natural gas was $0.80 per therm. Natural gas consumption was highest in winter months for heating.

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 supply rate charge be monitored and checked monthly.

Main Electric Meter Supply Costs –ACE vs. 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 Jefferson Hall. Specifics on the mechanical equipment can be found within the equipment inventory located in Appendix B.

3.3.1 Cooling Chilled Water System

One Multistack water cooled packaged chiller with digital scroll compressors and factory control panel was installed in 2001, and is located in the first floor mechanical room. The chilled water system operates from May until September, and the chiller is shut down during the fall and winter.

The chiller is piped to a primary loop pumping system with two 5.0 HP pumps that operate in lead-lag located in the first floor mechanical room. The primary pumps are constant volume with standard efficiency motors. Chilled water is provided to the air handling unit, the makeup air unit and the fan coil units located throughout the building. Chilled water system piping and valves appear to be insulated.

3.3.2 Forced Draft Cooling Tower

A Baltimore Air Coil forced draft cooling tower is located outside behind the building. The cooling tower was installed in 2001, and provides condenser water cooling for the building chiller. The cooling tower operates whenever the chiller is running to provide cooling for the building. Two 2.0 HP pumps operate in lead-lag and circulate water between the cooling tower and the chiller inside the mechanical room. The pumps are constant volume with standard efficiency motors, and a three-way control valve mixing assembly. The cooling tower condition is fair; during our field inspection, it was making noise indicative of a bad fan belt, or an imbalanced fan blade. It is recommended the cooling tower fill be cleaned, and investigating the source of the noise before the equipment breaks down.

3.3.3 Heating Hot Water System

The building is heated with hot water supplied by two Weil McLain cast iron sectional, gas-fired boilers with factory gas burner and controls. The boilers were installed in 2001 and are located in the first floor mechanical room. The hot water system operates from October until April, and the boiler is shut down during the summer. The boiler is piped to a primary loop pumping system with two 5.0 HP pumps that operate in lead-lag. The pumps are constant volume with standard efficiency motors. Hot water is provided to the air handling units, the makeup air unit and fan coil units throughout the building. Hot water system piping and valves appear to be insulated.

3.3.4 Package Cooling and Heating Air Handling Units

Two 2005 (approximate year) chilled water cooling, hot water heating AHUs are located in mechanical closets 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 first floor (AHU-1 and AHU-2).

3.3.5 3.3.6 DX Cooling Split System Units

One split system DX cooling air conditioner with an indoor high wall air handler was installed in 2001 to serve the first floor electric room/closet. The condensing unit is located outside on grade beside the area/space being served.

3.3.7 Fan Coil Units with Chilled Water Cooling Coils and Hot Water Heating

Rooms and spaces throughout the building are cooled and heated by 25 horizontal ceiling mounted fan coil units (FCUs). Outside air is provided by the air handling unit to the spaces, or by the dedicated makeup air unit; chilled water coils provide cooling, and hot water coils provide heating. Fan coil units are controlled by individual wall mounted thermostats in each space.

3.3.8 Electric Unit Heater

The entrance vestibule is heated by a recessed wall cabinet electric unit heater controlled by space a thermostat.

3.3.9 Exhaust Systems

Exhaust system fans are integrated into the building automation system (BAS) and generally operate during building occupancy.

Constant volume exhaust fans serve lecture rooms. Exhaust fans are also used for restrooms and custodial closets throughout the building.

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 facility primarily utilizes fixtures with T-8 32 watt bulbs and a few 42 watt compact fluorescent lighting. The primary source of control for the lights is switches manually turned off at the end of the school day.

Exterior lights consists wall pack metal halide fixtures. The wall pack 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 second floor mechanical room/closet contains one 40 gallon electric tank hot water heater installed in 2005 serving the building. Hot water is provided to toilets and janitor's closets, and the majority of hot water piping appears to be insulated. Water demand is primarily for the restrooms located in the Jefferson Hall on the various floors. Domestic hot water temperature is maintained at 140°F, and chemical disinfection soap is provided in the restrooms.

3.6.2 Plumbing Fixtures

The majority of the building's original lavatories, water closets, and urinals has been replaced with low flow plumbing fixtures during renovations and do not require upgrades. The remaining fixtures should be replaced thru attrition over the years with llavatories 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 HVAC Condensing Boiler Addition

The building is heated with hot water supplied by two Weil McLain cast iron sectional gas fired boilers from 2001. The boilers are non-condensing and have an estimated efficiency of 83%.

Due to the relatively low efficiency of the existing boilers, an evaluation was performed for adding two high efficiency condensing boiler to operate as the primary boiler during the shoulder months (October-November and March-April) with the existing boilers operating as secondary. The majority of the savings will be achieved during these months when the lower return water temperature enables the condensing boiler to achieve the highest efficiencies.

The boiler fuel consumption was calculated from the natural gas used annually for the shoulder months per utility bills and boiler efficiency. This was then compared to the efficiency of a new condensing boiler at the improved operating efficiency. The difference in fuel usage was the savings.

Natural gas-fired boilers have an expected life of 25 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 20,000 therms and $16,000.

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

ECM-1 HVAC Condensing Boilers Addition

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
66,800	0	0	800	600	0	600	(0.8)	3,000	>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.

4.2 ECM-2 Replace Domestic Water Heater

The building has one domestic hot water heater that provides hot water to the facility. The unit is a tank type electric water heater installed in 2005. 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 tankless type, high efficiency, condensing hot water heater with a storage tank to increase recovery capacity. 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 133,200 kWh (-3,840 therms as the unit will switch from electric to natural gas) and $24,000.

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

ECM-2 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	11,100	10	320	2,000	0	2,000	3.9	200	2.5	2.4

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

This measure is recommended.

4.3 ECM-3 Install Variable Frequency Drives, High Efficiency Motors

The chilled water system is served by two 5 HP pumps (CP-1, CP-2) operating in lead-lag. The pumps are constant volume pumps with standard efficiency motors.

Larger motors that operate pumps continuously consume significant electrical energy. The chilled water system pumps operate at a constant speed (water flows) even though the building load does not require all the flow to maintain temperatures. By adding Variable frequency Drives (VFD's) and inverter duty high efficiency motors, and reducing the flow (by slowing the motors down), significant electrical energy can be saved. Pressure actuated controllers are used to measure the water differential pressure in the hydronic systems and as valves close, the system pressure increases and pump speed is reduced.

The assumption of this calculation is that the operating hours, motor horsepower, and capacity stay the same. The energy savings are realized from operating higher efficiency motors and reducing power draw with the variable speed drives.

Motors and variable speed drives have an expected life of 20 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 186,000kWh and $24,000.

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

ECM-3 HVAC Install Speed Frequency Drives, High Efficiency Motors

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
25,900	9,300	0	0	1,200	0	1,200	-0.1	2,000	>20	19.9

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

This measure is not recommended.

4.4 ECM-4 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. 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 49,535 kWh, 5,292 therms, and $10,700. 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-4 HVAC Building Automation System Upgrade / Re-placement

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
4,800	2,750	0	290	600	0	600	0.3	0	8.0	8.0

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

This measure is recommended.

4.5 ECM-5 HVAC Air Handling Equipment Replacement

Two Airtherm air handling units were installed in 2005 and provide a combined 3,200 cfm of cooling and heating air to the building. Maintenance personnel indicated that these units have surpassed their usable lifetime and should be replaced with higher efficiency units.

The assumption of this calculation is that the operating hours, number of units, and capacities stay the same. The energy savings is the result of upgraded efficiency.

Air handling units have an expected life of 15 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 76,500 kWh and $10,100.

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

ECM-5 HVAC Air Handling Equipment Replacement

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
34,500	6,680	0	0	900	0	900	(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. However, the existing units should be replaced with units such as those assessed in this ECM thru attrition when they fail.

4.6 ECM-6 HVAC Cooling Tower Replacement

An existing Baltimore Air Coil (2001) closed loop cooling tower provides building loop water to the water source heat pumps serving the building. Replacement of the cooling tower which is in poor condition and undersized for the space; with a larger higher efficiency unit with VFDs on the tower fans and condenser water pumps was assessed.

The assumption of this calculation is that the operating hours of the 2001 cooling tower stays the same. The existing cooling tower was estimated to supply about 40 tons of cooling. With the addition of a third floor to the building, it was roughly assumed that an additional 20 tons of cooling should accommodate the additional loads. The energy savings result from operating a higher efficiency cooling tower with tower fan speed control, and condenser water pump flow control. A modern tower also has more efficient fill designs that result in a better approach temperature difference and performance. By replacing the cooling tower, adding VFDs and inverter duty high efficiency motors, and reducing the flow (by slowing the motors down), significant electrical energy can be saved. Cooling tower condenser water temperature can be used to control cooling tower fan speed and condenser water pump flow.

Cooling towers have an expected life of 20 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 140,800 kWh and $18,000.

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

ECM-6 HVAC Cooling Tower Replacement

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
34,800	7,040	0	0	900	0	900	(0.5)	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. However, the existing units should be replaced with units such as those assessed in this ECM thru attrition when they fail.

4.7 ECM-7 Lighting Replacement Upgrades

Jefferson Hall utilizes 4 foot 32W T-8 fluorescent bulbs with electronic ballasts. Recessed lights and surface mounted standard bulb fixtures use biaxial compact fluorescent lights (CFLs). 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 three 400 watt and two 200 watt metal halide wall pack fixtures. The exterior 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 to 120 watts per fixture. 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 2,500 kWh with an electrical demand reduction of about 2 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 37,500 kWh and $6,700.

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

ECM-7 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
6,500	2,500	2	0	400	0	400	0.0	2,200	16.2	10.8

* 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-9.

4.8 ECM-8 Lighting Controls Installation

The current Jefferson Hall lighting is mostly controlled by manual switches. Lights 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 individual rooms will automatically control the lights based on occupancy. 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 175,500 kWh and $23,100.

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

ECM-8 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
4,000	11,700	0	0	1,500	0	1,500	4.7	580	2.7	2.3

* 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-9.

4.9 ECM-9 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 208,500 kWh and $26,900.

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

ECM-9 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 kWh	Electric kW	Nat Gas Therms	Total $	$	$		$	Years	Years
10,507	13,900	0	0	1,800	0	1,800	1.6	2,700	5.8	4.3

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

This measure is recommended.

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 F.

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 available roof area justifies the use of a 11 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 F and summarized as follows:

Photovoltaic (PV) Rooftop Solar Power Generation – 11 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
$44,000	0.0	12,091	0	1,600	1,600	0	1,149	>25	16.0

* 30% federal tax credit

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

This measure is recommended.

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.

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	4,400	0	$580	$580	4,500	>25	18.1

* 30% federal tax credit

This is not recommended since the facility is not occupied year-round and domestic hot water demand is not excessive.

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 Jefferson Hall Building had a maximum electricity demand of 32 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.

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

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.

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

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

Energy Intensity	Camden County College Jefferson Hall	National Average
EPA Score	N/A	N/A
Site (kBtu/sf/year)	105	104
Source (kBtu/sf/year)	104	244

Jefferson Hall 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-2	Replace Domestic Water Heater (DWH)	4,900	2,000	2.5	200	2.4	X
4	HVAC Building Automation System Upgrade / Re-commissioning	4,800	600	8.0	0	8.0	X
9	Lighting Replacements with Lighting Controls (Occupancy Sensors)	10,507	1,800	5.8	2,700	4.3	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

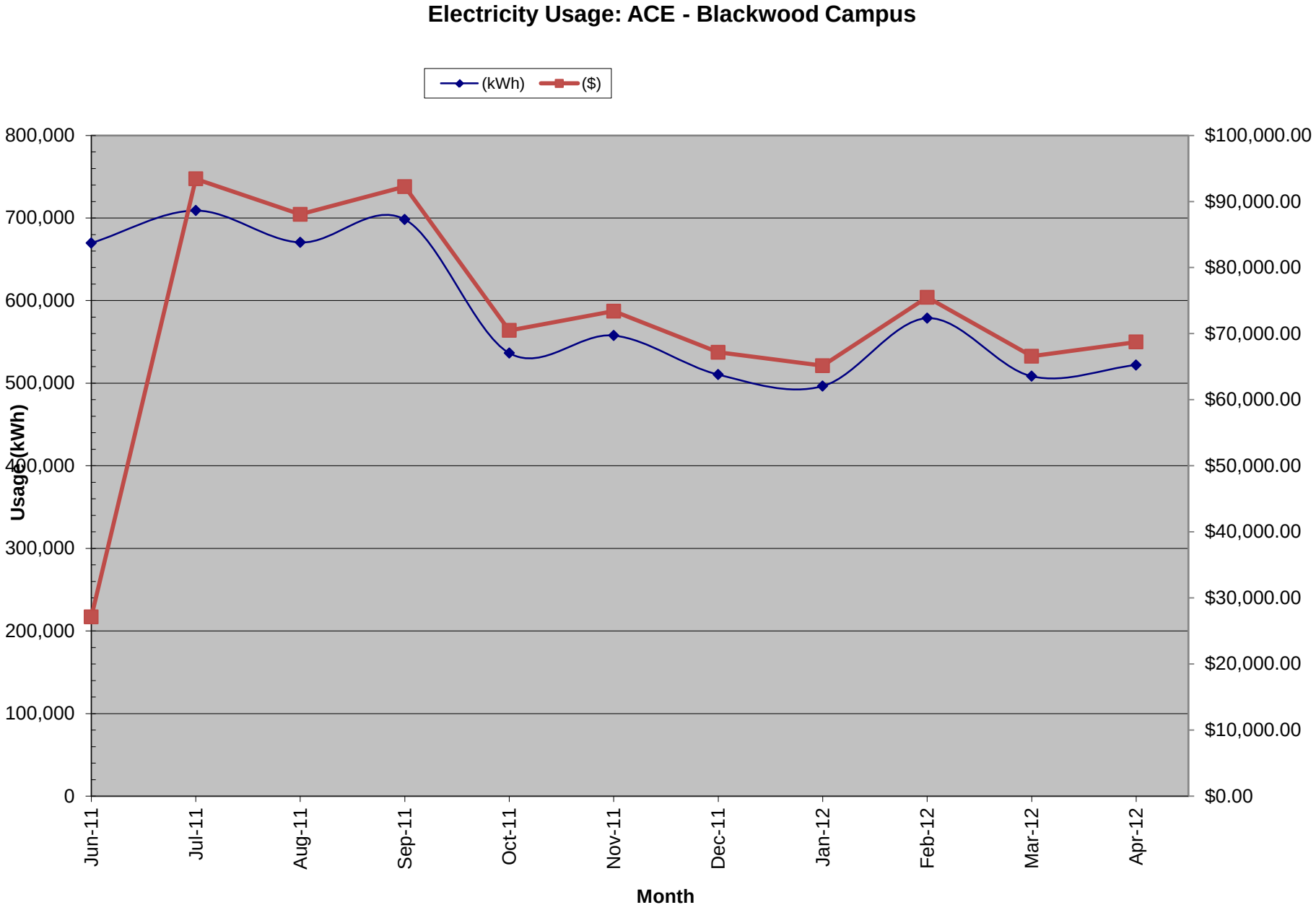
Building Name	~Electrical Consumption	Cost
Building		$ -
Taft Hall	580,947.75	$ 76,355
Truman Hall	580,947.75	$ 76,355

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
Jefferson Hall
Original Construction Date: 1950
Renovation/Addtion Date:

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.
CH-1	1	Multistack	MS30C2J1W (with Trane CSHA150K00B compressors)	JJ1226	Modular Water Cooled Chiller / Electric	3,960 MBH (30.5 tons) / 15.4 EER	Boiler Room	Jefferson Hall	2001	9	Fair Condition, 3 - way CDW Control Valve
CP-1 CP-2	2	TACO	KV2009AE-2JCB684	251161-1A 251161-1B	Primay CHW Loop Pump / Electric	5 HP / 1755 RPM / Standard Efficiency, 87.5%	Boiler Room	Jefferson Hall / Primary CHW System	2001	9	Fair Condition, One pump has a seal leak
CT-1	1	Baltimore Air Coil	VI-32-H	U13147901	Cooling Tower / Electric	96 GPM, 10°F Water ΔT at 78°F WB / (1) 5 HP Fans Hi-speed Fan, 1.5 HP Low-speed Fan / Premium Efficiency Motors, VSD on 5 HP motor	Chiller Yard Behind Building	Jefferson Hall / Chilled Water System Chiller	2001	9	Fair Condition, Bad fan belt or unbalanced; lots of noise during field inspection
CDP-1 CDP-2	2	TACO	KV2007AE2HCB662	251161-2A 251161-2D	Primary Condenser Water Loop Pumps / Electric	2 HP / 17755 RPM Standard Efficiency, 78.5%	Boiler Room	Jefferson Hall / Chilled Water System Cooling Tower	2001	9	Good Condition
Boiler 001 Boiler 002	2	Weil-Mclain	CGA8PIAN	CP4173862 CP138301	Hot Water Heating Boiler / Natural Gas	245 MBH Input / 177 MBH Output 72 % Efficiency	Boiler Room	Jefferson Hall	2001	24	Good Condition
HP-1 HP-2	2	TACO	KV1507AE2BCB692	251161-3A 251161-3B	HVAC Hot Water Heating System / Electric	2 HP / 1735 RPM Standard Efficiency, 80%	Boiler Room	Jefferson Hall / Primary HW System	2001	9	Good Condition
DHW-1	1	Hotpoint	HE40M1A	HP0601824656	Domestic Hot Water Heating / Electric	6.0 kW / 40 gal	2nd Floor Mechanical Room	Jefferson Hall	2005	5	Good Condition
AHU-1	1	Airtherm	48-AVW-4	9348220	HVAC / Chilled Water Cooling, Hot Water Heating	1600 CFM / CLG: 48 MBH HTG: 145 MBH / 1.0 HP SF	Mechanical Room / Elec. Room	1st Floor Offices	2005	13	Good Condition, OA Damper Wide Open
AHU-2	1	Airtherm	48-AVW-4	938220	HVAC / Chilled Water Cooling, Hot Water Heating	1600 CFM / CLG: 48 MBH HTG: 145 MBH / 1.0 HP SF	Mechanical Room / Elec. Room	1st Floor Offices	2005	13	Good Condition
MAU-1	1	TRANE	MCCB003UA0D0UB	K05E70360	HVAC / Chilled Water Cooling, Hot Water Heating	1,000 CFM / CLG: 69.5 MBH HTG: 91.4 MBH / 2.0 HP SF	Ducted Fan Coil Units Above Spaces Being Served	Jefferson Hall / FCUs Makeup Air	2005	13	Good Condition
AC-1 / CU-1	1	EMI	SCC18DF0000AA0B	1-05-H-5436-2B	HVAC / DX Electric Cooling	600 CFM / CLG: 18 MBH / Fractional HP SF	Electrical Room	Elec. Room & On Grade	2005	8	Good Condition
FC-1 thru 8, 10,15 20 thru 27 & FCU-3-1 thru 3-7	25	Airtherm Trane	Airtherm: XXX-1X-CC Series Trane: NOT AVAILABLE	NOT AVAILABLE	HVAC / Chilled Water Cooling, Hot Water Heating	1 to 2 tons (varies), fractional HP motors	Attic	1st Floor 2nd Floor 3rd Floor Attic	2005	8	Good Condition

New Jersey BPU Energy Audit Program
CHA #24364
Camden County College
Jefferson Hall
Original Construction Date: 1950
Renovation/Addtion Date:

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.
UH-1	1	TRANE	NOT AVAILABLE	NOT AVAILABLE	HVAC / Electric Heating	Fractional HP Fan Motor, 2.0 kW Heating Element	Floor Mounted Cabinet In Space Being Served	Entance Vestibule	2005	8	Good Condition

Energy Audit of Camden County College (Jefferson Hall)

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
209A	Men's Bathroom 1st Floor	7	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.41	SW	2500	None	1,033	
209A	Corridor 1st Floor	13	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.77	SW	2500	None	1,918	
227	South Fourier	6	**W60CF1**	F81EL	60	0.36	SW	2500	None	900	
209A	Women's Bathroom 1st Floor	7	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.41	SW	2125	C-OCC	878	
209A	Rm 114 - Dean's Office - Reception	12	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.71	SW	2125	C-OCC	1,505	
209A	Rm 112 - Storage	2	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.12	SW	2125	C-OCC	251	
209A	Rm 113 - Office	2	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.12	SW	2500	None	295	
209A	Dean's Office	6	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.35	SW	2125	OCC	752	
209A	Rm 104 - Conference Room	6	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.35	SW	2125	OCC	752	
209A	Rm 111 - Constructing & Planning	15	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.89	SW	2125	OCC	1,881	
209A	Rm 103 - Office	8	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.47	SW	2250	C-OCC	1,062	
209A	Rm 110 - Office	9	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.53	SW	2250	C-OCC	1,195	
209A	Rm 102 - Conference Room	12	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.71	SW	2125	OCC	1,505	
209A	Kitchen 1st Floor	3	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.18	SW	2125	OCC	376	
175A	Mechanical Room 1st Floor	2	**4' 2-LAMP T-8 (32W)**	F42ILL	59	0.12	SW	2125	OCC	251	
209A	North Vestibule	5	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.30	SW	2000	OCC	590	
175A	Mechanical Room 2nd Floor	2	**4' 2-LAMP T-8 (32W)**	F42ILL	59	0.12	SW	2125	OCC	251	
209A	Restroom 2nd Floor	1	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.06	SW	2125	OCC	125	
209A	Rm 217	7	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.41	SW	2125	OCC	878	
209A	Corridor 2nd Floor	12	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.71	SW	2125	OCC	1,505	
209A	Rm 202 - Office	6	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.35	SW	2125	OCC	752	
209A	Rm 218 - Vestibule	5	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.30	SW	2125	OCC	627	
209A	Rm 221 - Math Skills	4	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.24	SW	2125	OCC	502	
209A	Rm 220 - Office	4	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.24	SW	2125	OCC	502	
209A	Rm 219 - Office	2	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.12	SW	2500	None	295	
209A	Rm 203 - Allied Health	4	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.24	SW	2125	OCC	502	
209A	Rm 206 - Office	3	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.18	SW	2125	OCC	376	
209A	Rm 205 - Office	4	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.24	SW	500	None	118	
209A	Rm 204 - Office	2	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.12	SW	2125	OCC	251	
209A	Rm 207 - Office	5	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.30	SW	2500	None	738	
209A	Rm 208 - Office	4	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.24	SW	2500	None	590	
209A	Rm 209 - Office	4	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.24	SW	2500	None	590	
209A	Rm 210 - Office	4	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.24	SW	2125	OCC	502	
209A	Rm 211 - Office	4	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.24	SW	1063	None	251	
209A	Rm 222 - Office	5	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.30	SW	2125	OCC	627	
209A	Rm 223 - Office	4	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.24	SW	1063	None	251	
209A	Rm 224 - Office	4	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.24	SW	1063	None	251	
209A	Rm 225 - Office	3	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.18	SW	2125	OCC	376	
209A	Rm 226 - Office	4	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.24	SW	500	None	118	
209A	Rm 227 - Office	5	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.30	SW	500	None	148	
209A	Rm 228 - Office	4	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.24	SW	500	None	118	
209A	Rm 229 - Office	4	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.24	SW	2125	OCC	502	
209A	Rm 230 - Office	4	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.24	SW	1063	None	251	
209A	Rm 231 - Office	4	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.24	SW	2125	OCC	502	
209A	Rm 212 - Paramedic Science	6	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.35	SW	1063	None	376	

Energy Audit of Camden County College (Jefferson Hall)

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
209A	Rm 215	4	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.24	SW	2250	None	531	
209A	Rm 214	4	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.24	SW	2250	None	531	
209A	Rm 213	2	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.12	SW	500	None	59	
227	South Vestibule 2nd Floor	7	**W60CF1**	F81EL	60	0.42	SW	520	None	218	
227	South Vestibule 3rd Floor	6	**W60CF1**	F81EL	60	0.36	SW	520	C-OCC	187	
209A	South Stair Tower	4	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.24	SW	520	None	123	
209A	Corridor 3rd Floor	13	**2' 2-LAMP T-8 (32W)**	FU2ILL	59	0.77	SW	500	None	384	
23	Exit Signs	12	**X 5 W CF 2**	ECF5/2	20	0.24	SW	4380	None	1,051	
35A	Rm 317	4	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.36	SW	4380	None	1,559	
35A	Rm 317A	4	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.36	SW	8760	None	3,119	
35A	Rm 306	6	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.53	SW	8760	None	4,678	
35A	Rm 305	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	2125	OCC	378	
35A	Rm 315	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	2125	OCC	378	
35A	Rm 314	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	500	None	89	
35A	Men's Bathroom 3rd Floor	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	500	None	89	
35A	Rm 313	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	8760	None	1,559	
35A	Women's Bathroom 3rd Floor	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	500	None	89	
35A	Rm 302	6	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.53	SW	3285	OCC	1,754	
35A	Rm 308	4	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.36	SW	3285	OCC	1,169	
35A	Rm 308A	4	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.36	SW	8760	None	3,119	
35A	Rm 301	1	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.09	SW	8760	None	780	
41A	Closet 3rd Floor	1	**4' 1-LAMP T-8 (32W)**	F41ILL	31	0.03	SW	500	None	16	
175A	Attic	9	**4' 2-LAMP T-8 (32W)**	F42ILL	59	0.53	SW	2125	OCC	1,128	
146	Exterior	3	**High Bay MH 400**	MH400/1	458	1.37	SW	500	None	687	
9A	Exterior	2	**High Bay MH 200 35 Feet High**	MH200/1	232	0.46	SW	2000	OCC	928	
	Total	**347**				**22.77**				**52,614**	

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	HVAC Condensing Boilers Addition	66,800	600	111.3	3,000	106.3	
ECM-2	Replace Domestic Water Heater (DWH)	4,900	2,000	2.5	200	2.4	X
ECM-3	HVAC Install Speed Frequency Drives, High Efficiency Motors	25,900	1,200	21.6	2,000	19.9	
ECM-4	HVAC Building Automation System Upgrade / Re-placement	4,800	500	9.6	0	9.6	X
ECM-5	Air Handlers Replacement	35,400	900	39.3	0	39.3	
ECM-6	Cooling Tower Replacement	34,800	900	38.7	0	38.7	
ECM-7	Lighting Replacement Upgrades	6,481	400	16.2	2,167	10.8	X
ECM-8	Lighting Controls Installation (Occupancy Sensors)	4,026	1,500	2.7	580	2.3	X
ECM-9	Lighting Replacements with Lighting Controls (Occupancy Sensors)	10,507	1,800	5.8	2,747	4.3	X

Camden County College Blackwood Campus- NJBPU
CHA Project #24364
Jefferson Hall

ECM Summary Sheet

ECM-1 HVAC Condensing Boilers Addition

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
66,800	0	0	800	600	0	600	(0.8)	3,000	>20	>20

ECM-2 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	11,100	10	320	2,000	0	2,000	3.9	200	2.5	2.4

ECM-3 HVAC Install Speed Frequency Drives, High Efficiency Motors

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
25,900	9,300	0	0	1,200	0	1,200	-0.1	2,000	>20	19.9

ECM-4 HVAC Building Automation System Upgrade / Re-placement

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
4,800	2,220	0	290	500	0	500	0.1	0	9.6	9.6

ECM-5 Air Handlers Replacement

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
35,400	6,680	0	0	900	0	900	(0.6)	0	>20	>20

ECM-6 Cooling Tower Replacement

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
34,800	7,040	0	0	900	0	900	(0.5)	0	>20	>20

ECM-7 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
6,481	2,500	2	0	400	0	400	0.0	2,167	16.2	10.8

ECM-8 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
4,026	11,700	0	0	1,500	0	1,500	4.7	580	2.7	2.3

ECM-9 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
10,507	13,900	0	0	1,800	0	1,800	1.6	2,747	5.8	4.3

Camden County College Blackwood Campus- NJBPU
CHA Project #24364

Utility Costs		Yearly Usage	MTCDE	Building Area	Annual Utility Cost	
$ 0.131	$/kWh blended		0.00042021	9,500	Electric	Natural Gas
$ 0.119	$/kWh consumpt	92,544	0.00042021		$12,357	$2,752
$ 5.94	$/kW	33	0			
$ 0.80	$/Therm	3,869	0.00533471			
$ -	$/kgals	-	0			

Jefferson Hall

	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	HVAC Condensing Boilers Addition	0.0	0	800	0	0	$ 600	$ 66,800	111.3	4.3	25	$ 3,000	Y	$ 46,800	$ 3,000	106.3	0	0	20,000	0	0	$ 16,000	(0.8)
ECM-2	Replace Domestic Water Heater (DWH)	6.0	11,100	320	0	0	$ 2,000	$ 4,900	2.5	6.4	12	$ 200	Y	$ 3,400	$ 200	2.4	72	133,200	3,840	0	0	$ 24,000	3.9
ECM-3	HVAC Install Speed Frequency Drives, High Efficiency Motors	0.0	9,300	0	0	0	$ 1,200	$ 25,900	21.6	3.9	20	$ 2,000		$ -	$ 2,000	19.9	0	186,000	0	0	0	$ 24,400	(0.1)
ECM-4	HVAC Building Automation System Upgrade / Re-placement	0.0	2,221	294	0	0	$ 500	$ 4,800	9.6	2.5	10			$ -	$ -	9.6	0	22,211	2,940	0	0	$ 5,300	0.1
ECM-5	Air Handlers Replacement	0.0	6,678	0	0	0	$ 900	$ 35,400	39.3	2.8	15			$ -	$ -	39.3	0	100,169	0	0	0	$ 13,200	(0.6)
ECM-6	Cooling Tower Replacement	0.0	7,038	0	0	0	$ 900	$ 34,800	38.7	3.0	20			$ -	$ -	38.7	0	140,752	0	0	0	$ 18,500	(0.5)
ECM-7	Lighting Replacement Upgrades	2.1	2,500	0	0	0	$ 400	$6,481	16.2	1.1	15	$ 2,167		$ -	$ 2,167	10.8	31	37,500	0	0	0	$ 6,700	0.0
ECM-8	Lighting Controls Installation (Occupancy Sensors)	0.0	11,700	0	0	0	$ 1,500	$4,026	2.7	4.9	15	$ 580		$ -	$ 580	2.3	0	175,500	0	0	0	$ 23,100	4.7
ECM-9	Lighting Replacements with Lighting Controls (Occupancy Sensors)	2.1	13,900	0	0	0	$ 1,800	$10,507	5.8	5.8	15	$ 2,747	Y	$ 7,400	$ 2,747	4.3	31	208,500	0	0	0	$ 26,900	1.6
Total (Does Not Include ECM-5 & ECM-6)		**8.1**	**50,236.6**	**1,414.0**	**0.0**	**0.0**	**7,900.0**	**183,107.2**	`=J22/I22		17	$ 7,947		$ 57,600	$ 7,947	22.2	**103.1**	**790,831**	**26,780**	**0**	**0**	**$ 128,300**	(0.3)
Total Measures with Positive ROI		**8.1**	**27,221.1**	**614.0**	**0.0**	**0.0**	**4,300.0**	**20,207.2**	4.7		13.4	$ 2,947		$ 10,800	$ 2,947	4.0	**103.1**	**363,911**	**6,780**	**0**	**0**	**$ 56,200**	1.8
% of Existing		**25%**	**54%**	**37%**	**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

Camden County College Blackwood Campus- NJBPU
CHA Project #24364
Jefferson Hall

ECM-1: HVAC Condensing Boiler Added

ECM Description Summary

One (1) high efficiency condensing boiler will be added to operate as the primary boiler during the milder winter months (October-November and March-April) with the existing boilers operating as secondary boilers. Boiler installation location/space to be determined since there is not enough room in the existing boiler room. Space may have to be provided in existing building or constructed if boiler cannot fit in exsiting mechanical space.

Existing Fuel Nat.Gas
Proposed Fuel Nat.Gas

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	$ 0.80	/ Therm	
Proposed Fuel Cost	$ 0.80	/ Therm	
Baseline Fuel Use	3,869	Therms	Based on historical utility data.
Existing Boiler Plant Efficiency	72%		Estimated or Measured
Baseline Boiler Load	278,538	Mbtu/yr	Baseline Fuel Use x Existing Efficiency x 100 Mbtu/Therms
Baseline Fuel Cost	$ 3,091		
Proposed Boiler Plant Efficiency	92%		New Condensing Boiler Efficiency
Proposed Fuel Use	3,028	Therms	Baseline Boiler Load / Proposed Efficiency / 100 Mbtu/Therms
Proposed Fuel Cost	$ 2,419		
Annual Utility Savings	**800**	**Therms**	
Annual Savings	$ 700		
Boiler Addition Project Cost	**$ 66,800**		
Simple Payback	95	Years	Negative number indicates

Camden County College Blackwood Campus- NJBPU
CHA Project #24364
Jefferson Hall

ECM-1: HVAC Condensing Boiler Added - 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.		
3,000 MBH NG Condensing Boiler	1	EA	$ 4,150	$ 2,125		$ 4,565	$ 2,869	$ -	$ 7,400	
Flue Installation	25	LF	$ 75.0	$ 15.00		$ 2,063	$ 506	$ -	$ 2,600	
Reprogram DDC system	1	EA	$ 100.0	$ 350.00		$ 110	$ 473	$ -	$ 600	
Miscellaneous Electrical	1	LS	$ 500	$ 250		$ 550	$ 338	$ -	$ 900	
Miscellaneous HW Piping	1	LS	$ 2,000	$ 1,000		$ 2,200	$ 1,350	$ -	$ 3,600	
Boiler room/space construction	1	LS	$ 20,000	$ 10,000		$ 22,000	$ 13,500	$ -	$ 35,500	

$ 50,600	Subtotal
$ 5,060	10% Contingency
$ 11,132	20% Contractor O&P
$ -	0% Engineering
$ 66,800	**Total**

Camden County College Blackwood Campus- NJBPU
CHA Project #24364
Jefferson Hall

ECM-2: 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 tank-type, high efficiency condensing hot water heater.

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	130	˚F	
Hot Water Usage per day	197	gal/day	Calculated from usage below
Annual Hot Water Energy Demand	29,847	MBTU/yr	Energy required to heat annual quantity of hot water to setpoint
Existing Tank Size	40	Gallons	Per manufacturer nameplate
Hot Water Temperature	130	˚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)	0.5	MBH	
Annual Standby Hot Water Load	4,380	MBTU/yr	
Total Annual Hot Water Demand (w/ standby losses)	34,227	Mbtu/yr	Building demand plus standby losses
Existing Water Heater Efficiency	90%		Per Manufacturer
Total Annual Energy Required	38,030	Mbtu/yr	
Total Annual Electric Required	**11,100**	**kWh/yr**	**Electrical Savings**
Average Annual Electric Demand	1.27	kW	
Peak Electric Demand	**6.00**	**kW**	**Per Manufacturer's Nameplate (Demand Savings)**
New Tank Size	0	Gallons	Based on Rinnai tankless water heater
Hot Water Temperature	130	˚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)	29,847	MBTU/yr	
Proposed Avg. Hot water heater efficiency	92%		Based on Rinnai instantaneous, tankless DHW heater
Proposed Total Annual Energy Required	32,443	MBTU/yr	
Proposed Fuel Use	**320**	**Therms/yr**	Standby Losses and inefficient DHW heater eliminated
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	$1,744	$/yr	
Proposed Operating Cost of DHW	$256	$/yr	
Annual Utility Cost Savings	**$1,489**	**$/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	1	1			0	75%	0
KITCHEN SINK	2.5	0.5	1	1	2		3	75%	2
MOP SINK	2.5	2	1	1	2		10	75%	8
Dishwasher (gal per u	10	1	1	0			0	100%	0
						TOTAL	388		**197**

*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).

Camden County College Blackwood Campus- NJBPU
CHA Project #24364
Jefferson Hall

ECM-2: Replace Electric & Gas-Fired DHW Heaters 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	$ -	$ 100	
High Efficiency Gas-Fired tankless DHW Heater	1	EA	$ 1,200	$ 300		$ 1,320	$ 405	$ -	$ 1,700	
Miscellaneous Electrical	1	EA	$ 50	$ 100		$ 55	$ 135	$ -	$ 200	
Venting Kit	1	EA	$ 450	$ 650		$ 495	$ 878	$ -	$ 1,400	
Miscellaneous Piping and Valves	1	LS	$ 300			$ 330	$ -	$ -	$ 300	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 3,700	Subtotal
$ 370	10% Contingency
$ 814	20% Contractor O&P
$ -	0% Engineering
$ 4,900	**Total**

Camden County College Blackwood Campus- NJBPU
CHA Project #24364
Jefferson Hall

ECM-3A: Install Variable Speed Drives - CHW Pump

Variable Inputs

Blended Electric Rate	$0.13
Heating System "On" Point	55
VFD Efficiency	98.5%

ECM Description Summary

Larger motors that operate pumps unnecessarily consume electrical energy. The hot water system pumps operate at a constant speed even though the building load does not require all of the flow to maintain temperatures. By adding speed controllers to the motors, called Variable Frequency Drives (VFD's), and reducing the flow (by slowing the motors down), significant electrical energy can be saved. Pressure actuated controllers are used to measure the water pressure in the hto water system and as valves close, the system pressure increases and in turn the pump speed is reduced.

PUMP SCHEDULE

Pump ID	Qty	HP	Total HP	Existing Motor Motor Eff.	New Motor Motor Eff.	Exist. Motor kW Note 1	New Motor kW Note 2
CP-1, CP-2	2	5.0	10.0	87.5%	89.5%	6.82	6.67
					Total:	6.82	6.67

SAVINGS ANALYSIS

OAT - DB Avg Temp F	OAT - WB Avg 120	Annual Hours in Bin	Cooling Hours Bin	Pump Load %	Existing Pump kWh	Proposed Pump kW	Speed efficiency %	Proposed Pump kWh	Proposed Savings kWh
(A) See Note 3	(B) See Note 3	(C) See Note 3	(D) =IF(A>TP,0,C)	(E) =0.5+0.5* (50-A)/(50-10)) See Note 4	(F) =D*AA	(G) =BB*E^2.5/CC See Note 5	(H)	(I) =D*G	(J) =F-H
97.5	75	3	3	100%	20	6.8	99.0%	21	0
92.5	74	34	34	98%	232	6.4	99.6%	218	14
87.5	72	131	131	95%	893	6.0	100.0%	782	111
82.5	69	500	500	93%	3,410	5.6	100.0%	2,787	623
77.5	67	620	620	90%	4,229	5.2	100.0%	3,221	1,008
72.5	64	664	664	87%	4,529	4.8	100.0%	3,207	1,321
67.5	62	854	854	85%	5,825	4.5	100.0%	3,828	1,997
62.5	58	927	927	82%	6,323	4.1	100.0%	3,846	2,476
57.5	53	600	600	80%	4,092	3.8	99.6%	2,309	1,783
52.5	47	610	0	0%	0	0.0	0.0%	0	0
47.5	43	611	0	0%	0	0.0	0.0%	0	0
42.5	38	656	0	0%	0	0.0	0.0%	0	0
37.5	34	1,023	0	0%	0	0.0	0.0%	0	0
32.5	30	734	0	0%	0	0.0	0.0%	0	0
27.5	25	334	0	0%	0	0.0	0.0%	0	0
22.5	20	252	0	0%	0	0.0	0.0%	0	0
17.5	16	125	0	0%	0	0.0	0.0%	0	0
12.5	11	47	0	0%	0	0.0	0.0%	0	0
7.5	6	22	0	0%	0	0.0	0.0%	0	0
2.5	2	13	0	0%	0	0.0	0.0%	0	0
-2.5	-3	0	0	0%	0	0.0	0.0%	0	0
-7.5	-8	0	0	0%	0	0.0	0.0%	0	0
		8,760	4,333		29,554			20,219	9,334

Notes:

1) Existing motor power based on operation with existing motor efficiency, operating at 80% load factor when at full load. Formula: Motor HP x 0.746 x 0.8 / Exist. Motor Eff., New motor power is based on same formula using the new motor efficiency.
2) New motor power is the same as existing motor power adjusted for the new efficiency, if a new motor is proposed.
3) Weather data from NOAA for Newark, New Jersey.
4) The pump load is estimated at 100% at X deg. OAT and 50% at X deg. OAT and varies linearly in between.
5) The required VFD motor draw is based on a 2.5 power relationship to load.

Annual Utility Savings	9,300	kWh
Annual Savings	$ 1,222	
Install Variable Speed Drives	$ 25,900	
- CHW Pump Cost		
Simple Payback	21	Years

Camden County College Blackwood Campus- NJBPU
CHA Project #24364
Jefferson Hall

ECM-3A: Install Variable Speed Drives - CHW Pump - 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.		
						$ -	$ -	$ -	$ -	
5.0 HP VFD	2	ea	$ 1,485	$ 490		$ 3,267	$ 1,323	$ -	$ 4,600	
5.0 HP Motors	2	ea	$ 525	$ 85		$ 1,155	$ 230	$ -	$ 1,400	
Reprogram DDC system	2	ea	$ 100	$ 350		$ 220	$ 945	$ -	$ 1,200	
Electrical - misc.	2	ls	$ 200	$ 150		$ 440	$ 405	$ -	$ 800	
2-way or 3-way control valve(s) for system sequence	2	ea	$ 1,000	$ 2,000		$ 2,200	$ 5,400	$ -	$ 7,600	
Pipe pressure sensor/transmitter	2	ea	$ 850	$ 500		$ 1,870	$ 1,350	$ -	$ 3,200	
Misc. piping modification	2	ea	$ 200	$ 150		$ 440	$ 405	$ -	$ 800	
						$ -	$ -	$ -	$ -	

$ 19,600	Subtotal
$ 1,960	10% Contingency
$ 4,312	20% Contractor O&P
$ -	0% Engineering
$ 25,900	**Total**

Camden County College Blackwood Campus- NJBPU
CHA Project #24364
Jefferson Hall

ECM-4: 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.

9,500 Sq Footage

EXISTING CONDITIONS		
Existing Facility Total Electric usage	92,544	kWh
Existing Facility Total Gas usage	3,869	Therms
Existing Facility Cooling Electric usage	22,211	kWh[1]
Existing Facility Heating Natural Gas usage	2940	Therms[2]
PROPOSED CONDITIONS		
Proposed Facility Cooling Electric Usage	19,990	kWh
Proposed Facility Natural Gas Usage	2,646	Therms
SAVINGS		
Retro-Commissioning Electric Savings	2,221	**kWh**
Retro-Commissioning Natural Gas Savings	294	**Therms**
Total cost savings	$ 527	
Estimated Total Project Cost	$ 4,800	[4]
Simple Payback	9.1	**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		Based on $0.50 / Sq Ft recommissioning cost

Camden County College Blackwood Campus- NJBPU
CHA Project #24364
Jefferson Hall

ECM-5: Air Handlers Replacement - Install Variable Speed Drives

UNIT	HP	Existing Motor Eff (Note 1)	New Motor Eff (Note 1)	Existing Motor kW	New Motor kW		Building Balance Point
AHU-1	1.0	85.0%	94.0%	0.70	0.63		55.0
AHU-1	1.0	85.0%	94.0%	0.70	0.63		
MAU-1	2	85.0%	94.0%	1.40	1.27		
				2.81	2.54	VFD Eff. (CC)	98.5%

OAT - DB Avg Temp F	Bin Hours	Occupied Hours in Bin	AHU Hours in Bin	Existing Fan Kw	Existing Fan kWh	Fan Load %	Proposed Fan kW	Speed efficiency %	Proposed Fan kWh	Savings Fan kWh
(A)	(B)	(C)	(D)	(F)	(F)	(E)	(G)	(H)	(I)	(J)
102.5	0	0	0	2.8	0	50%	0.32	81.5%	0	0
97.5	6	2	2	2.8	6	50%	0.32	81.5%	1	5
92.5	45	16	16	2.8	45	50%	0.32	81.5%	6	39
87.5	146	52	52	2.8	147	50%	0.32	81.5%	21	126
82.5	298	106	106	2.8	299	50%	0.32	81.5%	42	257
77.5	476	170	170	2.8	478	50%	0.32	81.5%	67	410
72.5	662	237	237	2.8	664	50%	0.32	81.5%	94	571
67.5	740	264	264	2.8	743	50%	0.32	81.5%	105	638
62.5	765	273	273	2.8	768	50%	0.32	81.5%	108	660
57.5	733	262	262	2.8	736	50%	0.32	81.5%	104	632
52.5	668	239	239	2.8	670	52%	0.37	83.7%	105	565
47.5	659	235	235	2.8	661	57%	0.47	87.6%	127	534
42.5	685	245	245	2.8	687	61%	0.60	91.1%	160	527
37.5	739	264	264	2.8	742	66%	0.74	94.0%	207	534
32.5	717	256	256	2.8	719	70%	0.90	96.3%	240	480
27.5	543	194	194	2.8	545	75%	1.09	98.2%	215	330
22.5	318	114	114	2.8	319	80%	1.30	99.5%	148	171
17.5	245	88	88	2.8	246	84%	1.53	100.0%	134	112
12.5	156	56	56	2.8	157	89%	1.80	100.0%	100	56
7.5	92	33	33	2.8	92	93%	2.09	100.0%	69	24
2.5	36	13	13	2.8	36	98%	2.41	99.6%	31	5
-2.5	19	7	7	2.8	19	100%	2.58	99.0%	18	1
-7.5	8	3	3	2.8	8	100%	2.58	99.0%	7	1
TOTALS		**3,129**	**3,129**	**65**	**8,786**				**2,109**	**6,678**

Notes:

1) Existing motor power based on operation with existing motor efficiency, operating at 80% load factor when at full load. Formula: Motor HP x 0.746 x 0.8 / Exist. Motor Eff., New motor power is based on same formula using the new motor efficiency.
2) Weather data from NOAA for Concord, MA
3) Occupied & AHU Bin Hours are based upon existing schedule.
4) The required VFD motor power draw is based on a 3.0 power relationship to load, since system static pressure will not be controlled.

INSTALL VARIABLE SPEED DRIVES - SAVINGS SUMMARY					
	Electric Demand	Electric Usage	Nat Gas Usage	Maint.	Total Cost
	(kW)	(kWh)	(Therms)	($)	($)
Savings	**0**	**6,678**	**0**	**$0**	**$878**

Camden County College Blackwood Campus- NJBPU
CHA Project #24364
Jefferson Hall

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

ECM-5: Air Handlers Replacement Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
1.0 HP VFD	2	ea	$ 1,575	$ -	$ -	$ 3,465	$ -	$ -	$ 3,500	
1.0 HP Motors	2	ea	$ 245	$ 79	$ -	$ 539	$ 213	$ -	$ 800	
Reprogram DDC system	2	ea	$ 100	$ 350	$ -	$ 220	$ 945	$ -	$ 1,200	
Electrical - misc.	2	ls	$ 200	$ 150	$ -	$ 440	$ 405	$ -	$ 800	
2-way or 3-way control valve(s) for system sequence	2	ea	$ 1,000	$ 2,000	$ -	$ 2,200	$ 5,400	$ -	$ 7,600	
Pipe pressure sensor/transmitter	2	ea	$ 850	$ 500	$ -	$ 1,870	$ 1,350	$ -	$ 3,200	
Misc. piping modification	2	ea	$ 200	$ 150	$ -	$ 440	$ 405	$ -	$ 800	
2.0 HP VFD	1	ea	$ 1,575	$ -	$ -	$ 1,733	$ -	$ -	$ 1,700	
2.0 HP Motors	1	ea	$ 295	$ 79	$ -	$ 325	$ 107	$ -	$ 400	
Reprogram DDC system	1	ea	$ 100	$ 350	$ -	$ 110	$ 473	$ -	$ 600	
Electrical - misc.	1	ls	$ 200	$ 150	$ -	$ 220	$ 203	$ -	$ 400	
2-way or 3-way control valve(s) for system sequence	1	ea	$ 1,000	$ 2,000	$ -	$ 1,100	$ 2,700	$ -	$ 3,800	
Pipe pressure sensor/transmitter	1	ea	$ 850	$ 500	$ -	$ 935	$ 675	$ -	$ 1,600	
Misc. piping modification	1	ea	$ 200	$ 150	$ -	$ 220	$ 203	$ -	$ 400	
						$ -	$ -	$ -	$ -	

$	26,800	Subtotal
$	2,680	10% Contingency
$	5,896	20% Contractor O&P
$	-	0% Engineering
$	**35,400**	**Total**

Camden County College Blackwood Campus- NJBPU
CHA Project #24364
Jefferson Hall

ECM-6: Cooling Tower Replacement - Install Variable Speed Drives

Older Cooling towers supply constant volume air regardless of outside temperature. Modern cooling towers incorporate Variable Frequency Drives (VFD's) to reduce the air flow by slowing the motors down when less cooling capacity is needed, significant electrical energy can be saved. The fan motors will also be replaced with a premium efficiency motor. System static pressure will be permitted to float with fan speed, and pressure will not be controlled or monitored. Control strategy is to program the EMCS system to permit the CT fan to ramp speed linearly between 100% and 50% as OAT varies between the design cooling load and building balance point.

UNIT	Existing Motor HP	Existing Motor Eff (Note 1)	New Motor HP	New Motor Eff (Note 1)	Existing Motor kW	New Motor kW		Building Balance Point
CT-1	5.0	87.5%	7.5	91.0%	3.41	4.92		55.0
					3.41	4.92	VFD Eff. (CC)	98.5%

OAT - DB Avg Temp F	Bin Hours	Occupied Hours in Bin	AHU Hours in Bin	Existing Fan Kw	Existing Fan kWh	Fan Load %	Proposed Fan kW	Speed efficiency %	Proposed Fan kWh	Savings Fan kWh
(A)	(B)	(C)	(D)	(F)	(F)	(E)	(G)	(H)	(I)	(J)
102.5	0	0	0	3.4	0	100%	4.99	99.0%	0	0
97.5	6	2	2	3.4	7	100%	4.99	99.0%	11	-4
92.5	45	16	16	3.4	55	94%	4.16	100.0%	67	-12
87.5	146	52	52	3.4	178	88%	3.43	100.0%	179	-1
82.5	298	106	106	3.4	363	82%	2.79	100.0%	297	66
77.5	476	170	170	3.4	580	76%	2.23	98.7%	385	195
72.5	662	237	237	3.4	807	71%	1.76	96.4%	431	376
67.5	740	264	264	3.4	902	65%	1.35	93.2%	384	518
62.5	765	273	273	3.4	932	59%	1.02	89.2%	311	621
57.5	733	262	262	3.4	893	53%	0.74	84.3%	230	663
52.5	668	239	239	3.4	814	50%	0.62	81.5%	183	631
47.5	659	235	235	3.4	803	50%	0.62	81.5%	180	623
42.5	685	245	245	3.4	835	50%	0.62	81.5%	187	647
37.5	739	264	264	3.4	900	50%	0.62	81.5%	202	698
32.5	717	256	256	3.4	874	50%	0.62	81.5%	196	677
27.5	543	194	194	3.4	662	50%	0.62	81.5%	149	513
22.5	318	114	114	3.4	387	50%	0.62	81.5%	87	300
17.5	245	88	88	3.4	299	50%	0.62	81.5%	67	231
12.5	156	56	56	3.4	190	50%	0.62	81.5%	43	147
7.5	92	33	33	3.4	112	50%	0.62	81.5%	25	87
2.5	36	13	13	3.4	44	50%	0.62	81.5%	10	34
-2.5	19	7	7	3.4	23	50%	0.62	81.5%	5	18
-7.5	8	3	3	3.4	10	50%	0.62	81.5%	2	8
TOTALS		**3,129**	**3,129**	**78**	**10,669**				**3,632**	**7,038**

Notes:

1) Existing motor power based on operation with existing motor efficiency, operating at 80% load factor when at full load. Formula: Motor HP x 0.746 x 0.8 / Exist. Motor Eff., New motor power is based on same formula using the new motor efficiency.
2) Weather data from NOAA for Concord, MA
3) Occupied & AHU Bin Hours are based upon existing schedule.
4) The required VFD motor power draw is based on a 3.0 power relationship to load, since system static pressure will not be controlled.

INSTALL VARIABLE SPEED DRIVES - SAVINGS SUMMARY					
	Electric Demand	Electric Usage	Nat Gas Usage	Maint.	Total Cost
	(kW)	(kWh)	(Therms)	($)	($)
Savings	**0**	**7,038**	**0**	**$0**	**$925**

Camden County College Blackwood Campus- NJBPU
CHA Project #24364
Jefferson Hall

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

ECM-6: Cooling Tower Replacement - Install Variable Speed Drives

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Cooling Tower - 60 Ton Capacity	1	ea	$ 16,800	$ 818	$ -	$ 18,480	$ 1,104	$ -	$ 19,584	
Reprogram DDC system	1	ea	$ 100	$ 350	$ -	$ 110	$ 473	$ -	$ 600	
Electrical - misc.	1	ls	$ 200	$ 150	$ -	$ 220	$ 203	$ -	$ 400	
2-way or 3-way control valve(s) for system sequence	1	ea	$ 1,000	$ 2,000	$ -	$ 1,100	$ 2,700	$ -	$ 3,800	
Pipe pressure sensor/transmitter	1	ea	$ 850	$ 500	$ -	$ 935	$ 675	$ -	$ 1,600	
Misc. piping modification	1	ea	$ 200	$ 150	$ -	$ 220	$ 203	$ -	$ 400	
						$ -	$ -	$ -	$ -	

$ 26,384	Subtotal
$ 2,638	10% Contingency
$ 5,804	20% Contractor O&P
$ -	0% Engineering
$ 34,800	**Total**

ECM-5 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
$6,481	**2.1**	**2,500**	**0**	**$476**	**0**	**$476**	**$2,167**	**13.6**	**9.1**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-6 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
$4,026	**0.0**	**11,700**	**0**	**$1,538**	**0**	**$1,538**	**$580**	**2.6**	**2.2**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-7 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
$10,507	**2.1**	**13,900**	**0**	**$1,975**	**0**	**$1,975**	**$2,747**	**5.3**	**3.9**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

Energy Audit of Camden County College (Jefferson Hall)

CHA Project No. 24364

ECM-5 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
209A	Men's Bathroom 1st Floor	7	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	2500	1,033	7	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	2,500	1,033	-	0.0	$ -	$ -			
209A	Corridor 1st Floor	13	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.8	SW	2500	1,918	13	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.8	SW	2,500	1,918	-	0.0	$ -	$ -	$325		
227	South Fourier	6	W60CF1	F81EL	60	0.4	SW	2500	900	6	CF42W	CF42/1-L	48	0.3	SW	2,500	720	180	0.1	$ 28.79	$ 1,080.00		37.5	37.5
209A	Women's Bathroom 1st Floor	7	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	2125	878	7	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	2,125	878	-	0.0	$ -	$ -			
209A	Rm 114 - Dean's Office - Reception	12	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.7	SW	2125	1,505	12	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.7	SW	2,125	1,505	-	0.0	$ -	$ -			
209A	Rm 112 - Storage	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	SW	2125	251	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	SW	2,125	251	-	0.0	$ -	$ -	$50		
209A	Rm 113 - Office	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	SW	2500	295	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	SW	2,500	295	-	0.0	$ -	$ -	$50		
209A	Dean's Office	6	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	2125	752	6	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	2,125	752	-	0.0	$ -	$ -			
209A	Rm 104 - Conference Room	6	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	2125	752	6	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	2,125	752	-	0.0	$ -	$ -	$150		
209A	Rm 111 - Constructing & Planning	15	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.9	SW	2125	1,881	15	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.9	SW	2,125	1,881	-	0.0	$ -	$ -			
209A	Rm 103 - Office	8	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.5	SW	2250	1,062	8	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.5	SW	2,250	1,062	-	0.0	$ -	$ -			
209A	Rm 110 - Office	9	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.5	SW	2250	1,195	9	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.5	SW	2,250	1,195	-	0.0	$ -	$ -			
209A	Rm 102 - Conference Room	12	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.7	SW	2125	1,505	12	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.7	SW	2,125	1,505	-	0.0	$ -	$ -			
209A	Kitchen 1st Floor	3	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	376	3	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2,125	376	-	0.0	$ -	$ -			
175A	Mechanical Room 1st Floor	2	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	SW	2125	251	2	4' 2-LAMP T-8	F42ILL	59	0.1	SW	2,125	251	-	0.0	$ -	$ -			
209A	North Vestibule	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	SW	2000	590	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	SW	2,000	590	-	0.0	$ -	$ -			
175A	Mechanical Room 2nd Floor	2	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	SW	2125	251	2	4' 2-LAMP T-8	F42ILL	59	0.1	SW	2,125	251	-	0.0	$ -	$ -			
209A	Restroom 2nd Floor	1	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	SW	2125	125	1	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	SW	2,125	125	-	0.0	$ -	$ -			
209A	Rm 217	7	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	2125	878	7	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	2,125	878	-	0.0	$ -	$ -			
209A	Corridor 2nd Floor	12	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.7	SW	2125	1,505	12	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.7	SW	2,125	1,505	-	0.0	$ -	$ -			
209A	Rm 202 - Office	6	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	2125	752	6	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	2,125	752	-	0.0	$ -	$ -			
209A	Rm 218 - Vestibule	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	SW	2125	627	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	SW	2,125	627	-	0.0	$ -	$ -	$125		
209A	Rm 221 - Math Skills	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	502	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2,125	502	-	0.0	$ -	$ -			
209A	Rm 220 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	502	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2,125	502	-	0.0	$ -	$ -			
209A	Rm 219 - Office	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	SW	2500	295	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	SW	2,500	295	-	0.0	$ -	$ -			
209A	Rm 203 - Allied Health	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	502	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2,125	502	-	0.0	$ -	$ -			
209A	Rm 206 - Office	3	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	376	3	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2,125	376	-	0.0	$ -	$ -			
209A	Rm 205 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	500	118	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	500	118	-	0.0	$ -	$ -	$100		
209A	Rm 204 - Office	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	SW	2125	251	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	SW	2,125	251	-	0.0	$ -	$ -			
209A	Rm 207 - Office	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	SW	2500	738	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	SW	2,500	738	-	0.0	$ -	$ -			
209A	Rm 208 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2500	590	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2,500	590	-	0.0	$ -	$ -	$100		
209A	Rm 209 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2500	590	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2,500	590	-	0.0	$ -	$ -	$100		
209A	Rm 210 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	502	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2,125	502	-	0.0	$ -	$ -			
209A	Rm 211 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	1062.5	251	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	1,063	251	-	0.0	$ -	$ -			
209A	Rm 222 - Office	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	SW	2125	627	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	SW	2,125	627	-	0.0	$ -	$ -			
209A	Rm 223 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	1062.5	251	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	1,063	251	-	0.0	$ -	$ -			
209A	Rm 224 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	1062.5	251	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	1,063	251	-	0.0	$ -	$ -			
209A	Rm 225 - Office	3	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	376	3	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2,125	376	-	0.0	$ -	$ -			
209A	Rm 226 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	500	118	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	500	118	-	0.0	$ -	$ -			
209A	Rm 227 - Office	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	SW	500	148	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	SW	500	148	-	0.0	$ -	$ -			
209A	Rm 228 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	500	118	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	500	118	-	0.0	$ -	$ -			
209A	Rm 229 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	502	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2,125	502	-	0.0	$ -	$ -			
209A	Rm 230 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	1062.5	251	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	1,063	251	-	0.0	$ -	$ -			
209A	Rm 231 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	502	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2,125	502	-	0.0	$ -	$ -			
209A	Rm 212 - Paramedic Science	6	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	1062.5	376	6	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	1,063	376	-	0.0	$ -	$ -	$42		
209A	Rm 215	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2250	531	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2,250	531	-	0.0	$ -	$ -			
209A	Rm 214	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2250	531	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2,250	531	-	0.0	$ -	$ -			
209A	Rm 213	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	SW	500	59	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	SW	500	59	-	0.0	$ -	$ -			
227	South Vestibule 2nd Floor	7	W60CF1	F81EL	60	0.4	SW	520	218	7	CF42W	CF42/1-L	48	0.3	SW	520	175	44	0.1	$ 11.73	$ 1,260.00		107.4	107.4
227	South Vestibule 3rd Floor	6	W60CF1	F81EL	60	0.4	SW	520	187	6	CF42W	CF42/1-L	48	0.3	SW	520	150	37	0.1	$ 10.05	$ 1,080.00		107.4	107.4
209A	South Stair Tower	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	520	123	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	520	123	-	0.0	$ -	$ -	$100		
209A	Corridor 3rd Floor	13	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.8	SW	500	384	13	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.8	SW	500	384	-	0.0	$ -	$ -			
23	Exit Signs	12	X 5 W CF 2	ECF5/2	20	0.2	SW	4380	1,051	12	LED1.5W	ELED1.5/1	1.5	0.0	SW	4,380	79	972	0.2	$ 143.62	$ 1,368.00		9.5	9.5
35A	Rm 317	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	SW	4380	1,559	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	SW	4,380	1,559	-	0.0	$ -	$ -			
35A	Rm 317A	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	SW	8760	3,119	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	SW	8,760	3,119	-	0.0	$ -	$ -			
35A	Rm 306	6	4' 3-LAMP T-8 (32W)	F43ILL	89	0.5	SW	8760	4,678	6	4' 3-LAMP T-8 (32W)	F43ILL	89	0.5	SW	8,760	4,678	-	0.0	$ -	$ -			
35A	Rm 305	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2,125	378	-	0.0	$ -	$ -	$50		
35A	Rm 315	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2,125	378	-	0.0	$ -	$ -	$50		
35A	Rm 314	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	500	89	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	500	89	-	0.0	$ -	$ -	$50		
35A	Men's Bathroom 3rd Floor	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	500	89	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	500	89	-	0.0	$ -	$ -	$50		
35A	Rm 313	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	8760	1,559	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	8,760	1,559	-	0.0	$ -	$ -	$50		
35A	Women's Bathroom 3rd Floor	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	500	89	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	500	89	-	0.0	$ -	$ -	$50		
35A	Rm 302	6	4' 3-LAMP T-8 (32W)	F43ILL	89	0.5	SW	3285	1,754	6	4' 3-LAMP T-8 (32W)	F43ILL	89	0.5	SW	3,285	1,754	-	0.0	$ -	$ -	$150		
35A	Rm 308	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	SW	3285	1,169	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	SW	3,285	1,169	-	0.0	$ -	$ -	$100		
35A	Rm 308A	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	SW	8760	3,119	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	SW	8,760	3,119	-	0.0	$ -	$ -	$100		
35A	Rm 301	1	4' 3-LAMP T-8 (32W)	F43ILL	89	0.1	SW	8760	780	1	4' 3-LAMP T-8 (32W)	F43ILL	89	0.1	SW	8,760	780	-	0.0	$ -	$ -			
41A	Closet 3rd Floor	1	4' 1-LAMP T-8 (32W)	F41ILL	31	0.0	SW	500	16	1	4' 1-LAMP T-8 (32W)	F41ILL	31	0.0	SW	500	16	-	0.0	$ -	$ -	$25		
175A	Attic	9	4' 2-LAMP T-8 (32W)	F42ILL	59	0.5	SW	2125	1,128	9	4' 2-LAMP T-8	F42ILL	59	0.5	SW	2,125	1,128	-	0.0	$ -	$ -	$225		
146	Exterior	3	High Bay MH 400	MH400/1	458	1.4	SW	500	687	3	P 54 C F 4	FC20	20	0.1	SW	500	30	657	1.3	$ 180.02	$ -	$75	0.0	-0.4
9A	Exterior	2	High Bay MH 200 35 Feet High	MH200/1	232	0.5	SW	2000	928	2	FXLED78	FXLED78/1	78	0.2	SW	2,000	312	616	0.3	$ 102.92	$ 1,693.20	$50	16.5	16.0
	Total	**347**				**22.8**			**52,614**	**347**			**4,382**	**20.7**				**50,107**	**2,506**	**2.1**	**$500**	**$6,481**	**$2,167**		
																		Demand Savings			**2.1**	**$148**			
																		kWh Savings			**2,500**	**$329**			
																		Total savings				**$476**		**13.6**	**9.1**

Energy Audit of Camden County College (Jefferson Hall)

CHA Project No. 24364

ECM-6 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
209A	Men's Bathroom 1st Floor	7	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	2500	1,032.5	7	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	None	2500	1,032.5	0.0	0.0	$0.00	$0.00	$0.00		
209A	Corridor 1st Floor	13	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.8	SW	2500	1,917.5	13	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.8	None	2500	1,917.5	0.0	0.0	$0.00	$0.00	$0.00		
227	South Fourier	6	W60CF1	F81EL	60	0.4	SW	2500	900.0	6	W60CF1	F81EL	60	0.4	None	2500	900.0	0.0	0.0	$0.00	$0.00	$0.00		
209A	Women's Bathroom 1st Floor	7	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	2125	877.6	7	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	C-OCC	1200	495.6	382.0	0.0	$50.21				
209A	Rm 114 - Dean's Office - Reception	12	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.7	SW	2125	1,504.5	12	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.7	C-OCC	1200	849.6	654.9	0.0	$86.07	$180.00	$35.00	1.2	1.0
209A	Rm 112 - Storage	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	SW	2125	250.8	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	C-OCC	1200	141.6	109.2	0.0	$14.35				
209A	Rm 113 - Office	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	SW	2500	295.0	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	None	2500	295.0	0.0	0.0	$0.00	$0.00	$0.00		
209A	Dean's Office	6	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	2125	752.3	6	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	OCC	1200	424.8	327.5	0.0	$43.04	$114.00	$20.00	2.6	2.2
209A	Rm 104 - Conference Room	6	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	2125	752.3	6	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	OCC	1200	424.8	327.5	0.0	$43.04	$114.00	$20.00	2.6	2.2
209A	Rm 111 - Constructing & Planning	15	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.9	SW	2125	1,880.6	15	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.9	OCC	1200	1,062.0	818.6	0.0	$107.59	$114.00	$20.00	1.1	0.9
209A	Rm 103 - Office	8	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.5	SW	2250	1,062.0	8	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.5	C-OCC	1000	472.0	590.0	0.0	$77.54	$180.00	$35.00	2.3	1.9
209A	Rm 110 - Office	9	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.5	SW	2250	1,194.8	9	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.5	C-OCC	1000	531.0	663.8	0.0	$87.24	$180.00	$35.00	2.1	1.7
209A	Rm 102 - Conference Room	12	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.7	SW	2125	1,504.5	12	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.7	OCC	1200	849.6	654.9	0.0	$86.07	$114.00	$20.00	1.3	1.1
209A	Kitchen 1st Floor	3	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	376.1	3	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	OCC	1200	212.4	163.7	0.0	$21.52	$114.00	$20.00	5.3	4.4
175A	Mechanical Room 1st Floor	2	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	SW	2125	250.8	2	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	OCC	1200	141.6	109.2	0.0	$14.35	$114.00	$20.00	7.9	6.6
209A	North Vestibule	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	SW	2000	590.0	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	OCC	1000	295.0	295.0	0.0	$38.77	$114.00	$0.00	2.9	2.9
175A	Mechanical Room 2nd Floor	2	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	SW	2125	250.8	2	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	OCC	1200	141.6	109.2	0.0	$14.35	$114.00	$20.00	7.9	6.6
209A	Restroom 2nd Floor	1	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	SW	2125	125.4	1	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	OCC	1200	70.8	54.6	0.0	$7.17	$114.00	$20.00	15.9	13.1
209A	Rm 217	7	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	2125	877.6	7	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	OCC	1200	495.6	382.0	0.0	$50.21	$114.00	$20.00	2.3	1.9
209A	Corridor 2nd Floor	12	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.7	SW	2125	1,504.5	12	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.7	OCC	1200	849.6	654.9	0.0	$86.07	$114.00	$20.00	1.3	1.1
209A	Rm 202 - Office	6	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	2125	752.3	6	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	OCC	1200	424.8	327.5	0.0	$43.04	$114.00	$20.00	1.4	1.2
209A	Rm 218 - Vestibule	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	SW	2125	626.9	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	OCC	1200	354.0	272.9	0.0	$35.86				
209A	Rm 221 - Math Skills	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	501.5	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	OCC	1200	283.2	218.3	0.0	$28.69	$114.00	$20.00	4.0	3.3
209A	Rm 220 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	501.5	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	OCC	1200	283.2	218.3	0.0	$28.69	$114.00	$20.00	4.0	3.3
209A	Rm 219 - Office	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	SW	2500	295.0	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	None	2500	295.0	0.0	0.0	$0.00	$0.00	$0.00		
209A	Rm 203 - Allied Health	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	501.5	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	OCC	1200	283.2	218.3	0.0	$28.69	$114.00	$20.00	4.0	3.3
209A	Rm 206 - Office	3	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	376.1	3	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	OCC	1000	177.0	199.1	0.0	$26.17	$114.00	$20.00	4.4	3.6
209A	Rm 205 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	500	118.0	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	None	500	118.0	0.0	0.0	$0.00	$0.00	$0.00		
209A	Rm 204 - Office	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	SW	2125	250.8	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	OCC	1200	141.6	109.2	0.0	$14.35	$114.00	$20.00	7.9	6.6
209A	Rm 207 - Office	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	SW	2500	737.5	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	None	2500	737.5	0.0	0.0	$0.00	$0.00	$0.00		
209A	Rm 208 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2500	590.0	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	None	2500	590.0	0.0	0.0	$0.00	$0.00	$0.00		
209A	Rm 209 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2500	590.0	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	None	2500	590.0	0.0	0.0	$0.00	$0.00	$0.00		
209A	Rm 210 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	501.5	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	OCC	1200	283.2	218.3	0.0	$28.69	$114.00	$0.00	4.0	4.0
209A	Rm 211 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	1062.5	250.8	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	None	1062.5	250.8	0.0	0.0	$0.00	$0.00	$0.00		
209A	Rm 222 - Office	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	SW	2125	626.9	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	OCC	1200	354.0	272.9	0.0	$35.86	$114.00	$20.00	3.2	2.6
209A	Rm 223 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	1062.5	250.8	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	None	1062.5	250.8	0.0	0.0	$0.00	$0.00	$0.00		
209A	Rm 224 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	1062.5	250.8	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	None	1062.5	250.8	0.0	0.0	$0.00	$0.00	$0.00		
209A	Rm 225 - Office	3	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	376.1	3	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	OCC	1200	212.4	163.7	0.0	$21.52	$114.00	$20.00	5.3	4.4
209A	Rm 226 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	500	118.0	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	None	500	118.0	0.0	0.0	$0.00	$0.00	$0.00		
209A	Rm 227 - Office	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	SW	500	147.5	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	None	500	147.5	0.0	0.0	$0.00	$0.00	$0.00		
209A	Rm 228 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	500	118.0	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	None	500	118.0	0.0	0.0	$0.00	$0.00	$0.00		
209A	Rm 229 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	501.5	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	OCC	1200	283.2	218.3	0.0	$28.69	$114.00	$20.00	4.0	3.3
209A	Rm 230 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	1062.5	250.8	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	None	1062.5	250.8	0.0	0.0	$0.00	$0.00	$0.00		
209A	Rm 231 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	501.5	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	OCC	1200	283.2	218.3	0.0	$28.69	$114.00	$0.00	4.0	4.0
209A	Rm 212 - Paramedic Science	6	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	1062.5	376.1	6	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	None	1062.5	376.1	0.0	0.0	$0.00	$0.00	$0.00		
209A	Rm 215	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2250	531.0	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	None	2250	531.0	0.0	0.0	$0.00	$0.00	$0.00		
209A	Rm 214	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2250	531.0	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	None	2250	531.0	0.0	0.0	$0.00	$0.00	$0.00		
209A	Rm 213	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	SW	500	59.0	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	None	500	59.0	0.0	0.0	$0.00	$0.00	$0.00		
227	South Vestibule 2nd Floor	7	W60CF1	F81EL	60	0.4	SW	520	218.4	7	W60CF1	F81EL	60	0.4	None	520	218.4	0.0	0.0	$0.00	$0.00	$0.00		
227	South Vestibule 3rd Floor	6	W60CF1	F81EL	60	0.4	SW	520	187.2	6	W60CF1	F81EL	60	0.4	C-OCC	390	140.4	46.8	0.0	$6.15	$180.00	$35.00	29.3	23.6
209A	South Stair Tower	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	520	122.7	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	None	520	122.7	0.0	0.0	$0.00	$0.00	$0.00		
209A	Corridor 3rd Floor	13	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.8	SW	500	383.5	13	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.8	None	500	383.5	0.0	0.0	$0.00	$0.00	$0.00		
23	Exit Signs	12	X 5 W CF 2	ECF5/2	20	0.2	SW	4380	1,051.2	12	X 5 W CF 2	ECF5/2	20	0.2	None	4380	1,051.2	0.0	0.0	$0.00	$0.00	$0.00		
35A	Rm 317	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	SW	4380	1,559.3	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	None	4380	1,559.3	0.0	0.0	$0.00	$0.00	$0.00		
35A	Rm 317A	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	SW	8760	3,118.6	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	None	8760	3,118.6	0.0	0.0	$0.00	$0.00	$0.00		
35A	Rm 306	6	4' 3-LAMP T-8 (32W)	F43ILL	89	0.5	SW	8760	4,677.8	6	4' 3-LAMP T-8 (32W)	F43ILL	89	0.5	None	8760	4,677.8	0.0	0.0	$0.00	$0.00	$0.00		
35A	Rm 305	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378.3	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1200	213.6	164.7	0.0	$21.64	$114.00	$20.00	2.6	2.2
35A	Rm 315	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378.3	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1200	213.6	164.7	0.0	$21.64				
35A	Rm 314	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	500	89.0	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	500	89.0	0.0	0.0	$0.00	$0.00	$0.00		
35A	Men's Bathroom 3rd Floor	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	500	89.0	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	500	89.0	0.0	0.0	$0.00	$0.00	$0.00		
35A	Rm 313	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	8760	1,559.3	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	8760	1,559.3	0.0	0.0	$0.00	$0.00	$0.00		
35A	Women's Bathroom 3rd Floor	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	500	89.0	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	500	89.0	0.0	0.0	$0.00	$0.00	$0.00		
35A	Rm 302	6	4' 3-LAMP T-8 (32W)	F43ILL	89	0.5	SW	3285	1,754.2	6	4' 3-LAMP T-8 (32W)	F43ILL	89	0.5	OCC	1825	974.6	779.6	0.0	$102.47	$114.00	$20.00	1.1	0.9
35A	Rm 308	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	SW	3285	1,169.5	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	OCC	1825	649.7	519.8	0.0	$68.31	$114.00	$20.00	1.7	1.4
35A	Rm 308A	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	SW	8760	3,118.6	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	None	8760	3,118.6	0.0	0.0	$0.00	$0.00	$0.00		
35A	Rm 301	1	4' 3-LAMP T-8 (32W)	F43ILL	89	0.1	SW	8760	779.6	1	4' 3-LAMP T-8 (32W)	F43ILL	89	0.1	None	8760	779.6	0.0	0.0	$0.00	$0.00	$0.00		
41A	Closet 3rd Floor	1	4' 1-LAMP T-8 (32W)	F41ILL	31	0.0	SW	500	15.5	1	4' 1-LAMP T-8 (32W)	F41ILL	31	0.0	None	500	15.5	0.0	0.0	$0.00	$0.00	$0.00		
175A	Attic	9	4' 2-LAMP T-8 (32W)	F42ILL	59	0.5	SW	2125	1,128.4	9	4' 2-LAMP T-8 (32W)	F42ILL	59	0.5	OCC	1000	531.0	597.4	0.0	$78.51	$114.00	$0.00	1.5	1.5
146	Exterior	3	High Bay MH 400	MH400/1	458	1.4	SW	500	687.0	3	High Bay MH 400	MH400/1	458	1.4	None	500	687.0	0.0	0.0	$0.00	$0.00	$0.00		
9A	Exterior	2	High Bay MH 200 35 Feet High	MH200/1	232	0.5	SW	2000	928.0	2	High Bay MH 200 35 Feet High	MH200/1	232	0.5	OCC	1000	464.0	464.0	0.0	$60.98	$114.00	$0.00	1.9	1.9
	Total	**347**				**22.8**			**52,614**	**347**				**23**			**40,925**	**11,689**	**0**	**1,500**	**$4,026**	**580**		
																	Demand Savings			**0.0**	**$0**			
																	kWh Savings			**11,700**	**$1,538**			
																	Total Savings				**$1,538**		**2.6**	**2.2**

Energy Audit of Camden County College (Jefferson Hall)

CHA Project No. 24364

ECM-7 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
209A	Men's Bathroom 1st Floor	7	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	2500	1,033	7	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	None	2,500	1,033	-	0.0	$ -	$ -	$ -		
209A	Corridor 1st Floor	13	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.8	SW	2500	1,918	13	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.8	None	2,500	1,918	-	0.0	$ -	$ -	$ 325		
227	South Fourier	6	W60CF1	F81EL	60	0.4	SW	2500	900	6	CF42W	CF42/1-L	48	0.3	None	2,500	720	180	0.1	$ 28.79	$ 1,080.00	$ -	37.5	37.5
209A	Women's Bathroom 1st Floor	7	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	2125	878	7	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	C-OCC	1,200	496	382	0.0	$ 50.21	$ 180.00	$ 35	3.6	2.9
209A	Rm 114 - Dean's Office - Reception	12	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.7	SW	2125	1,505	12	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.7	C-OCC	1,200	850	655	0.0	$ 86.07	$ -	$ -	0.0	0.0
209A	Rm 112 - Storage	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	SW	2125	251	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	C-OCC	1,200	142	109	0.0	$ 14.35	$ -	$ 50	0.0	-3.5
209A	Rm 113 - Office	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	SW	2500	295	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	None	2,500	295	-	0.0	$ -	$ -	$ 50		
209A	Dean's Office	6	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	2125	752	6	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	OCC	1,200	425	327	0.0	$ 43.04	$ 114.00	$ 20	2.6	2.2
209A	Rm 104 - Conference Room	6	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	2125	752	6	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	OCC	1,200	425	327	0.0	$ 43.04	$ 114.00	$ 170	2.6	-1.3
209A	Rm 111 - Constructing & Planning	15	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.9	SW	2125	1,881	15	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.9	OCC	1,200	1,062	819	0.0	$ 107.59	$ 114.00	$ 20	1.1	0.9
209A	Rm 103 - Office	8	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.5	SW	2250	1,062	8	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.5	C-OCC	1,000	472	590	0.0	$ 77.54	$ 180.00	$ 35	2.3	1.9
209A	Rm 110 - Office	9	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.5	SW	2250	1,195	9	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.5	C-OCC	1,000	531	664	0.0	$ 87.24	$ 180.00	$ 35	2.1	1.7
209A	Rm 102 - Conference Room	12	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.7	SW	2125	1,505	12	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.7	OCC	1,200	850	655	0.0	$ 86.07	$ 114.00	$ 20	1.3	1.1
209A	Kitchen 1st Floor	3	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	376	3	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	OCC	1,200	212	164	0.0	$ 21.52	$ 114.00	$ 20	5.3	4.4
175A	Mechanical Room 1st Floor	2	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	SW	2125	251	2	4' 2-LAMP T-8	F42ILL	59	0.1	OCC	1,200	142	109	0.0	$ 14.35	$ 114.00	$ 20	7.9	6.6
209A	North Vestibule	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	SW	2000	590	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	OCC	1,000	295	295	0.0	$ 38.77	$ 114.00	$ -	2.9	2.9
175A	Mechanical Room 2nd Floor	2	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	SW	2125	251	2	4' 2-LAMP T-8	F42ILL	59	0.1	OCC	1,200	142	109	0.0	$ 14.35	$ 114.00	$ 20	7.9	6.6
209A	Restroom 2nd Floor	1	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	SW	2125	125	1	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	OCC	1,200	71	55	0.0	$ 7.17	$ 114.00	$ 20	15.9	13.1
209A	Rm 217	7	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	2125	878	7	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	OCC	1,200	496	382	0.0	$ 50.21	$ 114.00	$ 20	2.3	1.9
209A	Corridor 2nd Floor	12	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.7	SW	2125	1,505	12	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.7	OCC	1,200	850	655	0.0	$ 86.07	$ 114.00	$ 20	1.3	1.1
209A	Rm 202 - Office	6	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	2125	752	6	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	OCC	1,200	425	327	0.0	$ 43.04	$ 114.00	$ 20	2.6	2.2
209A	Rm 218 - Vestibule	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	SW	2125	627	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	OCC	1,200	354	273	0.0	$ 35.86	$ 114.00	$ 125	3.2	-0.3
209A	Rm 221 - Math Skills	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	502	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	OCC	1,200	283	218	0.0	$ 28.69	$ 114.00	$ 20	4.0	3.3
209A	Rm 220 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	502	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	OCC	1,200	283	218	0.0	$ 28.69	$ 114.00	$ 20	4.0	3.3
209A	Rm 219 - Office	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	SW	2500	295	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	None	2,500	295	-	0.0	$ -	$ -	$ -		
209A	Rm 203 - Allied Health	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	502	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	OCC	1,200	283	218	0.0	$ 28.69	$ 114.00	$ 20	4.0	3.3
209A	Rm 206 - Office	3	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	376	3	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	OCC	1,000	177	199	0.0	$ 26.17	$ 114.00	$ 20	4.4	3.6
209A	Rm 205 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	500	118	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	None	500	118	-	0.0	$ -	$ -	$ 100		
209A	Rm 204 - Office	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	SW	2125	251	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	OCC	1,200	142	109	0.0	$ 14.35	$ 114.00	$ 20	7.9	6.6
209A	Rm 207 - Office	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	SW	2500	738	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	None	2,500	738	-	0.0	$ -	$ -	$ -		
209A	Rm 208 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2500	590	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	None	2,500	590	-	0.0	$ -	$ -	$ 100		
209A	Rm 209 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2500	590	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	None	2,500	590	-	0.0	$ -	$ -	$ 100		
209A	Rm 210 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	502	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	OCC	1,200	283	218	0.0	$ 28.69	$ 114.00	$ -	4.0	4.0
209A	Rm 211 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	1062.5	251	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	None	1,063	251	-	0.0	$ -	$ -	$ -		
209A	Rm 222 - Office	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	SW	2125	627	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	OCC	1,200	354	273	0.0	$ 35.86	$ 114.00	$ 20	3.2	2.6
209A	Rm 223 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	1062.5	251	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	None	1,063	251	-	0.0	$ -	$ -	$ -		
209A	Rm 224 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	1062.5	251	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	None	1,063	251	-	0.0	$ -	$ -	$ -		
209A	Rm 225 - Office	3	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	376	3	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	OCC	1,200	212	164	0.0	$ 21.52	$ 114.00	$ 20	5.3	4.4
209A	Rm 226 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	500	118	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	None	500	118	-	0.0	$ -	$ -	$ -		
209A	Rm 227 - Office	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	SW	500	148	5	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.3	None	500	148	-	0.0	$ -	$ -	$ -		
209A	Rm 228 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	500	118	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	None	500	118	-	0.0	$ -	$ -	$ -		
209A	Rm 229 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	502	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	OCC	1,200	283	218	0.0	$ 28.69	$ 114.00	$ 20	4.0	3.3
209A	Rm 230 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	1062.5	251	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	None	1,063	251	-	0.0	$ -	$ -	$ -		
209A	Rm 231 - Office	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2125	502	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	OCC	1,200	283	218	0.0	$ 28.69	$ 114.00	$ -	4.0	4.0
209A	Rm 212 - Paramedic Science	6	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	SW	1062.5	376	6	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.4	None	1,063	376	-	0.0	$ -	$ -	$ 42		
209A	Rm 215	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2250	531	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	None	2,250	531	-	0.0	$ -	$ -	$ -		
209A	Rm 214	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	2250	531	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	None	2,250	531	-	0.0	$ -	$ -	$ -		
209A	Rm 213	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	SW	500	59	2	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.1	None	500	59	-	0.0	$ -	$ -	$ -		
227	South Vestibule 2nd Floor	7	W60CF1	F81EL	60	0.4	SW	520	218	7	CF42W	CF42/1-L	48	0.3	None	520	175	44	0.1	$ 11.73	$ 1,260.00	$ -	107.4	107.4
227	South Vestibule 3rd Floor	6	W60CF1	F81EL	60	0.4	SW	520	187	6	CF42W	CF42/1-L	48	0.3	C-OCC	390	112	75	0.1	$ 14.97	$ 1,260.00	$ 35	84.1	81.8
209A	South Stair Tower	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	SW	520	123	4	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.2	None	520	123	-	0.0	$ -	$ -	$ 100		
209A	Corridor 3rd Floor	13	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.8	SW	500	384	13	2' 2-LAMP T-8 (32W)	FU2ILL	59	0.8	None	500	384	-	0.0	$ -	$ -	$ -		
23	Exit Signs	12	X 5 W CF 2	ECF5/2	20	0.2	SW	4380	1,051	12	LED1.5W	ELED1.5/1	1.5	0.0	None	4,380	79	972	0.2	$ 143.62	$ 1,368.00	$ -	9.5	9.5
35A	Rm 317	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	SW	4380	1,559	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	None	4,380	1,559	-	0.0	$ -	$ -	$ -		
35A	Rm 317A	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	SW	8760	3,119	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	None	8,760	3,119	-	0.0	$ -	$ -	$ -		
35A	Rm 306	6	4' 3-LAMP T-8 (32W)	F43ILL	89	0.5	SW	8760	4,678	6	4' 3-LAMP T-8 (32W)	F43ILL	89	0.5	None	8,760	4,678	-	0.0	$ -	$ -	$ -		
35A	Rm 305	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1,200	214	165	0.0	$ 21.64	$ 114.00	$ 70	5.3	2.0
35A	Rm 315	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1,200	214	165	0.0	$ 21.64	$ 114.00	$ 50	5.3	3.0
35A	Rm 314	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	500	89	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	500	89	-	0.0	$ -	$ -	$ 50		
35A	Men's Bathroom 3rd Floor	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	500	89	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	500	89	-	0.0	$ -	$ -	$ 50		
35A	Rm 313	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	8760	1,559	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	8,760	1,559	-	0.0	$ -	$ -	$ 50		
35A	Women's Bathroom 3rd Floor	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	500	89	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	500	89	-	0.0	$ -	$ -	$ 50		
35A	Rm 302	6	4' 3-LAMP T-8 (32W)	F43ILL	89	0.5	SW	3285	1,754	6	4' 3-LAMP T-8 (32W)	F43ILL	89	0.5	OCC	1,825	975	780	0.0	$ 102.47	$ 114.00	$ 170	1.1	-0.5
35A	Rm 308	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	SW	3285	1,169	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	OCC	1,825	650	520	0.0	$ 68.31	$ 114.00	$ 120	1.7	-0.1
35A	Rm 308A	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	SW	8760	3,119	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	None	8,760	3,119	-	0.0	$ -	$ -	$ 100		
35A	Rm 301	1	4' 3-LAMP T-8 (32W)	F43ILL	89	0.1	SW	8760	780	1	4' 3-LAMP T-8 (32W)	F43ILL	89	0.1	None	8,760	780	-	0.0	$ -	$ -	$ -		
41A	Closet 3rd Floor	1	4' 1-LAMP T-8 (32W)	F41ILL	31	0.0	SW	500	16	1	4' 1-LAMP T-8 (32W)	F41ILL	31	0.0	None	500	16	-	0.0	$ -	$ -	$ 25		
175A	Attic	9	4' 2-LAMP T-8 (32W)	F42ILL	59	0.5	SW	2125	1,128	9	4' 2-LAMP T-8	F42ILL	59	0.5	OCC	1,000	531	597	0.0	$ 78.51	$ 114.00	$ 225	1.5	-1.4
146	Exterior	3	High Bay MH 400	MH400/1	458	1.4	SW	500	687	3	P 54 C F 4	FC20	20	0.1	None	500	30	657	1.3	$ 180.02	$ -	$ 75	0.0	-0.4
9A	Exterior	2	High Bay MH 200 35 Feet High	MH200/1	232	0.5	SW	2000	928	2	FXLED78	FXLED78/1	78	0.2	OCC	1,000	156	772	0.3	$ 123.42	$ 1,807.20	$ 50	14.6	14.2
	Total	**347**				**22.8**			**52,614**	**347**				**20.7**				**38,736**	**2.1**	**$2,000**	**$10,507**	**2,747**		
																		Demand Savings		**2.1**	**$148**			
																		kWh Savings		**13,900**	**$1,827**			
																		Total Savings			**$1,975**		**5.3**	**3.9**

APPENDIX D

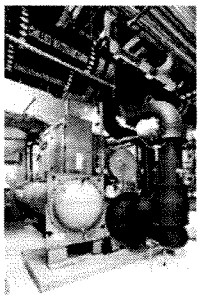
New Jersey Pay For Performance Incentive Program

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
Jefferson Hall

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)	9,500
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)	$12,357	$2,752
Existing Usage (from utility)	92,544	3,869
Proposed Savings	27,221	614
Existing Total MMBtus	703	
Proposed Savings MMBtus	154	
% Energy Reduction	**22.0%**	
Proposed Annual Savings	$4,300	

	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	$0.11	$1.25
Incentive #3	$0.09	$0.90	$0.005	$0.05	$0.11	$1.25	$0.11	$1.25

	Incentives $		
	Elec	Gas	Total
Incentive #1	$0	$0	$0
Incentive #2	$2,994	$766	$3,761
Incentive #3	$2,994	$766	$3,761
Total All Incentives	**$5,989**	**$1,532**	**$7,521**

Total Project Cost	$20,207

		Allowable Incentive
% Incentives #1 of Utility Cost*	0.0%	$0
% Incentives #2 of Project Cost**	18.6%	$3,761
% Incentives #3 of Project Cost**	18.6%	$3,761
Total Eligible Incentives***	**$7,521**	
Project Cost w/ Incentives	$12,686	

Project Payback (years)	
w/o Incentives	w/ Incentives
4.7	3.0

* 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
Jefferson Hall

Cost of Electricity	$0.131	/kWh
Electricity Usage	114,665	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
$40,000	**10.0**	**11,919**	**0**	**$1,561**	**0**	**$1,561**	**$0**	**$954**	**25.6**	**15.9**

** Estimated Solar Renewable Energy Certificate Program (SREC) SREC for 15 Years= $80 /1000kwh

Area Output*
339 m2
3,647 ft2

Perimeter Output*
58 m
190 ft

Available Roof Space for PV:
(Area Output - 10 ft x Perimeter) x 85%
1,485 ft2

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

11.5 watt/ft2
17,079 DC watts
10 kW Enter into PV Watts

PV Watts Inputs*

Array Tilt Angle	60	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
11,919 annual kWh calculated in PV Watts program

% Offset Calc

Usage	114,665	(from utilities)
PV Generation	11,919	(generated using PV Watts)
% offset	10%	

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

AC Energy & Cost Savings

Cautions for Interpreting the Results

Jefferson Hall (Camden County College)

Station Identification

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

PV System Specifications

DC Rating:	10.0 kW
DC to AC Derate Factor:	0.830
AC Rating:	8.30 kW
Array Type:	Fixed Tilt
Array Tilt:	60.0 °
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	3.41	894	117.11
2	3.96	934	122.35
3	4.76	1191	156.02
4	4.55	1071	140.30
5	4.47	1043	136.63
6	4.42	962	126.02
7	4.33	965	126.42
8	4.64	1047	137.16
9	4.81	1082	141.74
10	4.45	1077	141.09
11	3.50	851	111.48
12	3.15	802	105.06
Year	4.20	11919	1561.39

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

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

APPENDIX G

EPA Portfolio Manager

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Jefferson Hall

Building ID: 3251850
For 12-month Period Ending: April 30, 2012[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: November 08, 2012

Facility
Jefferson Hall
College Drive
Blackwood, NJ 08012

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1950
Gross Floor Area (ft²): 9,495

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

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	586,192
Natural Gas (kBtu)[4]	411,671
Total Energy (kBtu)	997,863

Energy Intensity[4]

Site (kBtu/ft²/yr)	105
Source (kBtu/ft²/yr)	252

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	105

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	3%
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	Jefferson Hall	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	9,495 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: 83431473 (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	12,789.16
02/26/2012	03/25/2012	12,454.16
01/26/2012	02/25/2012	14,177.08
12/26/2011	01/25/2012	12,162.35
11/26/2011	12/25/2011	12,503.01
10/26/2011	11/25/2011	13,662.23
09/26/2011	10/25/2011	13,141.40
08/26/2011	09/25/2011	17,105.23
07/26/2011	08/25/2011	16,423.06
06/26/2011	07/25/2011	17,368.35
05/26/2011	06/25/2011	16,046.13
83431473 Consumption (kWh (thousand Watt-hours))		**157,832.16**
83431473 Consumption (kBtu (thousand Btu))		**538,523.33**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**538,523.33**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

Meter: 4393670 (therms)
Space(s): Entire Facility

Start Date	End Date	Energy Use (therms)
03/24/2012	04/23/2012	401.70
02/24/2012	03/23/2012	616.97
01/24/2012	02/23/2012	941.06
12/24/2011	01/23/2012	868.94
11/24/2011	12/23/2011	596.41
10/24/2011	11/23/2011	419.83
09/24/2011	10/23/2011	23.67
08/24/2011	09/23/2011	0.00
07/24/2011	08/23/2011	0.00
06/24/2011	07/23/2011	0.00
05/24/2011	06/23/2011	0.00

4393670 Consumption (therms)	**3,868.58**
4393670 Consumption (kBtu (thousand Btu))	**386,858.00**
Total Natural Gas Consumption (kBtu (thousand Btu))	**386,858.00**
Is this the total Natural Gas consumption at this building including all Natural Gas 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
Jefferson Hall
College Drive
Blackwood, NJ 08012

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Jefferson Hall	
Gross Floor Area Excluding Parking: (ft^2)	9,495
Year Built	1950
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)	9,495
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)	105	105	0	N/A	104
Source (kBtu/ft²)	252	252	0	N/A	244
Energy Cost					
$/year	$ 22,145.20	$ 22,145.20	N/A	N/A	$ 21,915.51
$/ft²/year	$ 2.33	$ 2.33	N/A	N/A	$ 2.31
Greenhouse Gas Emissions					
$MtCO_2e$/year	105	105	0	N/A	104
$kgCO_2e/ft^2$/year	11	11	0	N/A	11

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 3% more 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.