CAMDEN COUNTY COLLEGE
CRIMINAL JUSTICE BUILDING
ENERGY ASSESSMENT

for

NEW JERSEY
BOARD OF PUBLIC UTILITIES

CHA PROJECT NO. 24364

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REPORT DISCLAIMER

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

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

1.0 EXECUTIVE SUMMARY

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

Building Name	Address	Square Feet	Construction Date
Camden County College Criminal Justice Building	200 College Drive Building 25 Blackwood, New Jersey	13,700	Original: 1990

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 $5,400 for the recommended ECMs may be realized with a payback of 8.2 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	89,500	200	>20	3,000	>20	
2	Replace Domestic Water Heater (DWH)	4,900	800	6.1	200	5.8	X
3	HVAC Air Handling Equipment Replacement	79,200	700	>20	1,600	>20	
4	Install Vending Miser	200 (per unit)	200 (average)	1.0	0	1.0	X
5	Replace Rooftop Exhaust Fans	2,500	300	8.3	0	8.3	X
6	Replace Domestic Hot Water Pumps	300	200	1.5	0	1.5	X
7	Install High Efficiency Motors on HVAC Equipment	2,100	1,400	1.5	200	1.3	X
8	Lighting Replacement Upgrades	31,300	1,400	>20	800	>20	
9	Install Lighting Controls (Occupancy Sensors)	3,000	1,600	1.9	500	1.6	X
10	Lighting Replacements with Lighting Controls (Occupancy Sensors)	34,300	2,500	13.7	1,300	13.2	X

2.0 INTRODUCTION AND BACKGROUND

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

The Criminal Justice Building located on the Camden County College campus in Blackwood, NJ, is a 13,700 square foot mainly single story block structure with brick veneer. The building contains classrooms, administrative offices and other support areas. A high bay area in the center of the building includes a small amphitheater. HVAC rooftop units are located on the roof, a boiler is in a mechanical room and an air cooled chiller is on grade behind the building. The building was constructed in 1990. Occupancy includes approximately XXX students and XX faculty members. The building operates Monday through Friday from 8:00 am to approximately 6:00 pm and on Saturday and Sunday from 8:00 pm to 4:00 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 1990, the Criminal Justice Building is a 13,700 square foot mainly single story block structure, containing classrooms, administrative offices, a 100 seat amphitheater and other support areas. The main entrance is a store front with glass doors in metal frame that open into a lobby on the north side of the building.

The Criminal Justice building has approximately XXX students and XX faculty and staff, and appears to be fully utilized during our field inspection. The building can be assumed to be fully occupied until 6:00 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 6:00 pm.
- Saturday, Sunday 8:00 pm to 4:00 pm.

The building is constructed of steel framing with masonry walls and brick veneer with an air space between. Insulation is incorporated into the wall assembly for an improved envelope. The majority of the interior walls are 3-5/8" metal studs filled with fiberglass insulation finished with gypsum board. The flat roof system is comprised of a structural steel framing with a metal deck having rigid foam board insulation. The rooftop has a light-colored EPDM roof membrane system. Windows are used in exterior walls (~30% on walls where used), and are double pane set in metal frames with tint. The main entrance in the north façade of the building has windows the entire height of the wall for 50% of the north façade; however, this length of window also has a major overhang. The building has exposed walls facing the north, east, south and west directions, with a mostly uniform one story height of approximately 15'; a higher area in the center of the building is also single story, but with a height of approximately 20' (see photo above). The first floor areas all have concrete slab-on-grade 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 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 133,548 kWh at a cost of 17,833. 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 middle school had a maximum electricity demand of 47 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 1,178 therms of natural gas. Based on the annual cost of $941, 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 the Criminal Justice building. Specifics on the mechanical equipment can be found within the equipment inventory located in Appendix B.

3.3.1 Heating Hot Water Systems

The building is heated with hot water supplied by one Weil McLain cast iron sectional gas fired boiler with factory gas burner and controls. The boiler was installed in 1990 and is located in the 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 3/4 HP pumps that operate in lead-lag. The pumps are constant volume with standard efficiency motors, and a 3-way modulating valve for hot water reset control. Hot water is provided to the fan coil boxes above the ceiling, and to the exterior zone unit ventilators (UVs). Hot water system piping and valves appear to be insulated.

3.3.2 Package DX Cooling and Heating Rooftop Units

Three 1990 packaged DX cooling, natural gas heating RTUs are located on the rooftop above the areas/spaces they serve. Each RTU is mounted on an extended curb, with outside air intake and relief air dampers, with an air mixing box. Supply and return ductwork is routed down through the roof curbs to duct distribution systems above the ceilings to each space. One RTU serves the west half of the building (RTU-1), one RTU serves the east half of the building (RTU-2) and one RTU serves the director's office (RTU-3).

3.3.3 Unit Ventilators with self-contained DX Cooling Systems and Hot Water Heating

The classrooms having exterior wall exposures are heated and cooled by a total of 12 floor mounted self-contained Unit ventilators. Ventilation air is drawn through exterior sidewall louvers through heating/ cooling coils. Hot condenser air is discharged through the same louvers in the summer. Cooling is provided by internal compressor/ evaporator/condenser direct expansion cooling systems. Hot water heating coils are connected to the boiler provide winter heating

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

Interior rooms and spaces around the core area are cooled and heated by 8 horizontal ceiling mounted fan coil units (FCUs). Outside air is provided by the rooftop units, and hot water provides heating. Record design drawings were not available, and it is unclear if cooling is provided by these FCUs, or wholly by the RTU serving that area.

3.3.5 Exhaust Systems

Constant volume exhaust fans serve lecture rooms. Exhaust fans are also used for restrooms and custodial closets throughout the building Exhaust system fans are integrated into the building automation system (BAS) and generally operate during building occupancy.

3.4 Control Systems

The building contains Honeywell electric and McQuay standalone temperature controls that operate the unit ventilators and roof top units. The hot water system boilers/pumps are controlled by a time clock. Each of the three RTUs serving the building is controlled by a standalone 24V programmable thermostat.

3.5 Lighting/Electrical Systems

The facility primarily utilizes fixtures with T-12 40 watt bulbs with magnetic ballasts. The building is also equipped with 32 watt T-8 fixtures, and 42 watt compact fluorescent light fixtures. The primary source of control for the lights is switches manually turned off at the end of the day.

The exterior lighting consists of wall pack high pressure sodium 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 A 40 gallon electric tank type hot water heater; this serves entire building. Hot water is provided to mop sinks and lavatories. Hot water demand is very low due to the size an function of the building. Domestic hot water temperature is maintained at 130°F, and chemical disinfection soap is provided at the toilet rooms.

3.6.2 Plumbing Fixtures

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

4.0 ENERGY CONSERVATION MEASURES

4.1 ECM-1 HVAC Condensing Boiler Addition

The Criminal Justice Building is heated with hot water supplied by one Weil McLain cast iron sectional gas-fired boiler from 1990. The boiler is non-condensing and has an estimated efficiency of 83%.

Due to the relatively low efficiency of the existing boiler, an evaluation was performed for adding one high efficiency condensing boiler to operate as the primary boiler during the shoulder months (October-November and March-April) with the existing boiler operating as a back-up heat source. 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 5,000 therms and $4,000.

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
89,500	0	0	200	200	0	200	(1.0)	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 Criminal Justice Building has one electric domestic hot water heater that provides hot water to the building. During periods of little or no domestic hot water use, the unit must still heat the water within its storage tank. Energy required maintaining the 40 gallons of hot water temperature setpoint during times of zero demand is known as standby losses; replacing this unit with a higher efficiency natural gas unit 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. 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 55,200 kWh (-1,320 therms as the unit is switching from electric to natural gas) and $9,300.

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	4,600	0	-110	800	0	800	0.9	240	6.1	5.8

* 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 HVAC Air Handling Equipment Replacement

Three packaged DX cooling, gas heating RTUs from 1990 serve the west half of the building (RTU-1), the east half of the building (RTU-2) and the director's office (RTU-3). Replacing these units with modern AAON units having supply fan variable speed drives and digital scroll compressors was evaluated.

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.

DX rooftop 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-3 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
79,200	5,100	0	0	700	0	700	-0.9	1,600	>20	>20

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

This measure is not recommended. However, the existing units should be replaced with units such as those assessed in this ECM thru attrition when they fail.

4.4 ECM-4 Install Vending Miser

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

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

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

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

ECM-4 Install Vending Miser

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

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

This measure is recommended.

4.5 ECM-5 Rooftop Exhaust Fan Replacement

Older rooftop exhaust fans run on less efficient motors and do not have backdraft dampers installed. Backdraft dampers prevent infiltration of outdoor air into the building and help protect the building envelope. According to ASHRAE standard 90.1, low leakage dampers should be less than 3 CFM/sqft. It was estimated that the existing rooftop units allow 2% infiltration per CFM of exhaust air. The existing units have a total airflow rate of 4,400 CFM which will result in 88 CFM of infiltration.

The savings for implementing this measure will therefore be a combination of decreased energy usage for a high efficiency motors and cooling and heating savings from

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

ECM-5 Rooftop Exhaust Fan 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
2,500	1,900	0	110	300	0	300	1.7	0	8.3	8.3

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

This measure is recommended.

4.6 ECM-6 Replace Domestic Hot Water Pumps

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

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

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

ECM-6 Replace Domestic Hot Water Pumps

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
300	1,190	0	0	200	0	200	8.2	0	1.5	1.5

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

This measure is recommended.

4.7 ECM-7 Install Premium Efficiency Fan Motors

Some of the existing HVAC system fans do not have premium efficiency motors. This ECM evaluated replacing the existing standard efficiency pump motors with premium efficiency units. Savings were determined by comparing the energy usage of the existing fan motors to the energy usage with premium efficiency motors.

Premium efficient motors have an expected lifetime of 15 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 163,200 kWh and $21,000.

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

ECM-7 Install Premium Efficiency Fan Motors

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kWh	Electric kW	Nat Gas Therms	Total $						
$					$	$		$		
2,100	10,880	0	0	1,400	0	1,400	9.0	150	1.5	1.4

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

This measure is recommended.

4.8 ECM-8 Lighting Replacement Upgrades

The classrooms and occupied spaces have magnetic ballast and utilize mainly 4 foot 40W T-12 fluorescent bulbs. Can lights and recessed mounted fixtures use biaxial compact fluorescent lights (CFLs); there are also some incandescent bulbs/fixtures currently being used. 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 eight 100 watt high pressure sodium pole fixtures, three 200 high pressure sodium pole fixtures. These fixtures are utilized for building lighting during nighttime hours and are in operation from sun down until sun up. Alternative LED lighting solutions are available to replace these fixtures that will reduce the total wattage 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 9,500 kWh with an electrical demand reduction of about 4 kW. Supporting calculations, including assumptions for lighting hours and annual energy usage for each fixture, are provided in Appendix C.

Lighting has an expected life of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 142,500 kWh and $21,500.

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

ECM-8 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
31,300	9,500	4	0	1,400	0	1,400	-0.3	800	>20	>20

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

This measure is not recommended in lieu of ECM-10.

4.9 ECM-9 Lighting Controls Installation

The current lighting is controlled by manual switches. Lights are generally turned on in the morning and shut off at night. 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 177,000 kWh and $23,300.

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

ECM-9 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
3,000	11,800	0	0	1,600	0	1,600	6.8	500	1.9	1.6

* 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-10.

4.10 ECM-10 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-4 and ECM-5 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 279,000 kWh and $37,600.

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

ECM-10 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
34,300	18,600	0	0	2,500	0	2,500	0.1	1,300	13.7	13.2

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

This measure is not recommended.

4.11 System Improvement Opportunities

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

- The existing electric controls are vintage 1990 and parts are becoming hard to find. Also, there is no connection to the main campus building automation system to alert maintenance personnel when there is problem. It is recommended the stand alone controls be replaced with fully automated DDC controls as a future facility improvement item. The new controls will provide for better comfort, night set-back to conserve energy and continuous monitoring and alarming to notify maintenance that there is a problem.

5.0 PROJECT INCENTIVES

5.1 Incentives Overview

5.1.1 New Jersey Pay For Performance Program

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

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

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

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

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

Electric

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

Gas

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

Incentive cap: 25% of total project cost

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

Electric

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

Gas

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

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

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

See Appendix D for calculations.

5.1.2 New Jersey Smart Start Program

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

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

5.1.3 Direct Install Program

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

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

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

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

5.1.4 Energy Savings Improvement Plans (ESIP)

The Energy Savings Improvement Program (ESIP) allows government agencies to make energy related improvements to their facilities and pay for the costs using the value of energy savings that result from the improvements. Under the recently enacted Chapter 4 of the Laws of 2009 (the law), the ESIP provides all

government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources.

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

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

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

6.0 ALTERNATIVE ENERGY SCREENING EVALUATION

6.1 Solar

6.1.1 Photovoltaic Rooftop Solar Power Generation

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

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

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

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

The area of the roof and allowable space justifies the use of 110 kW PV solar array. The system costs for PV installations were derived from contractor budgetary pricing in the state of New Jersey for estimates of total cost of system installation. It should be noted that the cost of installation is currently about $4.00 per watt or $4,000 per kW of installed system. Other cost considerations will also need to be considered. PV panels have an approximate 20 year life span; however, the inverter device that converts DC electricity to AC has a life span of 10 to 12 years and will need to be replaced multiple times during the useful life of the PV system.

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

Photovoltaic (PV) Rooftop Solar Power Generation – 16 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
$64,000	0.0	19,211	0	$2,500	$2,500	0	$1,825	>25	14.8

* 30% federal tax credit

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

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

6.1.2 Solar Thermal Hot Water Plant

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

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

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

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

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

Solar Thermal Hot Water Plant

Budgetary Cost	Annual Utility Savings				Total Savings	Federal Tax Credit *	Payback (without incentive)	Payback (with incentives)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$	$	$	Years	Years
$15,000	0.0	4,430	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 Criminal Justice Building had a maximum electricity demand of 47 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 Criminal Justice Building are as follows:

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

The Criminal Justice Center 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	800	6.1	240	5.8	X
4	Install Vending Miser	200 (per unit)	190 (average)	1.1	0	1.1	X
5	Replace Rooftop Exhaust Fans	2,500	300	8.3	0	8.3	X
6	Replace Domestic Hot Water Pumps	300	200	1.5	0	1.5	X
7	Install High Efficiency Motors on HVAC Equipment	2,100	1,400	1.5	200	1.3	X
10	Lighting Replacements with Lighting Controls (Occupancy Sensors)	34,300	2,500	13.7	1,300	13.2	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

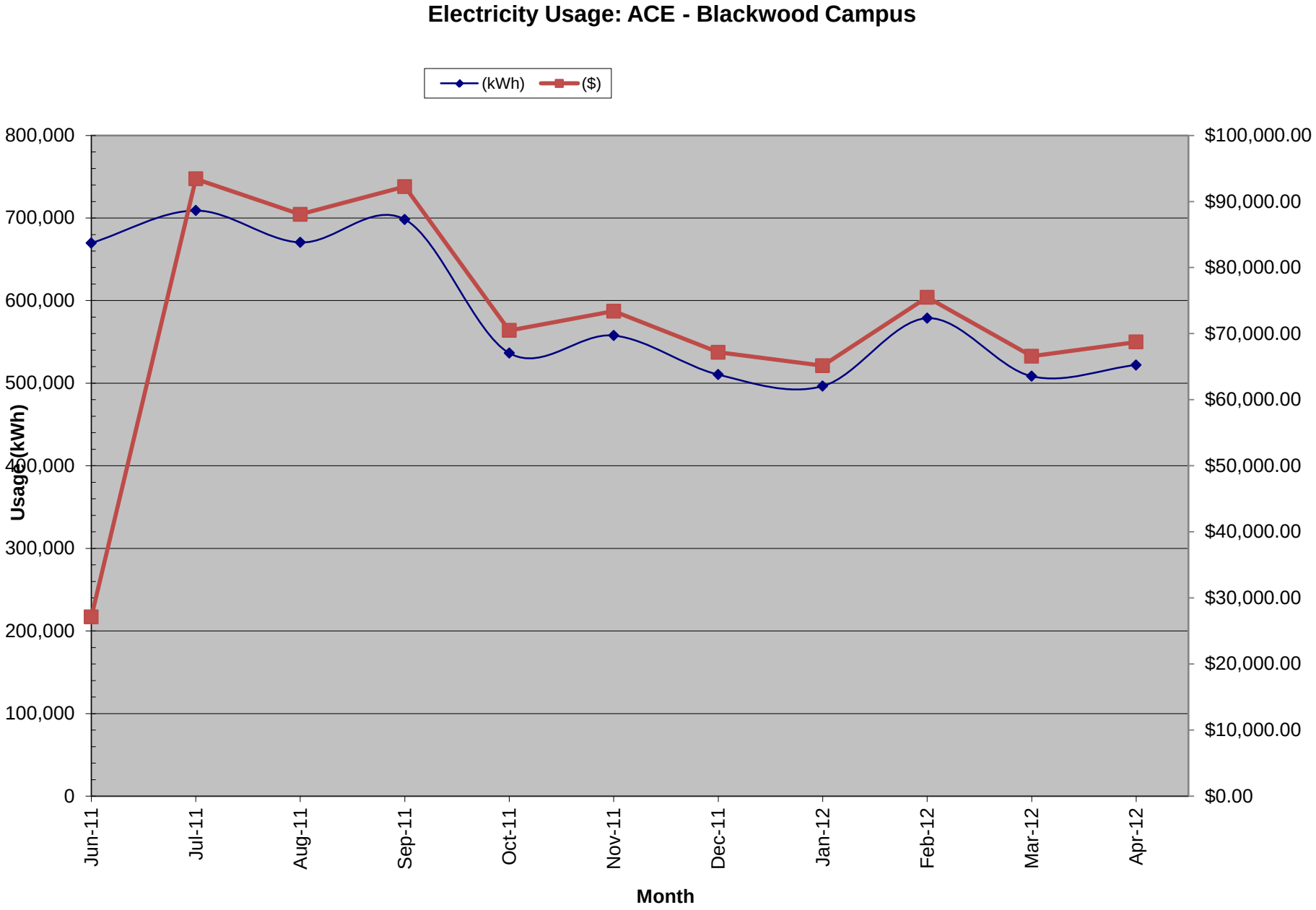
Building Name	~Electrical Consumption	Cost
Building		$ -
Taft Hall	580,947.75	$ 76,355
Truman Hall	580,947.75	$ 76,355

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
Criminal Justice Building
Original Construction Date: 1990
Renovation/Addtion Date: 1998

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.
B-1	1	Weil McLain	LGB Series, Model 976	CP-2076419	Heating / Natural Gas	794 MBH Input / 624 MBH Output / 79%	Boiler Mechanical Room	Criminal Justice Building	1990	13	Fair Condition
P-1	1	B & G	2AA-51BF	1-35852-019	Primary Loop Pup / Electric	3/4 HP / 1725 RPM / Standard Efficiency, 76.5%	Boiler Mechanical Room	Criminal Justice Building / Primary HW System	1990	-2	Good Condition
P-1	1	B & G	2AA-54BF	1-35852-018	Primary Loop Pup / Electric	3/4 HP / 1725 RPM / Standard Efficiency, 76.5%	Boiler Mechanical Room	Criminal Justice Building / Primary HW System	1990	-2	Good Condition
DWH-1	1	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	Domestic Hot Water Heating / Electric	4.5 kW / 40 gal	Boiler Mechanical Room	Criminal Justice Building	1998	-2	Good Condition
RTU-1	1	McQuay	CUR110FYYY	5W884233-01	HVAC / Electric DX Cooling, Natural Gas Heating	4,000 CFM / CLG: 90 MBH HTG: 84 MBH / 2.0 HP SF	Rooftop Above Area Being Served	West (Left) Side of Building	2007	10	Good Condition
RTU-2	1	McQuay	CUR125FYYY	5WC84054-01	HVAC / Electric DX Cooling, Natural Gas Heating	5,000 CFM / CLG: 150 MBH HTG: 168 MBH / 3 HP SF	Rooftop Above Area Being Served	East (Right) Side of Building	2007	10	Good Condition
RTU-3	1	McQuay	NOT AVAILABLE	NOT AVAILABLE	HVAC / Electric DX Cooling, Natural Gas Heating	4,000 CFM / CLG: 90 MBH HTG: 84 MBH / 1.5 HP SF	Rooftop	Directors Office	2007	10	Good Condition
UV-1 thru UV-12	12	American Air Filter (McQuay)	ECBCCLEAAZ 41725100	NOT AVAILABLE	HVAC / DX Cooling Hot Water Heating	Fractional HP fan motors	Vertical unit ventilator floor mounted cabinet	Exterior Zone Rooms	2007	15	Fair Condition
FB-1 thru FB-8	8	Environmental Corporation Fan Coil Units	NOT AVAILABLE	NOT AVAILABLE	HVAC / DX Cooling, Hot Water heating	Fractional HP fan motors	Horizontal Ducted Ceiling Mounted Units	Core Area Adminstrative Offices and Support Spaces	2007	10	Good Condition

Energy Audit of Camden County College (Criminal Justice Building)

CHA Project No. 24364

Existing Lighting

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

$5.94 **$/kW**

		EXISTING CONDITIONS									
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Retrofit Control**	**Annual kWh**	
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	Retrofit control device	(kW/space) * (Annual Hours)	Notes
11A	Office	15	**4' 2-LAMP T-12**	F42EL	60	0.90	SW	2500	None	2,250	
11A	Office Room - 110	2	**4' 2-LAMP T-12**	F42EL	60	0.12	SW	2500	None	300	
11A	Office Room - 111	2	**4' 2-LAMP T-12**	F42EL	60	0.12	SW	2500	None	300	
11A	Office Room - 112	2	**4' 2-LAMP T-12**	F42EL	60	0.12	SW	2125	C-OCC	255	
11A	Office Room - 113	2	**4' 2-LAMP T-12**	F42EL	60	0.12	SW	2125	C-OCC	255	
11A	Office Room - 114	2	**4' 2-LAMP T-12**	F42EL	60	0.12	SW	2125	C-OCC	255	
227	Front Vestibule	2	**W60CF1**	F81EL	60	0.12	SW	2500	None	300	
227	Common Area	29	**W60CF1**	F81EL	60	1.74	SW	2125	OCC	3,698	
227	Front Vestibule	10	**W60CF1**	F81EL	60	0.60	SW	2125	OCC	1,275	
162A	Classroom 105	10	**4' 4-LAMP T-12**	F44EL	120	1.20	SW	2125	OCC	2,550	
162A	Classroom 106	10	**4' 4-LAMP T-12**	F44EL	120	1.20	SW	2250	C-OCC	2,700	
162A	Classroom 107	10	**4' 4-LAMP T-12**	F44EL	120	1.20	SW	2250	C-OCC	2,700	
162A	Faculty Hotel Room - 116	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	OCC	510	
162A	Office Room - 116	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	OCC	510	
162A	Janitor Closet	1	**4' 4-LAMP T-12**	F44EL	120	0.12	SW	2125	OCC	255	
11A	Men's Bathroom	2	**4' 2-LAMP T-12**	F42EL	60	0.12	SW	2000	OCC	240	
11A	Women's Bathroom	2	**4' 2-LAMP T-12**	F42EL	60	0.12	SW	2125	OCC	255	
11A	Amphitheater	15	**4' 2-LAMP T-12**	F42EL	60	0.90	SW	2125	OCC	1,913	
11A	Copy Room	6	**4' 2-LAMP T-12**	F42EL	60	0.36	SW	2125	OCC	765	
234	Copy Room	2	**SP 100 W I 2**	i100/2	200	0.40	SW	2125	OCC	850	
11A	Classroom - 101	8	**4' 2-LAMP T-12**	F42EL	60	0.48	SW	2125	OCC	1,020	
11A	Classroom - 102	8	**4' 2-LAMP T-12**	F42EL	60	0.48	SW	2125	OCC	1,020	
11A	Classroom - 103	6	**4' 2-LAMP T-12**	F42EL	60	0.36	SW	2125	OCC	765	
11A	Classroom - 104	10	**4' 2-LAMP T-12**	F42EL	60	0.60	SW	2125	OCC	1,275	
11A	Men's Bathroom	2	**4' 2-LAMP T-12**	F42EL	60	0.12	SW	2500	None	300	
11A	Women's Bathroom	2	**4' 2-LAMP T-12**	F42EL	60	0.12	SW	2125	OCC	255	
180	Storage Room	5	**T 32 R F 4 (ELE)**	F44ILL	112	0.56	SW	2125	OCC	1,190	
162A	Office Room - 127	4	**4' 4-LAMP T-12**	F44EL	120	0.48	SW	500	None	240	
11A	Mechanical Room	6	**4' 2-LAMP T-12**	F42EL	60	0.36	SW	2125	OCC	765	
143	Exterior	8	**HPS 100 POLE**	HPS100/1	138	1.10	SW	2500	None	2,760	
141A	Exterior	3	**HPS 200**	HPS200/1	250	0.75	SW	2500	None	1,875	
	Total	**190**				**15.47**				**33,600**	

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	89,500	200	447.5	3,000	432.5	
ECM-2	Replace Domestic Water Heater (DWH)	4,900	780	6.3	240	6.0	X
ECM-3	HVAC Air Handling Equipment Replacement	79,200	700	113.1	1,600	110.8	
ECM-4	Vending Miser & Vending Machine Upgrade	600	600	1.0	0	1.0	X
ECM-5	Rooftop Exhaust Fan Replacement	2,500	300	8.3	0	8.3	X
ECM-6	DHW Pumps	300	200	1.6	0	1.6	X
ECM-7	HVAC VFDs & High Effciency Motors Install	2,100	1,400	1.5	150	1.4	X
ECM-8	Lighting Replacement Upgrades	31,300	1,400	22.4	780	21.8	
ECM-9	Lighting Controls Installation (Occupancy Sensors)	3,000	1,600	1.9	520	1.6	X
ECM-10	Lighting Replacements with Lighting Controls (Occupancy Sensors)	34,300	2,500	13.7	1,290	13.2	X

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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
89,500	0	0	200	200	0	200	(1.0)	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	4,600	0	-110	800	0	800	0.9	240	6.1	5.8

ECM-3 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
79,200	5,100	0	0	700	0	700	-0.9	1,625	>20	>20

ECM-4 Vending Miser & Vending Machine Upgrade

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

ECM-5 Rooftop Exhaust Fan 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
2,500	1,900	0	110	300	0	300	1.7	0	8.3	8.3

ECM-6 **DHW Pumps**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
328	1,190	0	0	200	0	200	8.2	0	1.6	1.6

ECM-7 **HVAC VFDs & High Effciency Motors Install**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
2,074	10,880	0	0	1,400	0	1,400	9.0	150	1.5	1.4

ECM-8 **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
31,300	9,500	4	0	1,400	0	1,400	-0.3	775	>20	>20

ECM-9 **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
3,000	11,800	0	0	1,600	0	1,600	6.8	515	1.9	1.6

ECM-10 **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
34,300	18,600	0	0	2,500	0	2,500	0.1	1,290	13.7	13.2

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Utility Costs		Yearly Usage	MTCDE	Building Area	Annual Utility Cost	
$ 0.131	$/kWh blended		0.00042021	13,700	Electric	Natural Gas
$ 0.119	$/kWh consumpt	133,548	0.00042021		$17,833	$941
$ 5.94	$/kW	47	0			
$ 0.80	$/Therm	1,178	0.00533471			
$ -	$/kgals	-	0			

Criminal Justice Building

	Item	Savings						Cost	Simple Payback	MTCDE	Life Expectancy	NJ Smart Start Incentives	Direct Install Eligible (Y/N)*	Direct Install Incentives**	Max Incentives	Payback w/ Incentives***	Simple Projected Lifetime Savings						ROI
		kW	kWh	therms	cooling kWh	kgal/yr	$										kW	kWh	therms	cooling	kgal/yr	$	
ECM-1	HVAC Condensing Boilers Addition	0.0	0	200	0	0	$ 200	$ 89,500	447.5	1.1	25	$ 3,000	Y	$ 62,700	$ 3,000	432.5	0	0	5,000	0	0	$ 4,000	(1.0)
ECM-2	Replace Domestic Water Heater (DWH)	4.5	4,600	-110	0	0	$ 780	$ 4,900	6.3	1.3	12	$ 240	Y	$ 3,400	$ 240	6.0	54	55,200	-1,320	0	0	$ 9,300	0.9
ECM-3	HVAC Air Handling Equipment Replacement	0.0	5,100	0	0	0	$ 700	$ 79,200	113.1	2.1	15	$ 1,625	Y	$ 55,400	$ 1,625	110.8	0	76,500	0	0	0	$ 10,100	(0.9)
ECM-4	Vending Miser & Vending Machine Upgrade	0.0	4,336	0	0	0	$ 600	$ 600	1.0		15			$ -	$ -	1.0	0	65,043	0	0	0	$ 8,500	13.2
ECM-5	Rooftop Exhaust Fan Replacement	0.0	1,899	106	0	0	$ 300	$ 2,500	8.3		20			$ -	$ -	8.3	0	37,985	2,123	0	0	$ 6,700	1.7
ECM-6	DHW Pumps	0.1	1,190	0	0	0	$ 200	$ 328	1.6		20			$ -	$ -	1.6	3	23,807	0	0	0	$ 3,000	8.2
ECM-7	HVAC VFDs & High Effciency Motors Install	1.2	10,879	0	0	0	$ 1,400	$ 2,074	1.5		15	$ 153		$ -	$ 153	1.4	19	163,182	0	0	0	$ 20,700	9.0
ECM-8	Lighting Replacement Upgrades	4.3	9,500	0	0	0	$ 1,400	$31,300	22.4	4.0	15	$ 775		$ -	$ 775	21.8	64	142,500	0	0	0	$ 21,500	(0.3)
ECM-9	Lighting Controls Installation (Occupancy Sensors)	0.0	11,800	0	0	0	$ 1,600	$3,000	1.9	5.0	15	$ 515		$ -	$ 515	1.6	0	177,000	0	0	0	$ 23,300	6.8
ECM-10	Lighting Replacements with Lighting Controls (Occupancy Sensors)	4.3	18,600	0	0	0	$ 2,500	$34,300	13.7	7.8	15	$ 1,290	Y	$ 24,000	$ 1,290	13.2	64	279,000	0	0	0	$ 37,600	0.1
	Total (Does Not Include ECM-8 & ECM-9)	**10.1**	**46,604.5**	**196.2**	**0.0**	**0.0**	**6,680.0**	**213,401.2**	31.9		17	$ 6,308		$ 145,500	$ 6,308	31.0	**139.1**	**700,716**	**5,803**	**0**	**0**	**$ 99,900**	(0.5)
	Total Measures with Positive ROI	**8.8**	**23,200.0**	**(110.0)**	**0.0**	**0.0**	**3,280.0**	**39,200.0**	12.0		16	$ 1,530		$ 27,400	$ 1,530	11.5	**117.9**	**334,200**	**(1,320)**	**0**	**0**	**$ 85,800**	1.2
	% of Existing	**21%**	**35%**	**17%**	**0%**	**-**																	

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

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ECM-1: 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 boiler operating as the secondary boiler. 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	1,178	Therms	Based on historical utility data.
Existing Boiler Plant Efficiency	79%		Estimated or Measured
Baseline Boiler Load	93,055	Mbtu/yr	Baseline Fuel Use x Existing Efficiency x 100 Mbtu/Therms
Baseline Fuel Cost	$ 941		
Proposed Boiler Plant Efficiency	92%		New Condensing Boiler Efficiency
Proposed Fuel Use	1,011	Therms	Baseline Boiler Load / Proposed Efficiency / 100 Mbtu/Therms
Proposed Fuel Cost	$ 808		
Annual Utility Savings	**200**	**Therms**	
Annual Savings	$ 100		
Boiler Addition Project Cost	**$ 89,500**		
Simple Payback	895	Years	Negative number indicates

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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.		
						$ -	$ -	$ -	$ -	
MBH NG Condensing Boiler	1	EA	$ 20,000	$ 2,000		$ 22,000	$ 2,700	$ -	$ 24,700	
Flue Installation	25	LF	$ 75.0	$ 15.00		$ 2,063	$ 506	$ -	$ 2,569	
Reprogram DDC system	1	EA	$ 100.0	$ 350.00		$ 110	$ 473	$ -	$ 583	
Miscellaneous Electrical	1	LS	$ 500	$ 250		$ 550	$ 338	$ -	$ 888	
Miscellaneous HW Piping	1	LS	$ 2,000	$ 1,000		$ 2,200	$ 1,350	$ -	$ 3,550	
Boiler room/space construction	1	LS	$ 20,000	$ 10,000		$ 22,000	$ 13,500	$ -	$ 35,500	
						$ -	$ -	$ -	$ -	

$ 67,789	Subtotal
$ 6,779	10% Contingency
$ 14,914	20% Contractor O&P
$ -	0% Engineering
$ 89,500	**Total**

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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 tankless-type, high efficiency condensing hot water heater with an auxiliary storage tank for increased hot water recovery capacity.

Item	Value	Units	Formula/Comments
Occupied days per week	5	days/wk	
Water supply Temperature	60	˚F	Termperature of water coming into building
Hot Water Temperature	130	˚F	
Hot Water Usage per day	64	gal/day	Calculated from usage below
Annual Hot Water Energy Demand	9,665	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)	14,045	Mbtu/yr	Building demand plus standby losses
Existing Water Heater Efficiency	90%		Per Manufacturer
Total Annual Energy Required	15,605	Mbtu/yr	
Total Annual Electric Required	**4,600**	**kWh/yr**	**Electrical Savings**
Average Annual Electric Demand	0.53	kW	
Peak Electric Demand	**4.50**	**kW**	**Per Manufacturer's Nameplate (Demand Savings)**
New Tank Size	0	Gallons	Based on Rinnai tankless water heate / Based on Rinnai tankless water heater with (1) 100 gal storage tank
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)	9,665	MBTU/yr	
Proposed Avg. Hot water heater efficiency	92%		Based on Rinnai instantaneous, tankle / Based on Rinnai instantaneous, tankless DHW heater
Proposed Total Annual Energy Required	10,505	MBTU/yr	
Proposed Fuel Use	**110**	**Therms/yr**	
Elec Utility Demand Unit Cost	$5.94	$/kW	
Elec Utility Supply Unit Cost	$0.12	$/kWh	
NG Utility Unit Cost	$0.80	$/Therm	
Existing Operating Cost of DHW	$866	$/yr	
Proposed Operating Cost of DHW	$88	$/yr	
Annual Utility Cost Savings	**$778**	**$/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	30	30	113	50%	56
SHOWER	2.5	5	1	1	0	0	0	75%	0
KITCHEN SINK	2.5	0.5	1	1	0		0	75%	0
MOP SINK	2.5	2	1	1	2		10	75%	8
Dishwasher (gal per u	10	1	1	0	0		0	100%	0
						TOTAL	123		**64**

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

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ECM-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	$ -	$ 68	
High Efficiency Gas-Fired tankless DHW Heater	1	EA	$ 1,200	$ 300		$ 1,320	$ 405	$ -	$ 1,725	
Miscellaneous Electrical	1	EA	$ 50	$ 100		$ 55	$ 135	$ -	$ 190	
Venting Kit	1	EA	$ 450	$ 650		$ 495	$ 878	$ -	$ 1,373	
Miscellaneous Piping and Valves	1	LS	$ 300			$ 330	$ -	$ -	$ 330	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

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

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EQUIPMENT	AREA SERVED	COOLING CAPACITY (MBH)
RTU-1	West Half of the Building	90
RTU-2	East Half of the Building	150
RTU-3	Director's Office	90
	Total Electric DX Cooling:	*330* *MBH*

ECM-3: HVAC Air Handling Equipment Replacment

ECM Summary

By replacing older air handling equipment with units which use more efficient fan motors and higher SEER/EER DX condensing units, significant electrical energy can be saved. The fan motors will also be replaced with premium efficiency motors. Control schemes can be incorporated that were not possible with the older equiopment as well. It is recommended these units be replaced by more modern AAON units with supply fan variable speed drives and digital scroll compressors.

ASSUMPTIONS			Comments
Electric Cost	$0.119	/ kWh	
Average run hours per Week	66	Hours	
Space Balance Point	55	F	
Space Temperature Setpoint	74	deg F	Setpoint.
BTU/Hr Rating of existing DX equipment	330,000	Btu / Hr	Total BTU/hr of DX cooling equipment to be replaced.
Average EER	8.0		Units are 13 years old, EERs were 10 when new
Existing Annual Electric Usage 120	11,381	kWh	

Item	Value	Units	Comments
Proposed EER	14.4		Based on AAON GAS/ DX RTU's
Proposed Annual Electric Usage	6,323	kWh	Unit will cycle on w/ temp of room. Possible operating time shown below

ANNUAL SAVINGS		
Annual Electrical Usage Savings	**5,100**	**kWh**
Annual Cost Savings	$600	
Total Project Cost	**$79,200**	
Simple Payback	132	years

OAT - DB Bin Temp F	Annual Hours	Cooling Hrs at Temp Above balance point	Assumed % of time of operation	Assumed hrs of Operation
102.5	0	0	100%	0
97.5	3	1	89%	1
92.5	34	13	79%	11
87.5	131	51	68%	35
82.5	500	196	58%	114
77.5	620	244	47%	115
72.5	664	0	0%	0
67.5	854	0	0%	0
62.5	927	0	0%	0
57.5	600	0	0%	0
52.5	610	0	0%	0
47.5	611	0	0%	0
42.5	656	0	0%	0
37.5	1,023	0	0%	0
32.5	734	0	0%	0
27.5	334	0	0%	0
22.5	252	0	0%	0
17.5	125	0	0%	0
12.5	47	0	0%	0
7.5	22	0	0%	0
2.5	13	0	0%	0
-2.5	0	0	0%	0
Total	8,760	506	55%	276

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ECM-3: HVAC Air Handling Equipment Replacment - 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.		
						$ -	$ -	$ -	$ -	
Existing (1) RTU demolition	2	EA	$ 100	$ 1,500		$ 220	$ 4,050	$ -	$ 4,270	
(2) RTU, 7.5 tons with DX cooling and HW heating	2	EA	$ 8,000	$ 3,500		$ 17,600	$ 9,450	$ -	$ 27,050	
- HW Valve & Piping to RTUs HW coil	2	EA	$ 350	$ 200		$ 770	$ 540	$ -	$ 1,310	
- Reprogram DDC system for (1) RTU	2	EA	$ 75	$ 300		$ 165	$ 810	$ -	$ 975	
(1) RTU, 12.0 tons with DX cooling and HW heating	1	EA	$ 12,500	$ 8,500		$ 13,750	$ 11,475	$ -	$ 25,225	
- HW Valve & Piping to RTUs HW coil	1	EA	$ 350	$ 200		$ 385	$ 270	$ -	$ 655	
- Reprogram DDC system for (1) RTU	1	EA	$ 75	$ 300		$ 83	$ 405	$ -	$ 488	
Electrical - misc.		LS	$ 1,000	$ 5,000		$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 59,973	Subtotal
$ 5,997	10% Contingency
$ 13,194	20% Contractor O&P
$ -	0% Engineering
$ 79,200	**Total**

ECM-4 Install Vending Machine Controls

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

Assumptions

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

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ECM-5a: Install Modern Roof Top Exhaust Fans with Premium Efficiency Motors

Demand Cost $/kW-month
$ 5.94

Energy Cost $/kWh
$ 0.13

Multipliers		
Material	Labor	Equipment
1.00	1.00	1.00

Savings Analysis

Cost Estimates

#	Description	Location	Existing HP	Load Factor	Existing Efficiency[a]	Existing kW	New HP[b]	New Load Factor	New Efficiency[a]	New kW	Demand Savings	Demand Savings $	Annual Hours	kWh Savings	$ kWh Savings	Total $ Savings	Estimated Cost	Payback Years	Unit Costs Materials	Unit Costs Labor	Unit Costs Equipment	Subtotal Costs Materials	Subtotal Costs Labor	Subtotal Costs Equipment	Total Cost	Remarks
1	EF-1	N/A	0.17	0.75	60%	0.2	0	0.75	0.802	0.1	0.039	$ 3	8,760	343	$ 45	$ 48	$ 500	10.4	$ 400	$ 100	$ -	$ 400	$ 100	$ -	$ 500	
2	EF-2	N/A	0.17	0.75	60%	0.2	0	0.75	0.802	0.1	0.039	$ 3	8,760	343	$ 45	$ 48	$ 500	10.4	$ 400	$ 100	$ -	$ 400	$ 100	$ -	$ 500	
3	EF-3	N/A	0.17	0.75	60%	0.2	0	0.75	0.802	0.1	0.039	$ 3	8,760	343	$ 45	$ 48	$ 500	10.4	$ 400	$ 100	$ -	$ 400	$ 100	$ -	$ 500	
4	EF-4	N/A	0.17	0.75	60%	0.2	0	0.75	0.802	0.1	0.039	$ 3	8,760	343	$ 45	$ 48	$ 500	10.4	$ 400	$ 100	$ -	$ 400	$ 100	$ -	$ 500	
5	EF-5	N/A	0.17	0.75	60%	0.2	0	0.75	0.802	0.1	0.039	$ 3	8,760	343	$ 45	$ 48	$ 500	10.4	$ 400	$ 100	$ -	$ 400	$ 100	$ -	$ 500	
		Total	**0.833333**			**0.8**	**0.833**			**0.6**	**0.20**	**$ 14**		**1,716**	**$ 226**	**$ 240**	**$ 2,500**										

Notes

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

b Same as existing HP unless resized to better match load

Note: pricing is for energy calculations only -do not use for procurement

ECM-5b: Rooftop Exhaust Replacement (Infiltration Savings)

Assume: Existing rooftop exhaust fans do not emply backdraft dampers to prevent outdoor air from seeping into the building

Proposed: Newer rooftop exhaust systems use back draft dampers to protect the building envelope and prevent outdoor air infiltration.

Perimeter of Exhaust Fans	23	LF	Cooling System Efficiency	1.2	kW/ton	Heating System Efficiency	80%	
Area of Exhaust Fans	6	SF	Ex Occupied Clng Temp.	74	*F	Heating On Temp.	60	*F
Existing Infiltration Factor	**13.9**	**cfm/SF**	Ex Unoccupied Clng Temp.	78	*F	Ex Occupied Htg Temp.	68	*F
Proposed Infiltration Factor	**3.0**	**cfm/SF**	Cooling Occ Enthalpy Setpoint	27.5	Btu/lb	Ex Unoccupied Htg Temp.	60	*F
			Cooling Unocc Enthalpy Setpoint	27.5	Btu/lb	Electricity	$ 0.131	$/kWh
						Natural Gas	$ 0.80	$/therm

					EXISTING LOADS		PROPOSED LOADS		COOLING ENERGY		HEATING ENERGY	
					Occupied	Unoccupied	Occupied	Unoccupied				
Avg Outdoor Air Temp. Bins °F	Avg Outdoor Air Enthalpy	Existing Equipment Bin Hours	Occupied Equipment Bin Hours	Unoccupied Equipment Bin Hours	Exhaust Infiltration BTUH	Exhaust Infiltration BTUH	Exhaust Infiltration BTUH	Exhaust Infiltration BTUH	Existing Cooling Energy kWh	Proposed Cooling Energy kWh	Existing Heating Energy Therms	Proposed Heating Energy Therms
A		B	C	D	E	F	G	H	I	J	K	L
102.5	50.1	0	0	0	-8,950	-8,950	-1,931	-1,931	0	0	0	0
97.5	42.5	3	1	2	-5,940	-5,940	-1,281	-1,281	2	0	0	0
92.5	39.5	34	13	21	-4,752	-4,752	-1,025	-1,025	16	3	0	0
87.5	36.6	131	51	80	-3,604	-3,604	-777	-777	47	10	0	0
82.5	34.0	500	196	304	-2,574	-2,574	-555	-555	129	28	0	0
77.5	31.6	620	244	376	-1,624	0	-350	0	40	9	0	0
72.5	29.2	664	261	403	0	0	0	0	0	0	0	0
67.5	27.0	854	336	519	0	0	0	0	0	0	0	0
62.5	24.5	927	364	563	0	0	0	0	0	0	0	0
57.5	21.4	600	236	364	998	238	215	51	0	0	4	1
52.5	18.7	610	240	370	1,473	713	318	154	0	0	8	2
47.5	16.2	611	240	371	1,948	1,188	420	256	0	0	11	2
42.5	14.4	656	258	398	2,424	1,663	523	359	0	0	16	3
37.5	12.6	1,023	402	621	2,899	2,138	625	461	0	0	31	7
32.5	10.7	734	288	446	3,374	2,614	728	564	0	0	27	6
27.5	8.6	334	131	203	3,849	3,089	830	666	0	0	14	3
22.5	6.8	252	99	153	4,324	3,564	933	769	0	0	12	3
17.5	5.5	125	49	76	4,800	4,039	1,035	871	0	0	7	1
12.5	4.1	47	18	29	5,275	4,514	1,138	974	0	0	3	1
7.5	2.6	22	9	13	5,750	4,990	1,240	1,076	0	0	1	0
2.5	1.0	13	5	8	6,225	5,465	1,343	1,179	0	0	1	0
-2.5	0.0	0	0	0	6,700	5,940	1,445	1,281	0	0	0	0
TOTALS		**8,760**	**3,441**	**5,319**					233	50	**135**	**29**

Existing Exhaust Infiltration	**88**	**cfm**	
Proposed Exhaust Infiltration	**19**	**cfm**	

Savings	**106**	**Therms**	**$ 85**
	183	**kWh**	**$ 24**
			$ 109

Window ID	Location	Quantity	Width (ft)	Height (ft)	Linear Feet (LF)	Area (SF)	Airflow (CFM)	Infiltration Rate (CFM/SF)	Infiltration (CFM)
EF-1	N/A	1	1.125	1.125	4.5	1.3	880.0	13.91	17.6
EF-2	N/A	1	1.125	1.125	4.5	1.3	880.0	13.91	17.6
EF-3	N/A	1	1.125	1.125	4.5	1.3	880.0	13.91	17.6
EF-4	N/A	1	1.125	1.125	4.5	1.3	880.0	13.91	17.6
EF-5	N/A	1	1.125	1.125	4.5	1.3	880.0	13.91	17.6
Total		**5**	**5.625**	**5.625**	**22.5**	**6.3**	**4,400.0**	**13.91**	**88.0**

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

Demand Cost $/kW-month
$ 5.94

Energy Cost $/kWh
$ 0.13

Multipliers		
Material	Labor	Equipment
1.10	1.35	1.10

ECM-6: DHW Pumps

Savings Analysis

Cost Estimates

										New																			
			Existing	Load	Existing	Existing	Existing	Existing	New	Load	New	New	New	Demand	Demand	Annual	kW	kWh	$ kWh	Total $	Estimated	Payback	Unit Costs			Subtotal Costs				
#	Description	Location	HP	Factor	Hours	Efficiency$_a$	kW	kWh	HP$_b$	Factor	Efficiency$_a$	kW	kWh	Savings	Savings $	Hours	Savings	Savings	Savings	Savings	Cost	Years	Materials	Labor	Equipment	Materials	Labor	Equipment	Total Cost	Remarks
1			0.17	0.8	8760	0.600	0.2	1451.6	0.04	0.8	0.600	0.04	261.29	0.126	$ 9	6,570	0.13	1,190	$ 156	$ 165	$ 328	2.0	$ 175	$ 100	$ -	$ 193	$ 135	$ -	$ 328	

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

b Same as existing HP unless resized to better match load

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

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

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

ECM-7: High Efficiency Motors Install

Demand Cost $/kW-month
$ 5.94

Energy Cost $/kWh
$ 0.13

Multipliers		
Material	Labor	Equipment
1.10	1.30	1.10

Savings Analysis

Cost Estimates

#	Description	Location	Existing HP	Load Factor	Existing Efficiency$_a$	Existing kW	New HP$_b$	New Load Factor	New Efficiency$_a$	New kW	Demand Savings	Demand Savings $	Annual Hours	kWh Savings	$ kWh Savings	Total $ Savings	Estimated Cost	Payback Years	Unit Costs Materials	Unit Costs Labor	Unit Costs Equipment	Subtotal Costs Materials	Subtotal Costs Labor	Subtotal Costs Equipment	Subtotal Costs Total Cost	Remarks
1	RTU-1	West Side of Bldg	2	0.75	70%	1.6	2	0.75	92%	1.2	0.382	$ 27	8,760	3,347	$ 440	$ 467	$ 636	1.4	$ 342	$ 200	$ -	$ 376	$ 260	$ -	$ 636	
2	RTU-2	East Side of Bldg	3	0.75	70%	2.4	3	0.75	92%	1.8	0.573	$ 41	8,760	5,021	$ 660	$ 701	$ 930	1.3	$ 550	$ 250	$ -	$ 605	$ 325	$ -	$ 930	
3	RTU-3	Directors Office	1.5	0.75	70%	1.2	2	0.75	92%	0.9	0.287	$ 20	8,760	2,510	$ 330	$ 350	$ 507	1.4	$ 284	$ 150	$ -	$ 312	$ 195	$ -	$ 507	
		Total	**6.5**			**5.2**	**6.5**			**4.0**	**1.24**	**$ 89**		**10,879**	**$ 1,430**	**$ 1,518**	**$ 2,074**									

Notes

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

b Same as existing HP unless resized to better match load

ECM-4 Lighting Replacements

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
$	kW	kWh	therms	$	$	$	$	Years	Years
$31,300	**4.3**	**9,500**	**0**	**$1,552**	**0**	**$1,552**	**$775**	**20.2**	**19.7**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-5 Install Occupancy Sensors

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
$	kW	kWh	therms	$	$	$	$	Years	Years
$3,000	**0.0**	**11,800**	**0**	**$1,551**	**0**	**$1,551**	**$515**	**1.9**	**1.6**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-6 Lighting Replacements with Occupancy Sensors

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
$	kW	kWh	therms	$	$	$	$	Years	Years
$34,300	**4.3**	**18,600**	**0**	**$2,745**	**0**	**$2,745**	**$1,290**	**12.5**	**12.0**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

Energy Audit of Camden County College (Criminal Justice Building)

CHA Project No. 24364

ECM-4 Lighting Replacements

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

$5.94 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**	**Number of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
11A	Office	15	4' 2-LAMP T-12	F42EL	60	0.9	SW	2500	2,250	15	F32T8	F42ILL-R	52	0.8	SW	2,500	1,950	300	0.1	$ 47.98	$ 3,600.00		75.0	75.0
11A	Office Room - 110	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2500	300	2	F32T8	F42ILL-R	52	0.1	SW	2,500	260	40	0.0	$ 6.40	$ 480.00	$50	75.0	67.2
11A	Office Room - 111	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2500	300	2	F32T8	F42ILL-R	52	0.1	SW	2,500	260	40	0.0	$ 6.40	$ 480.00		75.0	75.0
11A	Office Room - 112	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	255	2	F32T8	F42ILL-R	52	0.1	SW	2,125	221	34	0.0	$ 5.61	$ 480.00		85.6	85.6
11A	Office Room - 113	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	255	2	F32T8	F42ILL-R	52	0.1	SW	2,125	221	34	0.0	$ 5.61	$ 480.00		85.6	85.6
11A	Office Room - 114	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	255	2	F32T8	F42ILL-R	52	0.1	SW	2,125	221	34	0.0	$ 5.61	$ 480.00	$50	85.6	76.7
227	Front Vestibule	2	W60CF1	F81EL	60	0.1	SW	2500	300	2	CF42W	CF42/1-L	48	0.1	SW	2,500	240	60	0.0	$ 9.60	$ 360.00	$50	37.5	32.3
227	Common Area	29	W60CF1	F81EL	60	1.7	SW	2125	3,698	29	CF42W	CF42/1-L	48	1.4	SW	2,125	2,958	740	0.3	$ 122.00	$ 5,220.00		42.8	42.8
227	Front Vestibule	10	W60CF1	F81EL	60	0.6	SW	2125	1,275	10	CF42W	CF42/1-L	48	0.5	SW	2,125	1,020	255	0.1	$ 42.07	$ 1,800.00	$250	42.8	36.8
162A	Classroom 105	10	4' 4-LAMP T-12	F44EL	120	1.2	SW	2125	2,550	10	F28T8	F44SSILL-R	86	0.9	SW	2,125	1,828	723	0.3	$ 119.20	$ -		0.0	0.0
162A	Classroom 106	10	4' 4-LAMP T-12	F44EL	120	1.2	SW	2250	2,700	10	F28T8	F44SSILL-R	86	0.9	SW	2,250	1,935	765	0.3	$ 124.78	$ -		0.0	0.0
162A	Classroom 107	10	4' 4-LAMP T-12	F44EL	120	1.2	SW	2250	2,700	10	F28T8	F44SSILL-R	86	0.9	SW	2,250	1,935	765	0.3	$ 124.78	$ -		0.0	0.0
162A	Faculty Hotel Room - 116	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	SW	2,125	366	145	0.1	$ 23.84	$ -		0.0	0.0
162A	Office Room - 116	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	SW	2,125	366	145	0.1	$ 23.84	$ -		0.0	0.0
162A	Janitor Closet	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	2125	255	1	F28T8	F44SSILL-R	86	0.1	SW	2,125	183	72	0.0	$ 11.92	$ -		0.0	0.0
11A	Men's Bathroom	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2000	240	2	F32T8	F42ILL-R	52	0.1	SW	2,000	208	32	0.0	$ 5.35	$ 480.00		89.8	89.8
11A	Women's Bathroom	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	255	2	F32T8	F42ILL-R	52	0.1	SW	2,125	221	34	0.0	$ 5.61	$ 480.00		85.6	85.6
11A	Amphitheater	15	4' 2-LAMP T-12	F42EL	60	0.9	SW	2125	1,913	15	F32T8	F42ILL-R	52	0.8	SW	2,125	1,658	255	0.1	$ 42.07	$ 3,600.00		85.6	85.6
11A	Copy Room	6	4' 2-LAMP T-12	F42EL	60	0.4	SW	2125	765	6	F32T8	F42ILL-R	52	0.3	SW	2,125	663	102	0.0	$ 16.83	$ 1,440.00		85.6	85.6
234	Copy Room	2	SP 100 W I 2	i100/2	200	0.4	SW	2125	850	2	WP 42 1	CF42/2-L	100	0.2	SW	2,125	425	425	0.2	$ 70.12	$ 216.00		3.1	3.1
11A	Classroom - 101	8	4' 2-LAMP T-12	F42EL	60	0.5	SW	2125	1,020	8	F32T8	F42ILL-R	52	0.4	SW	2,125	884	136	0.1	$ 22.44	$ 1,920.00		85.6	85.6
11A	Classroom - 102	8	4' 2-LAMP T-12	F42EL	60	0.5	SW	2125	1,020	8	F32T8	F42ILL-R	52	0.4	SW	2,125	884	136	0.1	$ 22.44	$ 1,920.00	$200	85.6	76.7
11A	Classroom - 103	6	4' 2-LAMP T-12	F42EL	60	0.4	SW	2125	765	6	F32T8	F42ILL-R	52	0.3	SW	2,125	663	102	0.0	$ 16.83	$ 1,440.00		85.6	85.6
11A	Classroom - 104	10	4' 2-LAMP T-12	F42EL	60	0.6	SW	2125	1,275	10	F32T8	F42ILL-R	52	0.5	SW	2,125	1,105	170	0.1	$ 28.05	$ 2,400.00		85.6	85.6
11A	Men's Bathroom	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2500	300	2	F32T8	F42ILL-R	52	0.1	SW	2,500	260	40	0.0	$ 6.40	$ 480.00		75.0	75.0
11A	Women's Bathroom	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	255	2	F32T8	F42ILL-R	52	0.1	SW	2,125	221	34	0.0	$ 5.61	$ 480.00		85.6	85.6
180	Storage Room	5	T 32 R F 4 (ELE)	F44ILL	112	0.6	SW	2125	1,190	5	T 28 C F 4	F43SSILL	72	0.4	SW	2,125	765	425	0.2	$ 70.12	$ 510.00		7.3	7.3
162A	Office Room - 127	4	4' 4-LAMP T-12	F44EL	120	0.5	SW	500	240	4	F28T8	F44SSILL-R	86	0.3	SW	500	172	68	0.1	$ 18.63	$ -	$100	0.0	-5.4
11A	Mechanical Room	6	4' 2-LAMP T-12	F42EL	60	0.4	SW	2125	765	6	F32T8	F42ILL-R	52	0.3	SW	2,125	663	102	0.0	$ 16.83	$ 1,440.00		85.6	85.6
143	Exterior	8	HPS 100 POLE	HPS100/1	138	1.1	SW	2500	2,760	8	FXLED39/1	FXLED39/1	39	0.3	SW	2,500	780	1,980	0.8	$ 316.69	$ 816.00		2.6	2.6
141A	Exterior	3	HPS 200	HPS200/1	250	0.8	SW	2500	1,875	3	FXLED78	FXLED78/1	78	0.2	SW	2,500	585	1,290	0.5	$ 206.33	$ 306.00	$75	1.5	1.1
	Total	**190**				**15.5**			**33,600**	**190**			**1,919**	**11.2**			**24,119**	**9,481**	**4.3**	**$1,550**	**$31,300**	**$775**		
																		Demand Savings		**4.3**	**$304**			
																		kWh Savings		**9,500**	**$1,249**			
																		Total savings			**$1,552**		**20.2**	**19.7**

Energy Audit of Camden County College (Criminal Justice Building)

CHA Project No. 24364

ECM-5 Install Occupancy Sensors

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

$5.94 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**	**Number of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kW Saved) * ($/kWh)	Cost for renovations to lighting system		Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
11A	Office	15	4' 2-LAMP T-12	F42EL	60	0.9	SW	2500	2,250.0	15	4' 2-LAMP T-12	F42EL	60	0.9	None	2500	2,250.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Office Room - 110	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2500	300.0	2	4' 2-LAMP T-12	F42EL	60	0.1	None	2500	300.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Office Room - 111	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2500	300.0	2	4' 2-LAMP T-12	F42EL	60	0.1	None	2500	300.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Office Room - 112	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	255.0	2	4' 2-LAMP T-12	F42EL	60	0.1	C-OCC	1200	144.0	111.0	0.0	$14.59	$180.00	$35.00		
11A	Office Room - 113	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	255.0	2	4' 2-LAMP T-12	F42EL	60	0.1	C-OCC	1200	144.0	111.0	0.0	$14.59	$180.00	$35.00	4.1	3.3
11A	Office Room - 114	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	255.0	2	4' 2-LAMP T-12	F42EL	60	0.1	C-OCC	1200	144.0	111.0	0.0	$14.59	$180.00	$35.00		
227	Front Vestibule	2	W60CF1	F81EL	60	0.1	SW	2500	300.0	2	W60CF1	F81EL	60	0.1	None	2500	300.0	0.0	0.0	$0.00	$0.00	$0.00		
227	Common Area	29	W60CF1	F81EL	60	1.7	SW	2125	3,697.5	29	W60CF1	F81EL	60	1.7	OCC	1200	2,088.0	1,609.5	0.0	$211.54	$114.00	$20.00	0.5	0.4
227	Front Vestibule	10	W60CF1	F81EL	60	0.6	SW	2125	1,275.0	10	W60CF1	F81EL	60	0.6	OCC	1200	720.0	555.0	0.0	$72.94	$114.00	$20.00	1.6	1.3
162A	Classroom 105	10	4' 4-LAMP T-12	F44EL	120	1.2	SW	2125	2,550.0	10	4' 4-LAMP T-12	F44EL	120	1.2	OCC	1200	1,440.0	1,110.0	0.0	$145.89	$114.00	$20.00	0.8	0.6
162A	Classroom 106	10	4' 4-LAMP T-12	F44EL	120	1.2	SW	2250	2,700.0	10	4' 4-LAMP T-12	F44EL	120	1.2	C-OCC	1000	1,200.0	1,500.0	0.0	$197.15	$180.00	$35.00	0.9	0.7
162A	Classroom 107	10	4' 4-LAMP T-12	F44EL	120	1.2	SW	2250	2,700.0	10	4' 4-LAMP T-12	F44EL	120	1.2	C-OCC	1000	1,200.0	1,500.0	0.0	$197.15	$180.00	$35.00	0.9	0.7
162A	Faculty Hotel Room - 116	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510.0	2	4' 4-LAMP T-12	F44EL	120	0.2	OCC	1200	288.0	222.0	0.0	$29.18	$114.00	$20.00	3.9	3.2
162A	Office Room - 116	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510.0	2	4' 4-LAMP T-12	F44EL	120	0.2	OCC	1200	288.0	222.0	0.0	$29.18	$114.00	$20.00	3.9	3.2
162A	Janitor Closet	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	2125	255.0	1	4' 4-LAMP T-12	F44EL	120	0.1	OCC	1200	144.0	111.0	0.0	$14.59	$114.00	$20.00	7.8	6.4
11A	Men's Bathroom	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2000	240.0	2	4' 2-LAMP T-12	F42EL	60	0.1	OCC	1000	120.0	120.0	0.0	$15.77	$114.00	$0.00	7.2	7.2
11A	Women's Bathroom	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	255.0	2	4' 2-LAMP T-12	F42EL	60	0.1	OCC	1200	144.0	111.0	0.0	$14.59	$114.00	$20.00	7.8	6.4
11A	Amphitheater	15	4' 2-LAMP T-12	F42EL	60	0.9	SW	2125	1,912.5	15	4' 2-LAMP T-12	F42EL	60	0.9	OCC	1200	1,080.0	832.5	0.0	$109.42	$114.00	$20.00	1.0	0.9
11A	Copy Room	6	4' 2-LAMP T-12	F42EL	60	0.4	SW	2125	765.0	6	4' 2-LAMP T-12	F42EL	60	0.4	OCC	1200	432.0	333.0	0.0	$43.77	$114.00	$20.00	2.6	2.1
234	Copy Room	2	SP 100 W I 2	i100/2	200	0.4	SW	2125	850.0	2	SP 100 W I 2	i100/2	200	0.4	OCC	1200	480.0	370.0	0.0	$48.63	$114.00	$20.00	2.3	1.9
11A	Classroom - 101	8	4' 2-LAMP T-12	F42EL	60	0.5	SW	2125	1,020.0	8	4' 2-LAMP T-12	F42EL	60	0.5	OCC	1200	576.0	444.0	0.0	$58.36	$114.00	$20.00		
11A	Classroom - 102	8	4' 2-LAMP T-12	F42EL	60	0.5	SW	2125	1,020.0	8	4' 2-LAMP T-12	F42EL	60	0.5	OCC	1200	576.0	444.0	0.0	$58.36	$114.00	$20.00	1.0	0.8
11A	Classroom - 103	6	4' 2-LAMP T-12	F42EL	60	0.4	SW	2125	765.0	6	4' 2-LAMP T-12	F42EL	60	0.4	OCC	1200	432.0	333.0	0.0	$43.77	$114.00	$20.00	2.6	2.1
11A	Classroom - 104	10	4' 2-LAMP T-12	F42EL	60	0.6	SW	2125	1,275.0	10	4' 2-LAMP T-12	F42EL	60	0.6	OCC	1200	720.0	555.0	0.0	$72.94	$114.00	$20.00	1.6	1.3
11A	Men's Bathroom	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2500	300.0	2	4' 2-LAMP T-12	F42EL	60	0.1	None	2500	300.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Women's Bathroom	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	255.0	2	4' 2-LAMP T-12	F42EL	60	0.1	OCC	1200	144.0	111.0	0.0	$14.59	$114.00	$20.00	7.8	6.4
180	Storage Room	5	T 32 R F 4 (ELE)	F44ILL	112	0.6	SW	2125	1,190.0	5	T 32 R F 4 (ELE)	F44ILL	112	0.6	OCC	1000	560.0	630.0	0.0	$82.80	$114.00	$20.00	1.4	1.1
162A	Office Room - 127	4	4' 4-LAMP T-12	F44EL	120	0.5	SW	500	240.0	4	4' 4-LAMP T-12	F44EL	120	0.5	None	500	240.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Mechanical Room	6	4' 2-LAMP T-12	F42EL	60	0.4	SW	2125	765.0	6	4' 2-LAMP T-12	F42EL	60	0.4	OCC	1200	432.0	333.0	0.0	$43.77	$114.00	$20.00	2.6	2.1
143	Exterior	8	HPS 100 POLE	HPS100/1	138	1.1	SW	2500	2,760.0	8	HPS 100 POLE	HPS100/1	138	1.1	None	2500	2,760.0	0.0	0.0	$0.00	$0.00	$0.00		
141A	Exterior	3	HPS 200	HPS200/1	250	0.8	SW	2500	1,875.0	3	HPS 200	HPS200/1	250	0.8	None	2500	1,875.0	0.0	0.0	$0.00	$0.00	$0.00		
	Total	**190**				**15.5**			**33,600**	**190**				**15**			**21,821**	**11,779**	**0**	**$1,548**	**$3,000**	**515**		
																		Demand Savings		**0.0**	**$0**			
																		kWh Savings		**11,800**	**$1,551**			
																		Total Savings			**$1,551**		**1.9**	**1.6**

Energy Audit of Camden County College (Criminal Justice Building)

CHA Project No. 24364

ECM-6 Lighting Replacements with Occupancy Sensors

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

$5.94 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	NYSERDA Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh 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
11A	Office	15	4' 2-LAMP T-12	F42EL	60	0.9	SW	2500	2,250	15	F32T8	F42ILL-R	52	0.8	None	2,500	1,950	300	0.1	$ 47.98	$ 3,600.00	$ -	75.0	75.0
11A	Office Room - 110	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2500	300	2	F32T8	F42ILL-R	52	0.1	None	2,500	260	40	0.0	$ 6.40	$ 480.00	$ 50	75.0	67.2
11A	Office Room - 111	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2500	300	2	F32T8	F42ILL-R	52	0.1	None	2,500	260	40	0.0	$ 6.40	$ 480.00	$ -	75.0	75.0
11A	Office Room - 112	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	255	2	F32T8	F42ILL-R	52	0.1	C-OCC	1,200	125	130	0.0	$ 18.25	$ 660.00	$ 35	36.2	34.2
11A	Office Room - 113	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	255	2	F32T8	F42ILL-R	52	0.1	C-OCC	1,200	125	130	0.0	$ 18.25	$ 660.00	$ 35	36.2	34.2
11A	Office Room - 114	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	255	2	F32T8	F42ILL-R	52	0.1	C-OCC	1,200	125	130	0.0	$ 18.25	$ 660.00	$ 85	36.2	31.5
227	Front Vestibule	2	W60CF1	F81EL	60	0.1	SW	2500	300	2	CF42W	CF42/1-L	48	0.1	None	2,500	240	60	0.0	$ 9.60	$ 360.00	$ 50	37.5	32.3
227	Common Area	29	W60CF1	F81EL	60	1.7	SW	2125	3,698	29	CF42W	CF42/1-L	48	1.4	OCC	1,200	1,670	2,027	0.3	$ 291.23	$ 5,334.00	$ 20	18.3	18.2
227	Front Vestibule	10	W60CF1	F81EL	60	0.6	SW	2125	1,275	10	CF42W	CF42/1-L	48	0.5	OCC	1,200	576	699	0.1	$ 100.43	$ 1,914.00	$ 270	19.1	16.4
162A	Classroom 105	10	4' 4-LAMP T-12	F44EL	120	1.2	SW	2125	2,550	10	F28T8	F44SSILL-R	86	0.9	OCC	1,200	1,032	1,518	0.3	$ 223.75	$ 114.00	$ 20	0.5	0.4
162A	Classroom 106	10	4' 4-LAMP T-12	F44EL	120	1.2	SW	2250	2,700	10	F28T8	F44SSILL-R	86	0.9	C-OCC	1,000	860	1,840	0.3	$ 266.07	$ 180.00	$ 35	0.7	0.5
162A	Classroom 107	10	4' 4-LAMP T-12	F44EL	120	1.2	SW	2250	2,700	10	F28T8	F44SSILL-R	86	0.9	C-OCC	1,000	860	1,840	0.3	$ 266.07	$ 180.00	$ 35	0.7	0.5
162A	Faculty Hotel Room - 116	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	OCC	1,200	206	304	0.1	$ 44.75	$ 114.00	$ 20	2.5	2.1
162A	Office Room - 116	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	OCC	1,200	206	304	0.1	$ 44.75	$ 114.00	$ 20	2.5	2.1
162A	Janitor Closet	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	2125	255	1	F28T8	F44SSILL-R	86	0.1	OCC	1,200	103	152	0.0	$ 22.38	$ 114.00	$ 20	5.1	4.2
11A	Men's Bathroom	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2000	240	2	F32T8	F42ILL-R	52	0.1	OCC	1,000	104	136	0.0	$ 19.02	$ 594.00	$ -	31.2	31.2
11A	Women's Bathroom	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	255	2	F32T8	F42ILL-R	52	0.1	OCC	1,200	125	130	0.0	$ 18.25	$ 594.00	$ 20	32.5	31.4
11A	Amphitheater	15	4' 2-LAMP T-12	F42EL	60	0.9	SW	2125	1,913	15	F32T8	F42ILL-R	52	0.8	OCC	1,200	936	977	0.1	$ 136.90	$ 3,714.00	$ 20	27.1	27.0
11A	Copy Room	6	4' 2-LAMP T-12	F42EL	60	0.4	SW	2125	765	6	F32T8	F42ILL-R	52	0.3	OCC	1,200	374	391	0.0	$ 54.76	$ 1,554.00	$ 20	28.4	28.0
234	Copy Room	2	SP 100 W I 2	i100/2	200	0.4	SW	2125	850	2	WP 42 1	CF42/2-L	100	0.2	OCC	1,200	240	610	0.2	$ 94.43	$ 330.00	$ 20	3.5	3.3
11A	Classroom - 101	8	4' 2-LAMP T-12	F42EL	60	0.5	SW	2125	1,020	8	F32T8	F42ILL-R	52	0.4	OCC	1,200	499	521	0.1	$ 73.01	$ 2,034.00	$ 20	27.9	27.6
11A	Classroom - 102	8	4' 2-LAMP T-12	F42EL	60	0.5	SW	2125	1,020	8	F32T8	F42ILL-R	52	0.4	OCC	1,200	499	521	0.1	$ 73.01	$ 2,034.00	$ 220	27.9	24.8
11A	Classroom - 103	6	4' 2-LAMP T-12	F42EL	60	0.4	SW	2125	765	6	F32T8	F42ILL-R	52	0.3	OCC	1,200	374	391	0.0	$ 54.76	$ 1,554.00	$ 20	28.4	28.0
11A	Classroom - 104	10	4' 2-LAMP T-12	F42EL	60	0.6	SW	2125	1,275	10	F32T8	F42ILL-R	52	0.5	OCC	1,200	624	651	0.1	$ 91.27	$ 2,514.00	$ 20	27.5	27.3
11A	Men's Bathroom	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2500	300	2	F32T8	F42ILL-R	52	0.1	None	2,500	260	40	0.0	$ 6.40	$ 480.00	$ -	75.0	75.0
11A	Women's Bathroom	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	255	2	F32T8	F42ILL-R	52	0.1	OCC	1,200	125	130	0.0	$ 18.25	$ 594.00	$ 20	32.5	31.4
180	Storage Room	5	T 32 R F 4 (ELE)	F44ILL	112	0.6	SW	2125	1,190	5	T 28 C F 4	F43SSILL	72	0.4	OCC	1,000	360	830	0.2	$ 123.35	$ 624.00	$ 20	5.1	4.9
162A	Office Room - 127	4	4' 4-LAMP T-12	F44EL	120	0.5	SW	500	240	4	F28T8	F44SSILL-R	86	0.3	None	500	172	68	0.1	$ 18.63	$ -	$ 100	0.0	-5.4
11A	Mechanical Room	6	4' 2-LAMP T-12	F42EL	60	0.4	SW	2125	765	6	F32T8	F42ILL-R	52	0.3	OCC	1,200	374	391	0.0	$ 54.76	$ 1,554.00	$ 20	28.4	28.0
143	Exterior	8	HPS 100 POLE	HPS100/1	138	1.1	SW	2500	2,760	8	FXLED39	FXLED39/1	39	0.3	None	2,500	780	1,980	0.8	$ 316.69	$ -	$ -	2.6	2.6
141A	Exterior	3	HPS 200	HPS200/1	250	0.8	SW	2500	1,875	3	FXLED78	FXLED78/1	78	0.2	None	2,500	585	1,290	0.5	$ 206.33	$ 306.00	$ 75	1.5	1.1
	Total	**190**				**15.5**			**33,600**	**190**				**11.2**			**15,031**		**4.3**	**$2,744**	**$34,300**	**1,290**		
																		Demand Savings		**4.3**	**$300**			
																		kWh Savings		**18,600**	**$2,445**			
																		Total Savings			**$2,745**		**12.5**	**12.0**

APPENDIX D

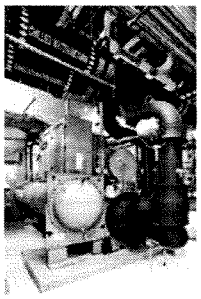
New Jersey Pay For Performance Incentive Program

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
Criminal Justice Building

New Jersey Pay For Performance Incentive Program

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

Total Building Area (Square Feet)	13,700
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)	$17,833	$941
Existing Usage (from utility)	133,548	1,178
Proposed Savings	23,200	-110
Existing Total MMBtus	574	
Proposed Savings MMBtus	68	
% Energy Reduction	**11.9%**	
Proposed Annual Savings	$3,280	

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

	Incentives $		
	Elec	Gas	Total
Incentive #1	$0	$0	$1,370
Incentive #2	$0	$0	$0
Incentive #3	$0	$0	$0
Total All Incentives	**$0**	**$0**	**$1,370**

Total Project Cost	$39,200

		Allowable Incentive
% Incentives #1 of Utility Cost*	7.3%	$1,370
% Incentives #2 of Project Cost**	0.0%	$0
% Incentives #3 of Project Cost**	0.0%	$0
Total Eligible Incentives***	**$1,370**	
Project Cost w/ Incentives	$37,830	

Project Payback (years)	
w/o Incentives	w/ Incentives
12.0	11.5

* 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
Criminal Justice Building

Cost of Electricity	$0.131	/kWh
Electricity Usage	132,253	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
$200,000	**50.0**	**63,889**	**0**	**$8,369**	**0**	**$8,369**	**$0**	**$5,111**	**23.9**	**14.8**

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

Area Output*

1,151 m2
12,386 ft2

Perimeter Output*

151 m
494 ft

Available Roof Space for PV:
(Area Output - 10 ft x Perimeter) x 85%
6,326 ft2

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

8	watt/ft2	
50,604	DC watts	
50	kW	Enter into PV Watts

PV Watts Inputs*

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

PV Watts Output

63,889 annual kWh calculated in PV Watts program

% Offset Calc

Usage	132,253	(from utilities)
PV Generation	63,889	(generated using PV Watts)
% offset	48%	

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

AC Energy & Cost Savings

Cautions for Interpreting the Results

Criminal Justice Building (Camden County College)

Station Identification

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

PV System Specifications

DC Rating:	50.0 kW
DC to AC Derate Factor:	0.830
AC Rating:	41.5 kW
Array Type:	Fixed Tilt
Array Tilt:	20.0 °
Array Azimuth:	180.0 °

Energy Specifications

Cost of Electricity:	13.1 ¢/kWh

Results

Month	Solar Radiation (kWh/m²/day)	AC Energy (kWh)	Energy Value ($)
1	2.71	3504	459.02
2	3.50	4125	540.38
3	4.81	6045	791.90
4	5.27	6250	818.75
5	5.81	6938	908.88
6	6.13	6860	898.66
7	5.76	6599	864.47
8	5.63	6425	841.68
9	5.03	5680	744.08
10	4.04	4890	640.59
11	2.90	3487	456.80
12	2.46	3087	404.40
Year	4.51	63889	8369.46

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
Criminal Justice Center

Building ID: 3251834
For 12-month Period Ending: April 30, 2012[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: November 08, 2012

Facility
Criminal Justice Center
College Drive
Blackwood, NJ 08012

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1990
Gross Floor Area (ft²): 13,702

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

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	847,147
Natural Gas - (kBtu)[4]	0
Total Energy (kBtu)	847,147

Energy Intensity[4]

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

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	120

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

National Median Comparison

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

Stamp of Certifying Professional

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

Certifying Professional
N/A

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

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

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

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Criminal Justice Center	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	13,702 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	18,455.72
02/26/2012	03/25/2012	17,972.29
01/26/2012	02/25/2012	20,458.60
12/26/2011	01/25/2012	17,551.19
11/26/2011	12/25/2011	18,042.78
10/26/2011	11/25/2011	19,715.62
09/26/2011	10/25/2011	18,694.03
08/26/2011	09/25/2011	24,684.13
07/26/2011	08/25/2011	23,699.71
06/26/2011	07/25/2011	25,063.84
05/26/2011	06/25/2011	23,675.29
83431473 Consumption (kWh (thousand Watt-hours))		**228,013.20**
83431473 Consumption (kBtu (thousand Btu))		**777,981.04**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**777,981.04**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

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

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

Certifying Professional

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

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
Criminal Justice Center
College Drive
Blackwood, NJ 08012

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Criminal Justice Center	
Gross Floor Area Excluding Parking: (ft^2)	13,702
Year Built	1990
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)	13,702
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 ($kBtu/ft^2$)	62	62	0	N/A	104
Source ($kBtu/ft^2$)	207	207	0	N/A	244
Energy Cost					
$/year	$ 28,011.11	$ 28,011.11	N/A	N/A	$ 47,115.57
$/$ft^2$/year	$ 2.04	$ 2.04	N/A	N/A	$ 3.43
Greenhouse Gas Emissions					
$MtCO_2e$/year	120	120	0	N/A	202
$kgCO_2e/ft^2$/year	9	9	0	N/A	15

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

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