CAMDEN COUNTY COLLEGE
HELENE FULD 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 Helene Fuld Building (School of Nursing)	200 College Drive Building 26 Blackwood, New Jersey	36,000	Original: 1993 Renovation: 2012

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 $44,800 for the recommended ECMs may be realized with a payback of 3.5 years. A summary of the costs, savings, and paybacks for the recommended ECMs follows:

Summary of Energy Conservation Measures							
Energy Conservation Measure		**Approx. Costs ($)**	**Approx. Savings ($/year)**	**Payback (Years) w/o Incentive**	**Potential Incentive ($)***	**Payback (Years) w/ Incentive**	**Recommended For Implementation**
ECM-1	HVAC Condensing Boilers Addition	89,600	1,400	>20	3,000	>20	
2	Replace Domestic Water Heater (DWH)	9,600	2,200	4.4	200	4.3	X
3	HVAC Water Source Heat Pumps Equipment Replacement	155,600	1,900	>20	0	>20	
4	HVAC Replace Electric Heat in RTUs	60,700	19,700	3.1	0	3.1	X
5	HVAC Install Variable Speed Drives, High Efficiency Motors	30,000	13,500	2.2	5,000	1.9	X
6	Install Vending Miser	200 (per unit)	200 (average)	1.0	0	1.0	X
7	Replace Rooftop Exhaust Fans	4,600	600	7.7	0	7.7	X
8	Replace Domestic Hot Water Pumps	300	200	1.5	0	1.5	X
9	HVAC Building Automation System Upgrade / Re-Commission	18,000	1,400	12.9	0	12.9	X
10	Replace Natural Draft Cooling Tower with Mechanical Cooling Tower	50,600	(3,000)	(14.9)	0	(14.9)	
11	Lighting Replacement Upgrades	27,400	5,100	5.4	4,200	4.6	X
12	Install Lighting Controls (Occupancy Sensors)	4,300	3,800	1.1	600	1.0	X
13	Lighting Replacements with Lighting Controls (Occupancy Sensors)	31,700	7,100	4.5	4,800	3.8	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 Helene Fuld building located on the Camden County College campus in Blackwood, NJ, is a 36,000 square foot two story brick building with an atrium-lounge area, administrative offices, classrooms, conference rooms and support spaces. The building has several separate HVAC systems including Packaged HVAC units located on the roof; individual water source heat pumps, classroom unit ventilators, DX/ electric heat fan coil units, heating hot water boilers and an air-cooled natural draft cooling tower on grade behind the building. The building was constructed in 1990, and originally functioned as a School of Nursing leased by the Camden County College. It is currently undergoing an interior renovation for use as a new Administration Building. Occupancy includes approximately XXX students and XXX faculty members. The building operates Monday through Friday from 8:00 am to approximately 8:00 pm. There is also some reduced occupancy on weekends, and occupancy levels are reduced in summer months between semesters for each school year.

3.0 EXISTING CONDITIONS

3.1 Building - General

Originally built in 1973, the Community Center building is a 36,000 square foot, two-story building with an atrium-lounge area, administrative offices, classrooms, conference rooms and support spaces. The building was undergoing a renovation during our field inspection, and is being repurposed for use as an administrative building. The interior areas are likely being reconfigured as a result. The main entrance on the north side of the building, and opens into the foyer which has a glass atrium-type roof; the glass is double pane in metal frame with tinting.

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

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

The building is constructed of steel framing with masonry walls and brick veneer with an air space between. Insulation is incorporated into the wall assembly for an improved envelope. The 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 minimal (~20% on walls where used) on most walls, and are double pane set in metal frames with tint. The main entrance doors are part glass, and part metal panel with metal frames; there is an overhang over the façade area with the entrance doors. The main entrance on the north side of the building opens into the foyer which has a glass atrium-type roof. The building has exposed walls facing the north, east, south and west directions, with a mostly uniform one story height of approximately 25' (see photo above). The first floor has concrete slab-on-grade floor, and the second floor has a reinforced concrete deck floor.

3.2 Utility Usage

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

The campus has one main electric meter. There was no installed sub-metering for this building from the main meter, therefore the following usage and costs rates were determined from square footage of the building. From June 2011 through April 2012, the electric usage for the building was 350,879 kWh at a cost of $46,853. 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 building had a maximum electricity demand of 124 kW. Electrical usage was generally higher in the summer months when air conditioning equipment was operational.

The facility has one natural gas meter. From July 2011 through May 2012, gas-fired equipment consumed about 3,095 therms of natural gas. Based on the annual cost of $15,092, 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 Helene Fuld building. Specifics on the mechanical equipment can be found within the equipment inventory located in Appendix B.

3.3.1 Natural Draft Cooling Tower with Shell and Tube Heat Exchanger

The building was originally cooled and heated by water source heat pumps, with a boiler hot water system as backup; a Baltimore Air Coil natural draft cooling tower is located outside behind the building. The cooling tower was installed in 1993, and provides tempered building loop water. The cooling tower operates as long as it is possible to provide heating and cooling with the water source heat pump equipment; when it becomes too cold, the hot water boilers are started and the building water loop is used for hot water.

The cooling tower water is piped to a Baltimore Air Coil shell and tube heat exchanger to decouple the cooling tower water from the building loop water pumping system. Two 30 HP pumps operate in lead-lag and circulate water between the cooling tower and the heat exchanger. The pumps are constant volume with high efficiency motors, and a three-way control valve mixing assembly.

The cooling tower condition is fair, and its location is not ideal; it was originally installed on grade at the rear of the building with no obstructions. Currently, there is a solid block wall enclosure around the natural draft cooling tower, and air flow patterns are not ideal for the equipment's performance. It is recommended the cooling tower fill be cleaned, and investigating possibility of improving airflow conditions (i.e., by adding louvers to walls lower down, replacing block walls with screening that allows air flow or by removing block wall enclosure altogether).

3.3.2 Heating Hot Water Systems

When the water source heat pumps are not able to provide adequate heating, hot water is supplied by six Weil McLain cast iron sectional, gas fired boilers with factory gas burners and controls. The boilers were installed in 1993, and are located in the mechanical room. The hot water system operates from October until April, and the boilers are shut down during the summer.

The boilers are piped to a building loop water pumping system with two 15 HP pumps that operate in lead-lag. The pumps are constant volume with high efficiency motors, and a two-way valve differential pressure control assembly system control. The building loop water system is shared with the cooling tower water to/from WSHPs. Hot water is provided to unit ventilators located in exterior rooms and spaces for heating when WSHP system cannot provide sufficient heating. Building loop water system piping and valves appear to be insulated.

3.3.3 Water Source Heat Pumps

The building was originally heated and cooled by a WSHP system. Sixteen water-to-water WSHPs have loop water provided by the two 15 HP pumps listed in sections 3.3.1 and 3.3.2. The WSHPs are located in ceilings above the areas they serve, and some are cabinet-type equipment inside the spaces. The heat pumps have water from the natural draft cooling tower connected on one side, and ductwork to the spaces being served connected on the other side. These heat pumps serve the entire building.

3.3.4 Package DX Cooling and Electric Heating Rooftop Units

Nine 2010 packaged DX cooling, electric heating RTUs are located on the rooftop, some directly above the areas/spaces they serve; some rooftops serve areas located on the first floor as well. 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. These RTUs were installed in 2010 as a demonstration/comparison to the original WSHP system and equipment. There is overlap between the two systems, where some spaces are served by both the RTUs and the WSHPs. The rooftop units serve mainly rooms on the second floor, but some ductwork has been extended to first floor spaces that had cooing issues.

3.3.5 DX Cooling Split System Units

One split system DX cooling air conditioner with an indoor high wall air handler was installed in 2010 to serve the IT closet in the work lab. Two split system DX cooling air conditioners with indoor ceiling mounted air handlers were installed in 2009 to serve office area 216 and office 218. The condensing units are located outside on grade at the west side of the building.

3.3.6 Unit Ventilators

Classrooms having exterior wall exposures are heated and ventilated by a total of eighteen floor mounted unit ventilators. Outside air is drawn through low sidewall louvers, and hot water coils piped to the boilers provides winter heating. The WSHPs described above provide cooling during the summer.

3.3.7 Exhaust Systems

Constant volume exhaust fans serve laboratories, larger classrooms and spaces. In classrooms, dedicated exhaust fans are connected directly to lab fume hoods, typically controlled by a hood mounted switch. Exhaust fans are also used for restrooms and custodial closets throughout the building.

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

3.4 Control Systems

The building is controlled by McQuay/Snyder General electronic controls; there does not seem to be a central BAS interface. The system consists of original, outdated 1993 electronic field devices and components which have become hard to replace and maintain.

Previous occupants added supplemental cooling to small rooms, and disabled the controls on the WSHPs in the area. Each split system has a wall mounted thermostat; setpoints in the building are 68°F heating and 74°F cooling during occupied times, and 55°F heating and 85°F cooling during unoccupied times. However, thermostats can be adjusted by occupants to override the central control system.

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

3.5 Lighting/Electrical Systems

The facility utilizes T-12 40 watt florescent lamped fixtures and 42 watt compact fluorescent recesses fixtures. The lights are controlled by switches which are manually operated by the staff.

Exterior lights consist of pole mounted shoebox type metal halides and wall pack high pressure sodium fixtures on daylight sensors and timers. The wall pack lights and pole lights are powered by the building's electrical system and are part of the lighting systems analysis. However, the majority of the pole lights are operated, maintained, and paid for by the local utility and are therefore, excluded from any ECM measures.

3.6 Plumbing Systems

3.6.1 Domestic Hot Water System

Storage room 124 contains one 40 gallon electric tank hot water heater installed in 1993 serving the first floor. Storage room 240 contains one 40 gallon electric tank hot water heater installed in 1993 serving the second floor. Hot water is provided to labs, a kitchen/lounge, toilets, janitor's closets, and the majority of hot water piping appears to be insulated. Water demand is primarily for the restrooms located in the building. Domestic hot water temperature is maintained at 140°F, and chemical disinfection soap is provided in the restrooms.

3.6.2 Plumbing Fixtures

The building's lavatories, water closets, and urinals are original and are lower flow plumbing fixtures, and do not require upgrades. Some of these fixtures have been replaced during the currently on-going renovation. The remaining fixtures should be replaced thru attrition over the years with llavatories that are 2.5 GPM with push type faucets, water closets that are 1.6 GPF, and urinals that are 1.0 GPF.

4.0 ENERGY CONSERVATION MEASURES

4.1 ECM-1 HVAC Condensing Boiler Addition

The building is heated with hot water supplied by six Weil McLain cast iron sectional gas fired boilers from 1993. The boilers are non-condensing and have an estimated efficiency of 76%.

Due to the relatively low efficiency of the existing boilers, 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 boilers operating as secondary. The majority of the savings will be achieved during these months when the lower return water temperature enables the condensing boiler to achieve the highest efficiencies.

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

Natural gas-fired boilers have an expected life of 25 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 45,000 therms and $36,000.

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 kWh	Electric kW	Nat Gas Therms	Total $						
$					$	$		$	Years	Years
89,600	0	0	1,800	1,400	0	1,400	(0.6)	3,000	>20	>20

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

This measure is not recommended.

4.2 ECM-2 Replace Domestic Water Heater

The building has two domestic hot water heaters that provide hot water to the facility. The A.O. Smith units are tank type electric water heaters installed in 1993. During periods of little or no domestic hot water use, the units must still heat the water within their storage tank. Energy required maintaining the 80 gallons of hot water temperature setpoint during times of zero demand is known as standby losses; replacing these units with higher efficiency natural gas units was evaluated.

According to the U.S. Department of Energy, 2.5% of stored capacity is lost every hour during HW heater standby. This value was applied to the total volume of the existing DHW heater storage tank to determine the annual standby losses. Proposed efficiency was based on a typical tankless type, high efficiency, condensing hot water heater with a storage tank to increase recovery capacity. The new water heater will require gas and water piping modifications, venting, and electrical connections.

Domestic hot water heaters have an expected life of 12 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 163,200 kWh (-4,320 therms as the unit is changing from electric to natural gas) and $26,200.

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
9,600	13,600	10	-360	2,200	0	2,200	1.7	240	4.4	4.3

* 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 Water Source Heat Pumps Replacement

Existing Snyder General (1993), McQuay (newer) and Trane (newer) WSHPs provide heating and cooling to the entire building. Replacement of the 1993 WSHPs with higher efficiency units was assessed. The newer McQuay and Trane WSHP units can be replaced by attrition in the future.

The assumption of this calculation is that the operating hours and capacities of the 1993 WSHP unit equipment stay the same. The energy savings result from operating higher efficiency units.

Due to the unfavorable payback, this measure is not recommended. GSHP equipment should be replaced with higher efficiency units by attrition in the future.

WSHP units have an expected life of 15 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 216,000 kWh and $28,400.

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

ECM-3 HVAC Water Source Heat Pumps 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
155,600	14,400	0	0	1,900	0	1,900	(0.8)	0	>20	>20

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

This measure is not recommended.

4.4 ECM-4 HVAC Replace Electric Heat in RTUs

Nine RTUs serving building have electric heat to provide heating for the areas served (RTU-1 thru RTU-9). The electric resistive heating equipment consumes electrical energy; the boiler plant can produce the required heating capacity using boilers and less costly natural gas. It is recommended electric heat in the RTUs be replaced with duct mounted hot water reheat coils. The electric heat in the RTUs themselves can remain to provide auxiliary heat in the event of an emergency or if hot water system becomes inoperable for some reason.

It is assumed the operating hours, number of units, and capacity stay the same. The energy saving is derived from operating higher efficiency, less costly natural gas compared to electricity.

Hot water heating coils have an expected life of 15 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 3,028,500 kWh, (-190,000 therms natural gas usage replaces electrical usage) and $295,000.

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

ECM-4 **HVAC Replace Electric Heat in RTUs**

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
60,700	201,900	0	-8,600	19,700	0	19,700	3.9	0	3.1	3.1

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

This measure is recommended.

4.5 ECM-5 Install Variable Speed Drives, High Efficiency Motors

The natural draft cooling tower serving the water source heat pumps in the building has a constant volume, standard efficiency fan motor. The two 30 HP waster source heat pump loop pumps have standard efficiency motors.

By replacing the standard efficiency motors with high efficiency motors and adding a variable frequency drive (VFD) for the tower fan, electrical energy can be conserved.

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

Motors and variable speed drives have an expected life of 20 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 517,500 kWh and $75,900.

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

ECM-5 Install Variable Frequency Drives, High Efficiency Motors

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
30,000	103,000	0	0	13,500	0	13,500	8.0	5,000	2.2	1.9

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

This measure is recommended.

4.6 ECM-6 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 Helene Fuld 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-6 Install Vending Miser

Vending Type	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
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.

4.7 ECM-7 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 7,107 CFM which will result in 142 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-7 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
4,560	4,030	0	140	600	0	600	1.7	0	7.6	7.6

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

This measure is recommended.

4.8 ECM-8 Replace Domestic Hot Water Pumps

Maintenance personnel at the Helene Fuld 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 Helene Fuld 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-8 Replace Domestic Hot Water Pumps

Budgetary	Annual Utility Savings	Estimated	Total			Payback	Payback

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

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

This measure is recommended.

4.9 ECM-9 HVAC Building Automation System Upgrade/Re-commissioning

The existing McQuay electronic controls do not have a BAS interface, and system devices and components have become hard to maintain or replace. These systems are not user friendly as more modern systems, and are not as functional as systems using current technology. It is recommended the electronic controls be replaced, a BAS interface be added and full system commissioning executed as a future facility improvment item. The commissioning should include all new control system controllers/field devices and HVAC equipment, as well as HVAC system dampers and valves that are not equipment components. This could be coordinated with a complete systems testing and balancing that must occur prior to system re-commissioning efforts.

This would allow more accurate control of HVAC systems, prevent local thermostat adjustment by occupants, allow improved trending/logging functions, and monitor that proper ventilation is being provided. Improved trending and logging aids in identifying improved scheduling and systems startup times. HVAC systems will be tuned up during this process, and significant savings could be obtained by making the following controls improvements:

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

Additional benefits of this system are that it can provide useful trending information such as daily, monthly, and seasonal energy usage, and also provide alarm messages via the internet indicating that a piece of equipment needs repair or maintenance. The BAS should also allow the facility to monitor the

energy consuming equipment in the building remotely in real-time, track the facility energy performance, and remotely adjust set points and schedules to optimize facility operation. Full color graphics and logical programming functions should also be provided.

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

Commissioning can have an expected life of 10 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 91,200 kWh, 2,500 therms and $14,000. To continue to gain this annual saving, proper maintenance of equipment is required.

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

ECM-9 HVAC Building Automation System Upgrade / Re-commissioning

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
18,000	9,120	0	250	1,400	0	1,400	(0.2)	0	12.9	12.9

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

This measure is recommended.

4.10 ECM-10 Replace Natural Draft Cooling Tower with Mechanical Cooling Tower

An existing Baltimore Air Coil natural draft cooling tower provides exchanges heat with building loop water which are pumped to each water source heat pump serving the building. Replacement of the cooling tower which is in poor condition with a mechanical unit with VFDs on the tower fans was assessed.

The assumption of this calculation is that the operating hours and capacities of the 1993 cooling tower stays the same. The energy consumption results from operating a mechanical cooling tower with tower fan speed control rather than a natural draft unit. The existing cooling tower does not use any mechanical energy but may not have enough cooling capacity or has surpassed its usable lifetime. Maintenance personnel would like to determine baseline costs and energy consumption through the addition of a modern tower with a more efficient fill designs that result in a better approach temperature difference and performance. The cooling tower is proposed to be replaced with one containing VFDs and inverter duty high efficiency motors which will reduce the flow by slowing the motors down. The cooling tower condenser water temperature can be used to control cooling tower fan speed and condenser water pump flow.

Cooling towers have an expected life of 20 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 502,000 kWh and $66,000.

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

ECM-10 Replace Natural Draft Cooling Tower with Mechanical Cooling Tower

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
50,600	(22,810)	(10)	0	(3,400)	0	(3,400)	(2.3)	0	N/A	N/A

* 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.

4.11 ECM-11 Lighting Replacement Upgrades

The building utilizes mainly 4 foot 40W T-12 fluorescent bulbs with magnetic ballasts; U-tube T-12s are also used in some fixtures. Recessed can lights and surface mounted standard bulb fixtures use biaxial compact fluorescent lights (CFLs). A comprehensive fixture survey was conducted of the entire building. Each switch and circuit was identified, and the number of fixtures, locations, and existing wattage established (Appendix C).

The existing exterior lighting system for this building consists of six 200 watt metal halide wall pack fixtures, and six 100 watt high pressure sodium pole fixtures. The exterior fixtures are utilized for building lighting during nighttime hours and are in operation from sun down until sun up. Alternative LED lighting solutions are available to replace these fixtures that will reduce the total wattage to 120 watts per fixture. It is suggested to replace the existing metal halide wall pack fixtures on a one for one basis with LED. The reduction in per fixture wattage will result in a reduced total exterior lighting connected wattage, therefore resulting in electrical energy savings. However, maintenance savings were not calculated or included in the payback analysis below due to unknown labor rates and knowledge of existing required maintenance time.

Energy savings for this measure were calculated by applying the existing and proposed fixture wattages to estimated times of operation. The difference between energy requirements resulted in a total annual savings of 34,500 kWh with an electrical demand reduction of about 14 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 517,500 kWh and $75,900.

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

ECM-11 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
27,400	34,500	14	0	5,100	0	5,100	1.8	4,200	5.4	4.6

* 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-8.

4.12 ECM-12 Lighting Controls Installation

The current Helene Fuld building 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 429,000 kWh and $56,400.

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

ECM-12 Lighting Controls Installation (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
4,300	28,600	0	0	3,800	0	3,800	12.1	600	1.1	1.0

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

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

4.13 ECM-13 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-6 and ECM-7 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 774,000 kWh and $106,300.

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

ECM-13 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
31,700	51,600	10	0	7,100	0	7,100	2.4	4,800	4.5	3.8

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

This measure is recommended.

5.0 PROJECT INCENTIVES

5.1 Incentives Overview

5.1.1 New Jersey Pay For Performance Program

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

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

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

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

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

Electric

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

Gas

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

Incentive cap: 25% of total project cost

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

Electric

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

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

Gas

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

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

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

See Appendix D for calculations.

5.1.2 New Jersey Smart Start Program

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

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

5.1.3 Direct Install Program

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

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

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

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

5.1.4 Energy Savings Improvement Plans (ESIP)

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

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

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

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

6.0 ALTERNATIVE ENERGY SCREENING EVALUATION

6.1 Solar

6.1.1 Photovoltaic Rooftop Solar Power Generation

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

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

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

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

The available roof area justifies the use of 115 kW PV solar array. The system costs for PV installations were derived from contractor budgetary pricing in the state of New Jersey for estimates of total cost of system installation. It should be noted that the cost of installation is currently about $4.00 per watt or $4,000 per kW of installed system. Other cost considerations will also need to be considered. PV panels have an approximate 20 year life span; however, the inverter device that converts DC electricity to AC has a life span of 10 to 12 years and will need to be replaced multiple times during the useful life of the PV system.

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

Photovoltaic (PV) Rooftop Solar Power Generation – 115 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
$460,000	0.0	138,076	0	18,100	18,100	0	13,117	>25	14.7

* 30% federal tax credit

** Solar Renewable Energy Certificate Program (SREC) for 2012 is $95/1000kwh

This measure is not recommended due to payback time period exceeding 25 years.

6.1.2 Solar Thermal Hot Water Plant

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

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

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

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

Solar Thermal Hot Water Plant

Budgetary Cost	Annual Utility Savings				Total Savings	Federal Tax Credit *	Payback (without incentive)	Payback (with incentives)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$	$	$	Years	Years
$15,000	0.0	4,400	0	$580	$580	4,500	>25	18.1

* 30% federal tax credit

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

6.2 Demand Response Curtailment

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

Utility Curtailment is an agreement with the utility provider's regional transmission organization and an approved Curtailment Service Provider (CSP) to shed electrical load by either turning major equipment off or energizing all or part of a facility utilizing an emergency generator; therefore, reducing the electrical demand on the utility grid. This program is to benefit the utility company during high demand

periods and utility provider offers incentives to the CSP to participate in this program. Enrolling in the program will require program participants to drop electrical load or turn on emergency generators during high electrical demand conditions or during emergencies. Part of the program also will require that program participants reduce their required load or run emergency generators with notice to test the system.

A pre-approved CSP will require a minimum of 100 kW of load reduction to participate in any curtailment program. From June 2011 through April 2012, the Helene Fuld Building a maximum electricity demand of 124 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 Helene Fuld Building are as follows:

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

The Helene Fuld building is considered 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)	9,600	2,200	4.4	240	4.3	X
4	HVAC Replace Electric Heat in RTUs	60,700	19,700	3.1	0	3.1	X
5	HVAC Install Variable Speed Drives, High Efficiency Motors	30,000	13,500	2.2	5,000	1.9	X
6	Install Vending Miser	200 (per unit)	190 (average)	1.1	0	1.1	X
7	Replace Rooftop Exhaust Fans	4,560	600	7.6	0	7.6	X
8	Replace Domestic Hot Water Pumps	300	200	1.5	0	1.5	X
9	HVAC Building Automation System Upgrade / Re-Commission	18,000	1,400	12.9	0	12.9	X
13	Lighting Replacements with Lighting Controls (Occupancy Sensors)	31,700	7,100	4.5	4,800	3.8	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

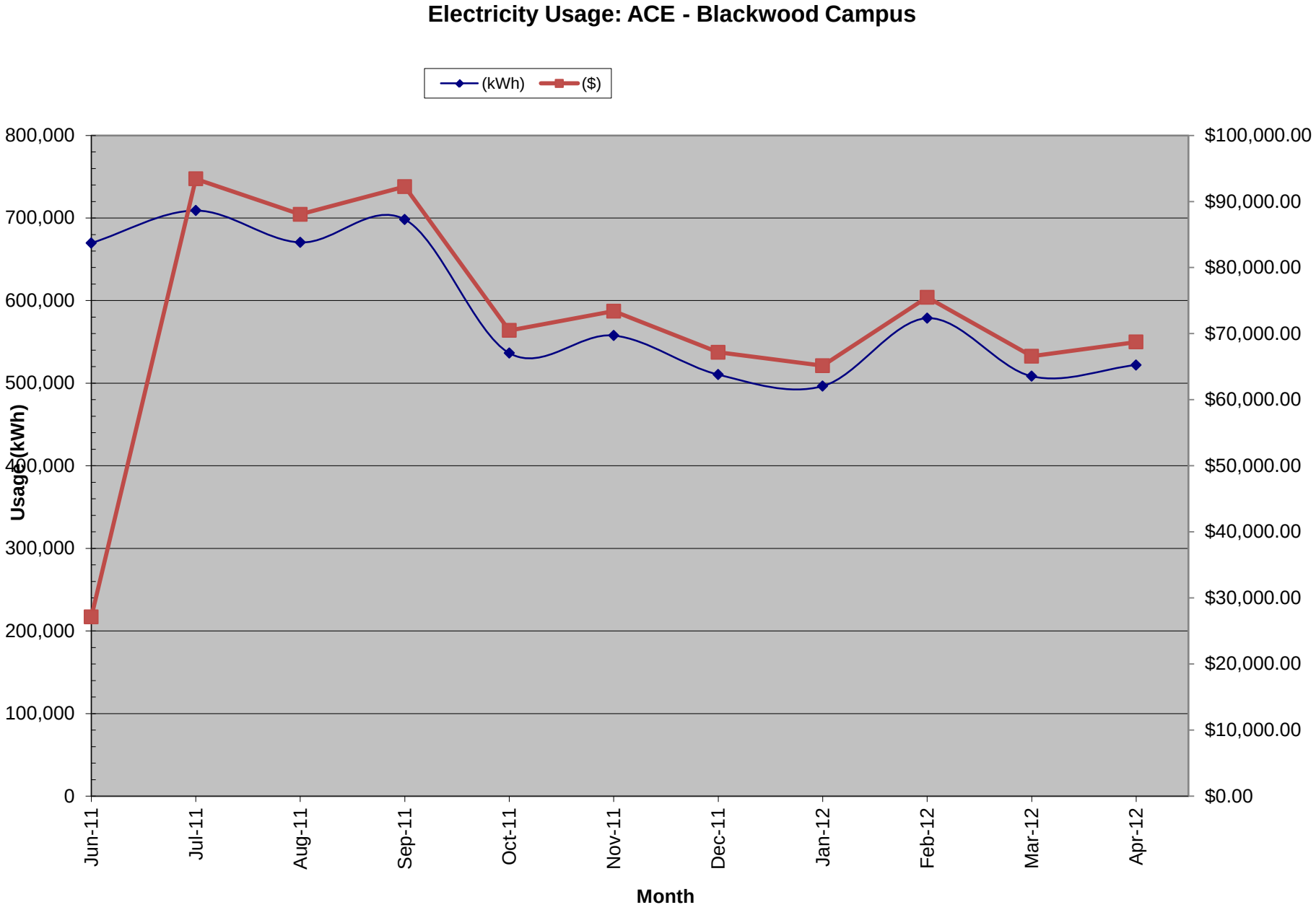
Building Name	~Electrical Consumption	Cost
Building		$ -
Taft Hall	580,947.75	$ 76,355
Truman Hall	580,947.75	$ 76,355

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		

New Jersey BPU Energy Audit Program
CHA #24364
Camden County College
Helen Fuld Building (Soon to be Administration Building)
Original Construction Date: 1993
Renovation/Addtion Date: 2012

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 B-2 B-3 B-4 B-5 B-6	6	Weil-Mclain	GV-6	CP2317118 CP2300562 CP2317112 CP2300550 CP23005500 CP2300561	Heating / Natural Gas	175 MBH Input / 133 MBH Output / 76% Efficiency	Boiler Room 111	Helene Fuld Building	1993	16	Fair Condition, Cast Iron Sectional Boiler
Building Loop Pump #1 Building Loop Pump #2	2	Auora Pumps	344SBF3X4X11	92-12824-2 92-12824-1	Building Loop Pump / Electric	15 HP / 1745 RPM / High Efficiency 90.2%	Mechanical Room 111	Helene Fuld Building / WSHP Water Loop for Cooling & Heating	1993	-4	Good Condition
CT-1	1	Baltimore Air Coil	J-1205-B33R	R92101131	Ejector Cooling Tower / Electric	476 GPM, 8°F Water ΔT at 78°F WB / No Motors	HVAC Yard / Behind Mechanical Room	Helene Fuld Building	1993	1	Fair Condition, Natural Draft Cooling Tower
Loop HX	1	Baltimore Air Coil	HK-8-10-2-1A	92-101132	Building Water Loop Heat Exchanger / Natural Draft Cooling Tower	476 GPM Tube side (CT-1) / 381 GPM shell side to building / Shell & Tube	Mechanical Room 111	Helene Fuld Building	1993	-4	Good Condition
Tower Loop Pump #1 Tower Loop Pump #2	2	Auora Pumps	344SBF3X4X12	92-12823-2 92-12823-1	Tower Loop Pump / Electric	30 HP / 1775 RPM / High Efficiency 91.7%	Mechanical Room 111	Helene Fuld Building / Cooling Tower Water Loop	1993	-4	Good Condition
DWH-1	1	AO Smith	DEL 40102	MA93-5000037-M32	Domestic Hot Water Heating / Electric	6.0 kW / 40 gal	Storgae 124	1st Floor	1993	-7	Good Condition
DWH-2	1	AO Smith	DEL 40102	MA93-5000036-M32	Domestic Hot Water Heating / Electric	6.0 kW / 40 gal	Storage 240	2nd Floor	1993	1	Good Condition
RTU-1	1	YORK	DJ048E15NUBAA2C	N0B9581878	HVAC / DX Cooling, Electric Heating	1600 CFM / CLG: 48 MBH HTG: 48 MBH / 1.5 HP SF	Rooftop Above Area Being Served	Classroom 202	2010	13	Good Condition
RTU-2	1	YORK	DJ036E15N4BAA2C	N0B9581970	HVAC / DX Cooling, Electric Heating	1200 CFM / CLG: 36 MBH HTG: 36 MBH / 1.5 HP SF	Rooftop Above Area Being Served	Classroom 203	2010	13	Good Condition
RTU-3	1	YORK	DJ036E15N4BAA2C	N0B9581971	HVAC / DX Cooling, Electric Heating	1200 CFM / CLG: 36 MBH HTG: 36 MBH / 1.5 HP SF	Rooftop Above Area Being Served	Classroom 204	2010	13	Good Condition
RTU-4	1	YORK	DJ048E15N4BAA2C	N0B9581979	HVAC / DX Cooling, Electric Heating	1600 CFM / CLG: 48 MBH HTG: 48 MBH / 1.5 HP SF	Rooftop Above Area Being Served	Classroom 205	2010	13	Good Condition
RTU-5	1	YORK	DJ048E15N4BAA2C	N0B9581977	HVAC / DX Cooling, Electric Heating	1600 CFM / CLG: 48 MBH HTG: 48 MBH / 1.5 HP SF	Rooftop Above Area Being Served	Classroom 206	2010	13	Good Condition
RTU-6	1	YORK	DJ048E15N4BAA2C	N0B9581976	HVAC / DX Cooling, Electric Heating	1600 CFM / CLG: 48 MBH HTG: 48 MBH / 1.5 HP SF	Rooftop Above Area Being Served	Classroom 207	2010	18	Good Condition

APPENDIX B

Equipment Inventory

New Jersey BPU Energy Audit Program
CHA #24364
Camden County College
Helen Fuld Building (Soon to be Administration Building)
Original Construction Date: 1993
Renovation/Addtion Date: 2012

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.
RTU-7	1	YORK	DJ036E15N4BAA2C	N0B9581969	HVAC / DX Cooling, Electric Heating	1200 CFM / CLG: 36 MBH HTG: 36 MBH / 1.5 HP SF	Rooftop Above Area Being Served	Classroom 208	2010	13	Good Condition
RTU-8	1	YORK	DJ036E15N4BAA2C	N0B9581972	HVAC / DX Cooling, Electric Heating	1200 CFM / CLG: 36 MBH HTG: 36 MBH / 1.5 HP SF	Rooftop Above Area Being Served	Classroom 210	2010	13	Good Condition
RTU-9	1	YORK	BP120C00N4AAA3B	N0E8906901	HVAC / DX Cooling, Electric Heating	3750 CFM / CLG: 120 MBH HTG: 60 MBH / 1.5 HP SF	Rooftop Above Area Being Served	Atrium	2010	13	Good Condition
HP-1 Water Source Heat Pump	1	Snyder General	CCW070ACTS	7 XKO6947 04	HVAC / WSHP Electric Cooling & Heating, Vertical Cabinet	1400 CFM / CLG: 48.5 MBH @ 10.5 EER HTG: 54.2 MBH @ 3.2 COP	Floor Mounted Cabinet In Area Served	First Floor	1993	-4	Good Condition
HP-2 Water Source Heat Pump	1	Snyder General	CCW019ACNS	7 XLO6310 08	HVAC / WSHP Electric Cooling & Heating, Vertical Cabinet	1500 CFM / CLG: 55.7 MBH @ 10.7 EER HTG: 54.2 MBH @ 3.7 COP	Floor Mounted Cabinet In Area Served	First Floor	1993	-4	Good Condition
HP-3 Water Source Heat Pump	1	Snyder General	CCW024ACNS	7 XLO5320 08	HVAC / WSHP Electric Cooling & Heating, Vertical Cabinet	340 CFM / CLG: 11.6 MBH @ 11.0 EER HTG:73.5 MBH @ 3.5 COP	Floor Mounted Cabinet In Area Served	First Floor	1993	-4	Good Condition
HP-4 Water Source Heat Pump	1	Snyder General	CCW120ACTS	7 XLO6939 04	HVAC / WSHP Electric Cooling & Heating, Vertical Cabinet	3800 CFM / CLG: 119.2 MBH @ 9.5 EER HTG: 158.8 MBH @ 3.5 COP	Floor Mounted Cabinet In Area Served	First Floor	1993	-4	Good Condition
HP-5 Water Source Heat Pump	1	Climate Master	HS015ESNMRBGCSC	B10280945	HVAC / WSHP Electric Cooling & Heating, Vertical Cabinet	2400 CFM / CLG: 70.0 MBH @ 11.4 EER HTG: 90.3 MBH @ 3.9 COP	Floor Mounted Cabinet In Area Served	First Floor	1993	-4	Good Condition
HP-6 Water Source Heat Pump	1	Snyder General	NOT AVAILABLE	NOT AVAILABLE	HVAC / WSHP Electric Cooling & Heating, Vertical Cabinet	1000 CFM / CLG: 32.0 MBH @ 10.9 EER HTG: 35.8 MBH @ 3.4 COP	Floor Mounted Cabinet In Area Served	First Floor	1993	-4	Good Condition
HP-7 Water Source Heat Pump	1	McQuay	W.CMS.1.070.K.Z.00. Z.00.AC.11	P/N 210933500	HVAC / WSHP Electric Cooling & Heating, Vertical Cabinet	630 CFM / CLG:18.7 MBH @ 11.3 EER HTG: 23.2 MBH @ 3.8 COP	Floor Mounted Cabinet In Area Served	First Floor	1993	-4	Good Condition

New Jersey BPU Energy Audit Program
CHA #24364
Camden County College
Helen Fuld Building (Soon to be Administration Building)
Original Construction Date: 1993
Renovation/Addtion Date: 2012

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.
HP-8 Water Source Heat Pump	1	Snyder General	9540951180	7 XLO5321 08	HVAC / WSHP Electric Cooling & Heating, Vertical Cabinet	800 CFM / CLG: 26.5 MBH @ 10.4 EER HTG: 30.0 MBH @ 3.6 COP	Floor Mounted Cabinet In Area Served	First Floor	1993	-4	Good Condition
HP-9 Water Source Heat Pump	1	Snyder General	CCW036ACNS	7 XLO2935 08	HVAC / WSHP Electric Cooling & Heating, Vertical Cabinet	1200 CFM / CLG: 42.7 MBH @ 10.4 EER HTG: 47.1 MBH @ 3.0 COP	Floor Mounted Cabinet In Area Served	First Floor	1993	-4	Good Condition
HP-10 Water Source Heat Pump	1	Snyder General	CCW036ACNS	7 XLO2394 08	HVAC / WSHP Electric Cooling & Heating, Vertical Cabinet	900 CFM / CLG: 25.1 MBH @ 11.0 EER HTG: 28.8 MBH @ 3.5 COP	Floor Mounted Cabinet In Area Served	Second Floor	1993	-4	Good Condition
HP-12 Water Source Heat Pump	1	Snyder General	CCW036ACNS	7 XLO2938 08	HVAC / WSHP Electric Cooling & Heating, Vertical Cabinet	1200 CFM / CLG: 36.2 MBH @ 10.8 EER HTG: 40.4 MBH @ 3.7 COP	Floor Mounted Cabinet In Area Served	Second Floor	1993	-4	Good Condition
HP-13 Water Source Heat Pump	1	Trane	GEHB036711T0200LRD010000100000000000	W08J43277	HVAC / WSHP Electric Cooling & Heating, Vertical Cabinet	1600 CFM / CLG: 48.0 MBH @ 10.7 EER HTG: 55.0 MBH @ 3.5 COP	Floor Mounted Cabinet In Area Served	Second Floor	1993	-4	Good Condition
HP-14 Water Source Heat Pump	1	Snyder General	CCW036ACNS	7 XLO2937 08	HVAC / WSHP Electric Cooling & Heating, Vertical Cabinet	400 CFM / CLG: 12.0 MBH @ 10.7 EER HTG: 15.8 MBH @ 3.8 COP	Floor Mounted Cabinet In Area Served	Second Floor	1993	-4	Good Condition
HP-15 Water Source Heat Pump	1	Trane	GEHB09041D0D00RLD100010000000000000	WO8E25435	HVAC / WSHP Electric Cooling & Heating, Vertical Cabinet	2000 CFM / CLG: 60.2 MBH @ 10.4 EER HTG: 69.4 MBH @ 3.5 COP	Floor Mounted Cabinet In Area Served	Second Floor	1993	-4	Good Condition
HP-16 Water Source Heat Pump	1	Snyder General	CCW048ACTS	7 XLO3115 08	HVAC / WSHP Electric Cooling & Heating, Vertical Cabinet	3000 CFM / CLG: 86.5 MBH @ 10.0 EER HTG: 102.5 MBH @ 3.5 COP	Floor Mounted Cabinet In Area Served	Second Floor	1993	-4	Good Condition
AC-1	1	FUJITSU	AOU18CL	DCN012801	HVAC / DX Cooling	525 CFM / CLG: 18 MBH / 1/12 HP SF / 10.4 EER	Rooftop	IT Closet in Work Lab	2010	18	Good Condition
AC-2	1	YORK	TCG32452152A	W0G8059997	HVAC / DX Cooling	800 CFM / CLG: 24 MBH 1/8 HP SF / 13 SEER	Outside on Grade & in Offices Being Served	Office Area 216	2009	17	Good Condition
AC-3	1	YORK	TCDGD2452152A	W0G8040395	HVAC / DX Cooling	800 CFM / CLG: 24 MBH 1/8 HP SF / 13 SEER	Outside on Grade & in Offices Being Served	Office 218	2009	17	Good Condition

New Jersey BPU Energy Audit Program
CHA #24364
Camden County College
Helen Fuld Building (Soon to be Administration Building)
Original Construction Date: 1993
Renovation/Addtion Date: 2012

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.
UV-1 thru UV-18	18	Snyder General	EABAENRSAR	NOT AVAILABLE	HVAC / Hot Water Heating	Fractional HP fan motors	Vertical unit ventilator floor mounted cabinet	Exterior Zone Rooms, 1st & 2nd Floors	2007	15	Good Condition

Energy Audit of Camden County College (Helene Fuld 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
227	Lower Atrium	48	**W60CF1**	F81EL	60	2.88	SW	2500	None	7,200	
162A	Room - 102	24	**4' 4-LAMP T-12**	F44EL	120	2.88	SW	2500	None	7,200	
11A	Room - 102	14	**4' 2-LAMP T-12**	F42EL	60	0.84	SW	2500	None	2,100	
162A	Room - 103	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	C-OCC	510	
162A	Room - 105	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	C-OCC	510	
162A	Room - 104	11	**4' 4-LAMP T-12**	F44EL	120	1.32	SW	2125	C-OCC	2,805	
162A	Room - 106	12	**4' 4-LAMP T-12**	F44EL	120	1.44	SW	2500	None	3,600	
162A	Room - 106A	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	OCC	510	
162A	Room - 106B	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	OCC	510	
162A	Corridor	13	**4' 4-LAMP T-12**	F44EL	120	1.56	SW	2125	OCC	3,315	
162A	Storage Room - 110	3	**4' 4-LAMP T-12**	F44EL	120	0.36	SW	2250	C-OCC	810	
11A	Mechanical Room	12	**4' 2-LAMP T-12**	F42EL	60	0.72	SW	2250	C-OCC	1,620	
162A	Cafeteria	7	**4' 4-LAMP T-12**	F44EL	120	0.84	SW	2125	OCC	1,785	
162A	Room - 113	4	**4' 4-LAMP T-12**	F44EL	120	0.48	SW	2125	OCC	1,020	
162A	Room - 114	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	OCC	510	
162A	Corridor	7	**4' 4-LAMP T-12**	F44EL	120	0.84	SW	2000	OCC	1,680	
162A	Room - 116	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	OCC	510	
162A	Room - 117	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	OCC	510	
162A	Room - 119	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	OCC	510	
162A	Room - 120	3	**4' 4-LAMP T-12**	F44EL	120	0.36	SW	2125	OCC	765	
162A	Room - 126	4	**4' 4-LAMP T-12**	F44EL	120	0.48	SW	2125	OCC	1,020	
162A	Room - 128	3	**4' 4-LAMP T-12**	F44EL	120	0.36	SW	2125	OCC	765	
11A	Toilet Room - 129	1	**4' 2-LAMP T-12**	F42EL	60	0.06	SW	2125	OCC	128	
162A	Room - 121	6	**4' 4-LAMP T-12**	F44EL	120	0.72	SW	2125	OCC	1,530	
162A	1st Floor Men's Bathroom	3	**4' 4-LAMP T-12**	F44EL	120	0.36	SW	2500	None	900	
162A	Room - 127	3	**4' 4-LAMP T-12**	F44EL	120	0.36	SW	2125	OCC	765	
162A	Room - 135	9	**4' 4-LAMP T-12**	F44EL	120	1.08	SW	2125	OCC	2,295	
162A	Room - 136	10	**4' 4-LAMP T-12**	F44EL	120	1.20	SW	500	None	600	
162A	Room - 125	1	**4' 4-LAMP T-12**	F44EL	120	0.12	SW	2125	OCC	255	
11A	Room - 135A	1	**4' 2-LAMP T-12**	F42EL	60	0.06	SW	2500	None	150	
227	2nd Floor Atrium	20	**W60CF1**	F81EL	60	1.20	SW	2500	None	3,000	
162A	Room - 202	12	**4' 4-LAMP T-12**	F44EL	120	1.44	SW	2500	None	3,600	
162A	Room - 203	15	**4' 4-LAMP T-12**	F44EL	120	1.80	SW	2125	OCC	3,825	
162A	Room - 240	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	1063	None	255	
162A	2nd Floor Men's Bathroom	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	OCC	510	
162A	2nd Floor Women's Bathroom	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	1063	None	255	
11A	Janitor	1	**4' 2-LAMP T-12**	F42EL	60	0.06	SW	1063	None	64	
162A	Room - 204	15	**4' 4-LAMP T-12**	F44EL	120	1.80	SW	2125	OCC	3,825	
162A	Room - 207	12	**4' 4-LAMP T-12**	F44EL	120	1.44	SW	500	None	720	
162A	Room - 206	12	**4' 4-LAMP T-12**	F44EL	120	1.44	SW	500	None	720	
162A	Stair Tower	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	500	None	120	
11A	Stair Tower	2	**4' 2-LAMP T-12**	F42EL	60	0.12	SW	2125	OCC	255	
162A	2nd Floor Corridor	9	**4' 4-LAMP T-12**	F44EL	120	1.08	SW	1063	None	1,148	
162A	Room - 232	4	**4' 4-LAMP T-12**	F44EL	120	0.48	SW	2125	OCC	1,020	
227	Room - 227	4	**W60CF1**	F81EL	60	0.24	SW	1063	None	255	

Energy Audit of Camden County College (Helene Fuld 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
162A	Room - 230	5	**4' 4-LAMP T-12**	F44EL	120	0.60	SW	2250	None	1,350	
222A	Toilet Room - 231	1	**1' 1-LAMP T-12**	F1.51SS	19	0.02	SW	2250	None	43	
4A	Room - 228	6	**2-LAMP U-TUBE T-12**	FU2SS	95	0.57	SW	500	None	285	
162A	Room - 232	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	520	None	125	
162A	Room - 213	1	**4' 4-LAMP T-12**	F44EL	120	0.12	SW	520	C-OCC	62	
162A	Room - 214	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	520	None	125	
162A	Room - 215	1	**4' 4-LAMP T-12**	F44EL	120	0.12	SW	500	None	60	
162A	Room - 216	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	4380	None	1,051	
162A	Room - 217	1	**4' 4-LAMP T-12**	F44EL	120	0.12	SW	4380	None	526	
162A	Room - 218	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	8760	None	2,102	
162A	Room - 219	4	**4' 4-LAMP T-12**	F44EL	120	0.48	SW	8760	None	4,205	
162A	Room - 220	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	OCC	510	
162A	Room - 221	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	OCC	510	
162A	Room - 223	1	**4' 4-LAMP T-12**	F44EL	120	0.12	SW	500	None	60	
162A	Room - 222A	1	**4' 4-LAMP T-12**	F44EL	120	0.12	SW	500	None	60	
162A	Room - 223A	1	**4' 4-LAMP T-12**	F44EL	120	0.12	SW	8760	None	1,051	
162A	Room - 222	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	500	None	120	
162A	Room - 224	4	**4' 4-LAMP T-12**	F44EL	120	0.48	SW	3285	OCC	1,577	
162A	Room - 225	1	**4' 4-LAMP T-12**	F44EL	120	0.12	SW	3285	OCC	394	
162A	Room - 226	1	**4' 4-LAMP T-12**	F44EL	120	0.12	SW	8760	None	1,051	
162A	2nd Floor Hallway	9	**4' 4-LAMP T-12**	F44EL	120	1.08	SW	8760	None	9,461	
162A	Room - 211	4	**4' 4-LAMP T-12**	F44EL	120	0.48	SW	500	None	240	
4A	Room - 211A	1	**2-LAMP U-TUBE T-12**	FU2SS	95	0.10	SW	2125	OCC	202	
11A	Room - 211B	1	**4' 2-LAMP T-12**	F42EL	60	0.06	SW	500	None	30	
162A	Room - 210	16	**4' 4-LAMP T-12**	F44EL	120	1.92	SW	2000	OCC	3,840	
162A	Room - 209	3	**4' 4-LAMP T-12**	F44EL	120	0.36	SW	2000	None	720	
162A	Room - 208	16	**4' 4-LAMP T-12**	F44EL	120	1.92	SW	500	None	960	
11A	2nd Floor Bathroom	1	**4' 2-LAMP T-12**	F42EL	60	0.06	SW	8760	OCC	526	
11A	2nd Floor Bathroom	1	**4' 2-LAMP T-12**	F42EL	60	0.06	SW	500	None	30	
143	Exterior	6	**HPS 100 POLE**	HPS100/1	138	0.83	SW	500	None	414	
9A	Exterior	6	**High Bay MH 200 35 Feet High**	MH200/1	232	1.39	SW	8760	OCC	12,194	
	Total	**435**				**46.34**				**109,842**	

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	89,600	1,400	64.0	3,000	61.9	
ECM-2	Replace Domestic Water Heater (DWH)	9,600	2,180	4.4	240	4.3	X
ECM-3	HVAC Water Source Heat Pumps Replacement	155,600	1,900	81.9	0	81.9	
ECM-4	HVAC Replace Electric Heat in RTUs	60,700	19,700	3.1	0	3.1	X
ECM-5	HVAC Install Speed Frequency Drives, High Efficiency Motors	30,000	13,500	2.2	5,000	1.9	X
ECM-6	Vending Miser & Vending Machine Upgrade	600	600	1.0	0	1.0	X
ECM-7	Rooftop Exhaust Fan Replacement	4,560	600	7.6	0	7.6	X
ECM-8	DHW Pumps	300	200	1.5	0	1.5	X
ECM-9	BAS Upgrade / Recommissioning	18,000	1,400	12.9	0	12.9	
ECM-10	Open Loop Cooling Tower - VFD	50,600	-3,400	-14.9	0	-14.9	
ECM-11	Lighting Replacement Upgrades	27,442	5,100	5.4	4,178	4.6	X
ECM-12	Lighting Controls Installation (Occupancy Sensors)	4,300	3,800	1.1	600	1.0	X
ECM-13	Lighting Replacements with Lighting Controls (Occupancy Sensors)	31,700	7,100	4.5	4,778	3.8	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
89,600	0	0	1,800	1,400	0	1,400	(0.6)	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
9,600	13,600	10	-360	2,200	0	2,200	1.7	240	4.4	4.3

ECM-3 HVAC Water Source Heat Pumps 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
155,600	14,400	0	0	1,900	0	1,900	(0.8)	0	>20	>20

ECM-4 HVAC Replace Electric Heat in RTUs

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
60,700	201,900	0	-8,600	19,700	0	19,700	3.9	0	3.1	3.1

ECM-5 HVAC Install Speed Frequency Drives, High Efficiency Motors

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
30,000	103,000	0	0	13,500	0	13,500	8.0	5,000	2.2	1.9

ECM-6 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-7 **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
4,560	4,030	0	140	600	0	600	1.7	0	7.6	7.6

ECM-8 **DHW Pumps**

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

ECM-9 **BAS Upgrade / Recommissioning**

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
18,000	9,120	0	250	1,400	0	1,400	-0.2	0	12.9	12.9

ECM-10 **Open Loop Cooling Tower - VFD**

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
50,600	-22,810	-10	0	-3,400	0	-3,400	-2.3	0	-14.9	-14.9

ECM-11 **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
27,442	34,500	14	0	5,100	0	5,100	1.8	4,178	5.4	4.6

ECM-12 **Lighting Controls Installation (Occupancy Sensors)**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
4,300	28,600	0	0	3,800	0	3,800	12.1	600	1.1	1.0

ECM-13 **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
31,700	51,600	10	0	7,100	0	7,100	2.4	4,778	4.5	3.8

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Utility Costs		Yearly Usage	MTCDE	Building Area	Annual Utility Cost	
$ 0.131	$/kWh blended		0.00042021	36,000	Electric	Natural Gas
$ 0.119	$/kWh consumpt	350,879	0.00042021		$46,853	$2,473
$ 5.94	$/kW	124	0			
$ 0.80	$/Therm	3,095	0.00533471			
$ -	$/kgals	-	0			

Helene Fuld 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	1,800	0	0	$ 1,400	$ 89,600	64.0	9.6	25	$ 3,000	Y	$ 62,700	$ 3,000	61.9	0	0	45,000	0	0	$ 36,000	(0.6)
ECM-2	Replace Domestic Water Heater (DWH)	12.0	13,600	(360)	0	0	$ 2,180	$ 9,600	4.4	3.8	12	$ 240	Y	$ 6,700	$ 240	4.3	144	163,200	-4,320	0	0	$ 26,200	1.7
ECM-3	HVAC Water Source Heat Pumps Replacement	0.0	14,400	0	0	0	$ 1,900	$ 155,600	81.9	6.1	15		Y	$ 75,000	$ -	81.9	0	216,000	0	0	0	$ 28,400	(0.8)
ECM-4	HVAC Replace Electric Heat in RTUs	0.0	201,900	(8,600)	0	0	$ 19,700	$ 60,700	3.1	39.0	15			$ -	$ -	3.1	0	3,028,500	-129,000	0	0	$ 295,000	3.9
ECM-5	HVAC Install Speed Frequency Drives, High Efficiency Motors	0.0	103,000	0	0	0	$ 13,500	$ 30,000	2.2	43.3	20	$ 5,000		$ -	$ 5,000	1.9	0	2,060,000	0	0	0	$ 270,800	8.0
ECM-6	Vending Miser & Vending Machine Upgrade	0.0	4,336	0	0	0	$ 600	$ 600	1.0	1.8	15			$ -	$ -	1.0	0	65,043	0	0	0	$ 8,500	13.2
ECM-7	Rooftop Exhaust Fan Replacement	0.4	4,032	139	0	0	$ 600	$ 4,560	7.6	2.4	20			$ -	$ -	7.6	9	80,641	2,776	0	0	$ 12,400	1.7
ECM-8	DHW Pumps	0.1	1,190	0	0	0	$ 200	$ 300	1.5	0.5	20			$ -	$ -	1.5	3	23,807	0	0	0	$ 3,000	9.0
ECM-9	BAS Upgrade / Recommissioning	0.0	9,123	254	0	0	$ 1,400	$ 18,000	12.9	5.2	10			$ -	$ -	12.9	0	91,228	2,538	0	0	$ 14,000	(0.2)
ECM-10	Open Loop Cooling Tower - VFD	(9.9)	(22,810)	0	0	0	$ (3,400)	$ 50,600	-14.9	-9.6	20			$ -	$ -	-14.9	-198	-456,191	0	0	0	$ (68,300)	(2.3)
ECM-11	Lighting Replacement Upgrades	13.6	34,500	0	0	0	$ 5,100	$27,442	5.4	14.5	15	$ 4,178		$ -	$ 4,178	4.6	204	517,500	0	0	0	$ 75,900	1.8
ECM-12	Lighting Controls Installation (Occupancy Sensors)	0.0	28,600	0	0	0	$ 3,800	$4,300	1.1	12.0	15	$ 600		$ -	$ 600	1.0	0	429,000	0	0	0	$ 56,400	12.1
ECM-13	Lighting Replacements with Lighting Controls (Occupancy Sensors)	13.6	51,600	0	0	0	$ 7,100	$31,700	4.5	21.7	15	$ 4,778	Y	$ 22,200	$ 4,778	3.8	204	774,000	0	0	0	$ 106,300	2.4
	Total (Does Not Include ECM-6 & ECM-7)	**16.2**	**380,372**	**(6,767)**	**0.0**	**0.0**	**45,180.0**	**451,260.0**	10.0		17	$ 13,018		$ 166,600	$ 13,018	9.7	**160.6**	**6,046,228**	**(83,006)**	**0**	**0**	**$ 732,300**	0.6
	Total Measures with Positive ROI	**25.6**	**370,100**	**(8,960)**	**0.0**	**0.0**	**42,480.0**	**132,000.0**	3.1		16	$ 10,018		$ 28,900	$ 10,018	2.9	**359.1**	**6,195,191**	**(130,544)**	**0**	**0**	**$ 722,200**	4.5
	% of Existing	**13%**	**108%**	**-219%**	**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 boilers operating as secondary boilers. Boiler installation location/space to be determined since there is not enough room in the existing boiler room. Space may have to be provided in existing building or constructed if boiler cannot fit in exsiting mechanical space.

Existing Fuel Nat.Gas
Proposed Fuel Nat.Gas

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	$ 0.80	/ Therm	
Proposed Fuel Cost	$ 0.80	/ Therm	
Baseline Fuel Use	13,534	Therms	Based on historical utility data.
Existing Boiler Plant Efficiency	80%		Estimated or Measured
Baseline Boiler Load	1,082,720	Mbtu/yr	Baseline Fuel Use x Existing Efficiency x 100 Mbtu/Therms
Baseline Fuel Cost	$ 10,815		
Proposed Boiler Plant Efficiency	92%		New Condensing Boiler Efficiency
Proposed Fuel Use	11,769	Therms	Baseline Boiler Load / Proposed Efficiency / 100 Mbtu/Therms
Proposed Fuel Cost	$ 9,405		
Annual Utility Savings	**1,800**	**Therms**	
Annual Savings	$ 1,400		
Boiler Addition Project Cost	**$ 89,600**		
Simple Payback	64	Years	

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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.		
						$ -	$ -	$ -	$ -	
1,000 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	$ -	$ 2,600	
Reprogram DDC system	1	EA	$ 100.0	$ 350.00		$ 110	$ 473	$ -	$ 600	
Miscellaneous Electrical	1	LS	$ 500	$ 250		$ 550	$ 338	$ -	$ 900	
Miscellaneous HW Piping	1	LS	$ 2,000	$ 1,000		$ 2,200	$ 1,350	$ -	$ 3,600	
Boiler room/space construction	1	LS	$ 20,000	$ 10,000		$ 22,000	$ 13,500	$ -	$ 35,500	
						$ -	$ -	$ -	$ -	

$ 67,900	Subtotal
$ 6,790	10% Contingency
$ 14,938	20% Contractor O&P
$ -	0% Engineering
$ 89,600	**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	50	˚F	Termperature of water coming into building
Hot Water Temperature	130	˚F	
Hot Water Usage per day	191	gal/day	Calculated from usage below
Annual Hot Water Energy Demand	33,137	MBTU/yr	Energy required to heat annual quantity of hot water to setpoint
Existing Tank Size	80	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)	1.0	MBH	
Annual Standby Hot Water Load	8,760	MBTU/yr	
Total Annual Hot Water Demand (w/ standby losses)	41,897	Mbtu/yr	Building demand plus standby losses
Existing Water Heater Efficiency	90%		Per Manufacturer
Total Annual Energy Required	46,552	Mbtu/yr	
Total Annual Electric Required	**13,600**	**kWh/yr**	**Electrical Savings**
Average Annual Electric Demand	1.55	kW	
Peak Electric Demand	**12.0**	**kW**	**Per Manufacturer's Nameplate (Demand Savings)**
New Tank Size	0	Gallons	Based on Rinnai tankless water heater with no 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)	33,137	MBTU/yr	
Proposed Avg. Hot water heater efficiency	92%		Based on Rinnai instantaneous, tankless DHW heater
Proposed Total Annual Energy Required	36,018	MBTU/yr	
Proposed Fuel Use	**360**	**Therms/yr**	
Elec Utility Demand Unit Cost	$5.94	$/kW	
Elec Utility Supply Unit Cost	$0.12	$/kWh	
NG Utility Unit Cost	$0.80	$/Therm	
Existing Operating Cost of DHW	$2,468	$/yr	
Proposed Operating Cost of DHW	$288	$/yr	
Annual Utility Cost Savings	**$2,181**	**$/yr**	

Daily Hot Water Demand

			#USES PER DAY		FULL TIME OCCUPANTS**				
FIXTURE	*BASE WATER USE GPM	DURATION OF USE (MIN)	MALE	FEMALE	MALE	FEMALE	TOTAL GAL/DAY	% HOT WATER	TOTAL HW GAL/DAY
LAVATORY (Low-Flow Lavs use 0.5 GPM)	2.5	0.25	3	3	100	100	375	50%	188
SHOWER	2.5	5	1	1			0	75%	0
KITCHEN SINK	2.5	0.5	1	1			0	75%	0
MOP SINK	2.5	2	1	1	1		5	75%	4
Dishwasher (gal per u	10	1	1	0			0	100%	0
						TOTAL	380		**191**

*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	2	EA	$ 1,200	$ 300		$ 2,640	$ 810	$ -	$ 3,450	
Miscellaneous Electrical	2	EA	$ 50	$ 100		$ 110	$ 270	$ -	$ 380	
Venting Kit	2	EA	$ 450	$ 650		$ 990	$ 1,755	$ -	$ 2,745	
Miscellaneous Piping and Valves	2	LS	$ 300			$ 660	$ -	$ -	$ 660	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 7,303	Subtotal
$ 730	10% Contingency
$ 1,607	20% Contractor O&P
$ -	0% Engineering
$ 9,600	**Total**

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EQUIPMENT	AREA SERVED	DX COOLING CAPACITY (MBH)	DX HEATING CAPACITY (MBH)	TONS COOLING
HP-1	First Floor	48.5	54.2	4.0
HP-2	First Floor	55.7	54.2	4.6
HP-3	First Floor	11.6	73.5	1.0
HP-4	First Floor	119.2	158.8	9.9
HP-5	First Floor	70.0	90.3	5.8
HP-6	First Floor	32.0	35.8	2.7
HP-7	First Floor	11.3	23.2	0.9
HP-8	First Floor	26.5	30.0	2.2
HP-9	First Floor	42.7	47.1	3.6
HP-10	Second Floor	25.1	28.8	2.1
HP-12 (No HP-11)	Second Floor	36.2	40.4	3.0
HP-13	Second Floor	48.0	55.0	4.0
HP-14	Second Floor	12.0	15.8	1.0
HP-15	Second Floor	60.2	69.4	5.0
HP-16	Second Floor	86.5	102.5	7.2
		686	*879*	*MBH*

ECM-3: HVAC Water Source Heat Pumps Replacement

ECM Description Summary

By replacing older water source heat pump equipment with units which have high efficiency fan motors and higher SEER/EER compressors, significant electrical energy can be saved. 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 water source heat pumps.

ASSUMPTIONS			Comments
Electric Cost	$0.131	/ kWh	
Average run hours per Week	66	Hours	
Space Balance Point	55	F	
Space Temperature Setpoint	74	deg F	Setpoint.
Cooling BTU/Hr Rating of existing DX equipment	685,500	Btu / Hr	Total BTU/hr of DX cooling equipment to be replaced.
Heating BTU/Hr Rating of existing DX equipment	879,000	Btu / Hr	Total BTU/hr of DX cooling equipment to be replaced.
Average EER (cooling)	11.7		Units are 10 years old, EER of 12.0, COP of 3.0 when new.
Average COP (heating)	3.1		Units are 10 years old, EER of 12.0, COP of 3.0 when new.
Existing Annual Electric Usage	78,292	kWh	

Item	Value	Units	Comments
Proposed Average EER	14.4		
Proposed Average COP	3.8		New two speed variable speed WSHP- McQuay or Equal
Proposed Annual Electric Usage	63,870	kWh	Unit will cycle on w/ temp of room. Possible operating time shown below

ANNUAL SAVINGS		
Annual Electrical Usage Savings	**14,400**	**kWh**
Annual Cost Savings	**$1,900**	
Total Project Cost	**$155,600**	
Simple Payback	82	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
-7.5	0	0	0%	0

Total	8,760	506	55%	276

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Helene Fuld Building

ECM-3: HVAC Water Source Heat Pumps Replacement - 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 (53) WSHPs demolition	16	EA	$ 100	$ 1,000		$ 1,760	$ 21,600	$ -	$ 23,360	
(3) WSHPs, 1.0 ton with cooling and heating	3	EA	$ 1,690	$ 400		$ 5,577	$ 1,620	$ -	$ 7,197	
- Valves & Piping to WSHP CHW & HW coils	3	EA	$ 250	$ 300		$ 825	$ 1,215	$ -	$ 2,040	
- Reprogram DDC system for (1) WSHP	3	EA	$ 75	$ 200		$ 248	$ 810	$ -	$ 1,058	
(1) WSHPs, 2.0 tons with cooling and heating	1	EA	$ 2,140	$ 470		$ 2,354	$ 635	$ -	$ 2,989	
- Valves & Piping to WSHP CHW & HW coils	1	EA	$ 250	$ 300		$ 275	$ 405	$ -	$ 680	
- Reprogram DDC system for (1) WSHP	1	EA	$ 75	$ 200		$ 83	$ 270	$ -	$ 353	
(2) WSHP, 2.5 tons with cooling and heating	2	EA	$ 2,340	$ 500		$ 5,148	$ 1,350	$ -	$ 6,498	
- Valves & Piping to WSHP CHW & HW coils	2	EA	$ 250	$ 300		$ 550	$ 810	$ -	$ 1,360	
- Reprogram DDC system for (1) WSHP	2	EA	$ 75	$ 200		$ 165	$ 540	$ -	$ 705	
(1) WSHPs, 3.0 tons with cooling and heating	1	EA	$ 2,400	$ 575		$ 2,640	$ 776	$ -	$ 3,416	
- Valves & Piping to WSHP CHW & HW coils	1	EA	$ 250	$ 300		$ 275	$ 405	$ -	$ 680	
- Reprogram DDC system for (1) WSHP	1	EA	$ 75	$ 200		$ 83	$ 270	$ -	$ 353	
(3) WSHPs, 4.0 tons with cooling and heating	3	EA	$ 2,850	$ 670		$ 9,405	$ 2,714	$ -	$ 12,119	
- Valves & Piping to WSHP CHW & HW coils	3	EA	$ 300	$ 400		$ 990	$ 1,620	$ -	$ 2,610	
- Reprogram DDC system for (1) WSHP	3	EA	$ 75	$ 200		$ 248	$ 810	$ -	$ 1,058	
(2) WSHPs, 5.0 tons with cooling and heating	2	EA	$ 3,270	$ 890		$ 7,194	$ 2,403	$ -	$ 9,597	
- Valves & Piping to WSHP CHW & HW coils	2	EA	$ 300	$ 400		$ 660	$ 1,080	$ -	$ 1,740	
- Reprogram DDC system for (1) WSHP	2	EA	$ 75	$ 200		$ 165	$ 540	$ -	$ 705	
(1) WSHPs, 6.0 tons with cooling and heating	1	EA	$ 3,300	$ 1,200		$ 3,630	$ 1,620	$ -	$ 5,250	
- Valves & Piping to WSHP CHW & HW coils	1	EA	$ 300	$ 400		$ 330	$ 540	$ -	$ 870	
- Reprogram DDC system for (1) WSHP	1	EA	$ 75	$ 200		$ 83	$ 270	$ -	$ 353	
(1) WSHPs, 7.0 tons with cooling and heating	1	EA	$ 6,600	$ 1,325		$ 7,260	$ 1,789	$ -	$ 9,049	
- Valves & Piping to WSHP CHW & HW coils	1	EA	$ 400	$ 500		$ 440	$ 675	$ -	$ 1,115	
- Reprogram DDC system for (1) WSHP	1	EA	$ 75	$ 300		$ 83	$ 405	$ -	$ 488	
(1) WSHPs, 10.0 tons with cooling and heating	1	EA	$ 8,575	$ 1,525		$ 9,433	$ 2,059	$ -	$ 11,491	
- Valves & Piping to WSHP CHW & HW coils	1	EA	$ 400	$ 500		$ 440	$ 675	$ -	$ 1,115	
- Reprogram DDC system for (1) WSHP	1	EA	$ 75	$ 300		$ 83	$ 405	$ -	$ 488	
Electrical - misc.	16	LS	$ 150	$ 300		$ 2,640	$ 6,480	$ -	$ 9,120	
						$ -	$ -	$ -	$ -	

$ 117,853	Subtotal
$ 11,785	10% Contingency
$ 25,928	20% Contractor O&P
$ -	0% Engineering
$ 155,600	**Total**

Camden County College Blackwood Campus- NJBPU
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Helene Fuld Building

ECM-4: Air Handling Unit Electric Heating Coil Replacement

ECM Description Summary (rewrite and simplify)

Air handling equipment serving building have electric heat to provide heating for the areas being served. The electric resistive heating equipment consumes electrical energy; the boiler plant can produce the required heating capacity using boilers and less costly natural gas. It is recommended electric heat in the air handlers be replaced with duct mounted hot water reheat coils. The electric heat in the air handlers themselves can remain to provide auxiliary heat in the event of an emergency or if hot water system becomes inoperable for some reason. Electric heating coils will be mounted in the main supply ductwork from each unit to provide temperature control for each zone in the majority of the high school building areas.

EQUIPMENT	AREA SERVED	DX Cooling Capacity (MBH)	Electric Heating Capacity (MBH)
RTU-1	Classroom 202	48.0	48.0
RTU-2	Classroom 203	36.0	36.0
RTU-3	Classroom 204	36.0	36.0
RTU-4	Classroom 205	48.0	48.0
RTU-5	Classroom 206	48.0	48.0
RTU-6	Classroom 207	48.0	48.0
RTU-7	Classroom 208	36.0	36.0
RTU-8	Classroom 210	36.0	36.0
RTU-9	Atrium	120.0	60.0
		456	*396* *MBH*

Existing Fuel Electric
Proposed Fuel Nat.Gas

Item	Value	Units	Formula/Comments
Baseline Electric Utility Cost	$ 0.131	/ kWh	
Proposed Fuel Cost	$ 0.80	/ Therm	
Existing Electric Duct Coils Capacity	396,000	BTU/hr	Based on scheduled equipment data
Existing Electric Duct Coil Load	116	kW	Conversion 1 kW = 3,412 btu/hr
Annual Hours of Operation	1,739	hours	Heating Hours / year
Existing Electric Duct Coil Electric Usage	201,851	kWh	Electric Load * Heating Hours
Baseline Electric Cost	$ 26,530	/year	
Hot Water System Plant Efficiency	80%		Based on using existing boiler
Hot Water Heating Coil Gas Usage	**8,600**	**Therms**	
Proposed Fuel Cost	$ 6,872		
Annual Electric Utility Savings	**201,900**	kWh	
Annual Cost Savings	$ 19,657		
Electric Duct Heating Coil Replacment Cost	**$ 60,700**		
Simple Payback	3.1	years	

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

ECM-4: Air Handling Unit Electric Heating Coil Replacement - 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.		
						$ -	$ -	$ -	$ -	
Hot Water Coils Cost & Installation	9	EA	$1,200.0	$ 250.00		$ 11,880	$ 3,038	$ -	$ 14,900	*Based on 2012 Means*
Hot Water Valves & Piping Installation	9	EA	$ 1,000	$ 1,200		$ 9,900	$ 14,580	$ -	$ 24,500	
Reprogram DDC system	9	LS	$ 75	$ 150		$ 743	$ 1,823	$ -	$ 2,600	
Miscellaneous Electrical Wiring for Controls	9	EA	$ 100	$ 250		$ 990	$ 3,038	$ -	$ 4,000	
						$ -	$ -	$ -	$ -	

$ 46,000	Subtotal
$ 4,600.00	10% Contingency
$ 10,120.00	20% Contractor O&P
$ -	0% Engineering
$ 60,700	**Total**

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

ECM-5A: Install Variable Speed Drives - CDW Pump

Variable Inputs

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

ECM Description Summary

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

PUMP SCHEDULE

Pump ID	Qty	HP	Total HP	Existing Motor Motor Eff.	New Motor Motor Eff.	Exist. Motor kW Note 1	New Motor kW Note 2
Tower Loop Pump #1,#2	2	30.0	60.0	91.7%	94.1%	39.05	38.05
					Total:	39.05	38.05

SAVINGS ANALYSIS

OAT - DB Avg Temp F	OAT - WB Avg 120	Annual Hours in Bin	Cooling Hours Bin	Pump Load %	Existing Pump kWh	Proposed Pump kW	Speed efficiency %	Proposed Pump kWh	Proposed Savings kWh
(A) See Note 3	(B) See Note 3	(C) See Note 3	(D) =IF(A>TP,0,C)	(E) =0.5+0.5*(50-A)/(50-10)) See Note 4	(F) =D*AA	(G) =BB*E^2.5/CC See Note 5	(H)	(I) =D*G	(J) =F-H
97.5	75	3	3	97%	117	36.0	99.7%	108	9
92.5	74	34	34	92%	1,328	31.1	100.0%	1,057	271
87.5	72	131	131	86%	5,115	26.6	100.0%	3,482	1,633
82.5	69	500	500	81%	19,525	22.5	99.8%	11,278	8,246
77.5	67	620	620	75%	24,210	18.8	98.2%	11,882	12,328
72.5	64	664	664	69%	25,929	15.5	95.9%	10,754	15,174
67.5	62	854	854	64%	33,348	12.6	92.7%	11,607	21,740
62.5	58	927	927	58%	36,198	10.0	88.8%	10,478	25,720
57.5	53	600	600	53%	23,429	7.8	84.1%	5,575	17,854
52.5	47	610	0	0%	0	0.0	0.0%	0	0
47.5	43	611	0	0%	0	0.0	0.0%	0	0
42.5	38	656	0	0%	0	0.0	0.0%	0	0
37.5	34	1,023	0	0%	0	0.0	0.0%	0	0
32.5	30	734	0	0%	0	0.0	0.0%	0	0
27.5	25	334	0	0%	0	0.0	0.0%	0	0
22.5	20	252	0	0%	0	0.0	0.0%	0	0
17.5	16	125	0	0%	0	0.0	0.0%	0	0
12.5	11	47	0	0%	0	0.0	0.0%	0	0
7.5	6	22	0	0%	0	0.0	0.0%	0	0
2.5	2	13	0	0%	0	0.0	0.0%	0	0
-2.5	-3	0	0	0%	0	0.0	0.0%	0	0
-7.5	-8	0	0	0%	0	0.0	0.0%	0	0
		8,760	4,333		169,200			66,223	102,976

Notes:

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

Annual Utility Savings	103,000	kWh
Annual Savings	$ 13,538	
Install Variable Speed Drives	$ 30,000	
- HW Pump Cost		
Simple Payback	2	Years

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Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

ECM-5A: Install Variable Speed Drives - CDW Pump - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
30 HP VFD	2	ea	$ 3,525	$ 1,175		$ 7,755	$ 3,173	$ -	$ 10,928	
30 HP Motors	2	ea	$ 1,660	$ 175		$ 3,652	$ 473	$ -	$ 4,125	
Reprogram DDC system	1	ea	$ 100	$ 350		$ 110	$ 473	$ -	$ 583	
Electrical - misc.	2	ls	$ 200	$ 150		$ 440	$ 405	$ -	$ 845	
2-way or 3-way control valve(s) for system sequence	1	ea	$ 1,000	$ 2,000		$ 1,100	$ 2,700	$ -	$ 3,800	
Pipe pressure sensor/transmitter	1	ea	$ 850	$ 500		$ 935	$ 675	$ -	$ 1,610	
Misc. piping modification	2	ea	$ 200	$ 150		$ 440	$ 405	$ -	$ 845	
						$ -	$ -	$ -	$ -	

$ 22,735	Subtotal
$ 2,273	10% Contingency
$ 5,002	20% Contractor O&P
$ -	0% Engineering
$ 30,000	**Total**

ECM-6 Install Vending Machine Controls

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

Assumptions

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

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Demand Cost $/kW-month	Energy Cost $/kWh
$ 5.94	$ 0.13

Multipliers		
Material	Labor	Equipment
1.10	1.30	1.10

ECM-7a: Install Modern Roof Top Exhaust Fans with Premium Efficiency Motors

Savings Analysis

Cost Estimates

								New																			
			Existing	Load	Existing	Existing	New	Load	New	New	Demand	Demand	Annual	kWh	$ kWh	Total $	Estimated	Payback	Unit Costs			Subtotal Costs				
#	Description	Location	HP	Factor	Efficiency$_a$	kW	HP$_b$	Factor	Efficiency$_a$	kW	Savings	Savings $	Hours	Savings	Savings	Savings	Cost	Years	Materials	Labor	Equipment	Materials	Labor	Equipment	Total Cost	Remarks
1	EF-1	N/A	0.79	0.75	70%	0.6	1	0.75	0.845	0.5	0.108	$ 8	8,760	949	$ 125	$ 132	$ 570	4.3	$ 400	$ 100	$ -	$ 440	$ 130	$ -	$ 570	
2	EF-2	N/A	0.17	0.75	70%	0.1	0	0.75	0.802	0.1	0.017	$ 1	8,760	149	$ 20	$ 21	$ 570	27.4	$ 400	$ 100	$ -	$ 440	$ 130	$ -	$ 570	
3	EF-3	N/A	0.17	0.75	70%	0.1	0	0.75	0.802	0.1	0.017	$ 1	8,760	149	$ 20	$ 21	$ 570	27.4	$ 400	$ 100	$ -	$ 440	$ 130	$ -	$ 570	
4	EF-4	N/A	0.17	0.75	70%	0.1	0	0.75	0.802	0.1	0.017	$ 1	8,760	149	$ 20	$ 21	$ 570	27.4	$ 400	$ 100	$ -	$ 440	$ 130	$ -	$ 570	
5	EF-5	N/A	0.17	0.75	70%	0.1	0	0.75	0.802	0.1	0.017	$ 1	8,760	149	$ 20	$ 21	$ 570	27.4	$ 400	$ 100	$ -	$ 440	$ 130	$ -	$ 570	
6	EF-6	N/A	0.17	0.75	70%	0.1	0	0.75	0.802	0.1	0.017	$ 1	8,760	149	$ 20	$ 21	$ 570	27.4	$ 400	$ 100	$ -	$ 440	$ 130	$ -	$ 570	
7	EF-7	N/A	1.20	0.75	70%	1.0	1	0.75	0.857	0.8	0.176	$ 13	8,760	1,541	$ 203	$ 215	$ 570	2.6	$ 400	$ 100	$ -	$ 440	$ 130	$ -	$ 570	
8	EF-8	N/A	0.50	0.75	70%	0.4	1	0.75	0.833	0.3	0.064	$ 5	8,760	558	$ 73	$ 78	$ 570	7.3	$ 400	$ 100	$ -	$ 440	$ 130	$ -	$ 570	
		Total	**3.32341**			**2.7**	**3.323**			**2.2**	**0.43**	**$ 31**		**3,793**	**$ 498**	**$ 529**	**$ 4,560**										

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-7b: 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	46	LF	Cooling System Efficiency	1.2	kW/ton	Heating System Efficiency	80%	
Area of Exhaust Fans	17	SF	Ex Occupied Clng Temp.	74	*F	Heating On Temp.	60	*F
Existing Infiltration Factor	**8.9**	**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	-14,456	-14,456	-5,279	-5,279	0	0	0	0
97.5	42.5	3	1	2	-9,594	-9,594	-3,504	-3,504	3	1	0	0
92.5	39.5	34	13	21	-7,676	-7,676	-2,803	-2,803	26	10	0	0
87.5	36.6	131	51	80	-5,821	-5,821	-2,126	-2,126	76	28	0	0
82.5	34.0	500	196	304	-4,158	-4,158	-1,518	-1,518	208	76	0	0
77.5	31.6	620	244	376	-2,622	0	-958	0	64	23	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	1,612	384	589	140	0	0	6	2
52.5	18.7	610	240	370	2,379	1,151	869	420	0	0	12	5
47.5	16.2	611	240	371	3,147	1,919	1,149	701	0	0	18	7
42.5	14.4	656	258	398	3,915	2,686	1,429	981	0	0	26	9
37.5	12.6	1,023	402	621	4,682	3,454	1,710	1,261	0	0	50	18
32.5	10.7	734	288	446	5,450	4,222	1,990	1,542	0	0	43	16
27.5	8.6	334	131	203	6,217	4,989	2,270	1,822	0	0	23	8
22.5	6.8	252	99	153	6,985	5,757	2,551	2,102	0	0	20	7
17.5	5.5	125	49	76	7,752	6,524	2,831	2,382	0	0	11	4
12.5	4.1	47	18	29	8,520	7,292	3,111	2,663	0	0	5	2
7.5	2.6	22	9	13	9,287	8,059	3,392	2,943	0	0	2	1
2.5	1.0	13	5	8	10,055	8,827	3,672	3,223	0	0	2	1
-2.5	0.0	0	0	0	10,823	9,594	3,952	3,504	0	0	0	0
TOTALS		**8,760**	**3,441**	**5,319**					377	138	**219**	**80**

Existing Exhaust Infiltration	**142**	**cfm**
Proposed Exhaust Infiltration	**52**	**cfm**

Savings	**139**	**Therms**	**$ 111**
	239	**kWh**	**$ 31**
			$ 142

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	2	2	8.0	4.0	75.0	0.38	1.5
EF-2	N/A	1	1.21	1.21	4.8	1.5	761.0	10.42	15.2
EF-3	N/A	1	1.21	1.21	4.8	1.5	1281.0	17.55	25.6
EF-4	N/A	1	1.21	1.21	4.8	1.5	900.0	12.33	18.0
EF-5	N/A	1	1.54	1.54	6.2	2.4	1503.0	12.65	30.1
EF-6	N/A	1	1.21	1.21	4.8	1.5	842.0	11.53	16.8
EF-7	N/A	1	1.04	1.04	4.2	1.1	140.0	2.58	2.8
EF-8	N/A	1	2	2	8.0	4.0	1605.0	8.03	32.1
Total		**8**	**11.41666667**	**11.41666667**	**45.7**	**17.3**	**7,107.0**	**8.90**	**142.1**

Camden County College Blackwood Campus- NJBPU

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Helene Fuld Building

ECM-8: DHW Pumps

Demand Cost $/kW-month	Energy Cost $/kWh
$ 5.94	$ 0.13

Multipliers		
Material	Labor	Equipment
1.10	1.35	1.10

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
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ECM-9: Re-commission Facility BAS and Integrate Existing HVAC Equipment

ECM Description Summary

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

36,000 Sq Footage

EXISTING CONDITIONS		
Existing Facility Total Electric usage	350,879	kWh
Existing Facility Total Gas usage	3,095	Therms
Existing Facility Cooling Electric usage	91,228	kWh[1]
Existing Facility Heating Natural Gas usage	2538	Therms[2]
PROPOSED CONDITIONS		
Proposed Facility Cooling Electric Savings	9,123	kWh
Proposed Facility Natural Gas Savings	254	Therms
SAVINGS		
Retro-Commissioning Electric Savings	9,123	**kWh**
Retro-Commissioning Natural Gas Savings	254	**Therms**
Total cost savings	$ 1,402	
Estimated Total Project Cost	$ 18,000	[4]
Simple Payback	12.8	**years**

Assumptions

1	26%	of facility total electricity dedicated to Cooling; Source: E source, data from U.S. Energy Information Administration
2	82%	of facility total natural gas dedicated to Heating; Source: E source, data from U.S. Energy Information Administration
3	10%	Typical Savings associated with Retro-Commissioning of controls based on previous project experience
4		Based on $0.50 / Sq Ft recommissioning cost

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ECM-10: Replace Natural Draft Cooling Tower with Mechanical Cooling Tower

Summary:

Owner request new cooling tower which includes an assumed 90.2% efficiency 15 HP motor on the fan. There are no actual savings with this ECM because by adding the new cooling tower the building will consume more electricity This measure shows a negative energy savings and energy cost in savings due to the addition of the new cooling tower.

UNIT	HP	Existing Motor Eff (Note 1)	New Motor Eff (Note 1)	Existing Motor kW	New Motor kW		Building Balance Point
CT- Fan Motor	15.0	90.2%	90.2%	9.92	9.92		55.0
				9.92	9.92	VFD Eff. (CC)	98.5%

OAT - DB Avg Temp F	Bin Hours	Occupied Hours in Bin	AHU Hours in Bin	Existing Fan Kw	Existing Fan kWh	Fan Load %	Proposed Fan kW	Speed efficiency %	Proposed Fan kWh	Savings Fan kWh
(A)	(B)	(C)	(D)	(F)	(F)	(E)	(G)	(H)	(I)	(J)
102.5	0	0	0	9.9	0	50%	1.26	81.5%	0	0
97.5	6	2	2	9.9	21	50%	1.26	81.5%	3	18
92.5	45	16	16	9.9	160	50%	1.26	81.5%	25	135
87.5	146	52	52	9.9	518	50%	1.26	81.5%	81	437
82.5	298	106	106	9.9	1,057	50%	1.26	81.5%	165	892
77.5	476	170	170	9.9	1,688	50%	1.26	81.5%	263	1,425
72.5	662	237	237	9.9	2,348	50%	1.26	81.5%	366	1,982
67.5	740	264	264	9.9	2,624	50%	1.26	81.5%	409	2,215
62.5	765	273	273	9.9	2,713	50%	1.26	81.5%	422	2,290
57.5	733	262	262	9.9	2,599	50%	1.26	81.5%	405	2,195
52.5	668	239	239	9.9	2,369	52%	1.44	83.7%	411	1,958
47.5	659	235	235	9.9	2,337	57%	1.85	87.6%	497	1,840
42.5	685	245	245	9.9	2,429	61%	2.33	91.1%	626	1,803
37.5	739	264	264	9.9	2,621	66%	2.88	94.0%	811	1,810
32.5	717	256	256	9.9	2,543	70%	3.52	96.3%	937	1,606
27.5	543	194	194	9.9	1,926	75%	4.25	98.2%	840	1,086
22.5	318	114	114	9.9	1,128	80%	5.07	99.5%	579	549
17.5	245	88	88	9.9	869	84%	5.99	100.0%	524	344
12.5	156	56	56	9.9	553	89%	7.02	100.0%	391	162
7.5	92	33	33	9.9	326	93%	8.15	100.0%	268	58
2.5	36	13	13	9.9	128	98%	9.40	99.6%	121	6
-2.5	19	7	7	9.9	67	100%	10.08	99.0%	69	-2
-7.5	8	3	3	9.9	28	100%	10.08	99.0%	29	-1
TOTALS		**3,129**	**3,129**	**228**	**31,050**				**8,240**	**22,810**

Notes:

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

INSTALL VARIABLE SPEED DRIVES - SAVINGS SUMMARY					
	Electric Demand	Electric Usage	Nat Gas Usage	Maint.	Total Cost
	(kW)	(kWh)	(Therms)	($)	($)
Savings	**-10**	**-22,810**	**0**	**$0**	**-$2,998**

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ECM-10: Replace Natural Draft Cooling Tower with Mechanical Cooling Tower 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.		
						$ -	$ -	$ -	$ -	
200 Ton Axial Fan Induced Draft Cooling Tower	1	EA	$ 31,625.0	$ 2,593.75		$ 34,788	$ 3,502	$ -	$ 38,300	*Based on 2012 RS Means*
		EA				$ -	$ -	$ -	$ -	
		LS				$ -	$ -	$ -	$ -	
		EA				$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 38,300	Subtotal
$ 3,830.00	10% Contingency
$ 8,426.00	20% Contractor O&P
$ -	0% Engineering
$ 50,600	**Total**

ECM-6 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
$27,442	**13.6**	**34,500**	**0**	**$5,503**	**0**	**$5,503**	**$4,178**	**5.0**	**4.2**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-7 Install Occupancy Sensors

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
$	kW	kWh	therms	$	$	$	$	Years	Years
$4,300	**0.0**	**28,600**	**0**	**$3,759**	**0**	**$3,759**	**$600**	**1.1**	**1.0**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-8 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
$31,700	**13.6**	**51,600**	**0**	**$7,751**	**0**	**$7,751**	**$4,778**	**4.1**	**3.5**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

Energy Audit of Camden County College (Helene Fuld Building)

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ECM-6 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
227	Lower Atrium	48	W60CF1	F81EL	60	2.9	SW	2500	7,200	48	CF42W	CF42/1-L	48	2.3	SW	2,500	5,760	1,440	0.6	$ 230.32	$ 8,640.00		37.5	37.5
162A	Room - 102	24	4' 4-LAMP T-12	F44EL	120	2.9	SW	2500	7,200	24	F28T8	F44SSILL-R	86	2.1	SW	2,500	5,160	2,040	0.8	$ 326.29	$ -	$600	0.0	-1.8
11A	Room - 102	14	4' 2-LAMP T-12	F42EL	60	0.8	SW	2500	2,100	14	F32T8	F42ILL-R	52	0.7	SW	2,500	1,820	280	0.1	$ 44.78	$ 3,360.00		75.0	75.0
162A	Room - 103	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	Room - 105	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	Room - 104	11	4' 4-LAMP T-12	F44EL	120	1.3	SW	2125	2,805	11	F28T8	F44SSILL-R	86	0.9	SW	2,125	2,010	795	0.4	$ 131.12	$ -	$275	0.0	-2.1
162A	Room - 106	12	4' 4-LAMP T-12	F44EL	120	1.4	SW	2500	3,600	12	F28T8	F44SSILL-R	86	1.0	SW	2,500	2,580	1,020	0.4	$ 163.14	$ -	$300	0.0	-1.8
162A	Room - 106A	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	Room - 106B	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	$ -	$50	0.0	-2.1
162A	Corridor	13	4' 4-LAMP T-12	F44EL	120	1.6	SW	2125	3,315	13	F28T8	F44SSILL-R	86	1.1	SW	2,125	2,376	939	0.4	$ 154.96	$ -		0.0	0.0
162A	Storage Room - 110	3	4' 4-LAMP T-12	F44EL	120	0.4	SW	2250	810	3	F28T8	F44SSILL-R	86	0.3	SW	2,250	581	230	0.1	$ 37.43	$ -		0.0	0.0
11A	Mechanical Room	12	4' 2-LAMP T-12	F42EL	60	0.7	SW	2250	1,620	12	F32T8	F42ILL-R	52	0.6	SW	2,250	1,404	216	0.1	$ 35.23	$ 2,880.00		81.7	81.7
162A	Cafeteria	7	4' 4-LAMP T-12	F44EL	120	0.8	SW	2125	1,785	7	F28T8	F44SSILL-R	86	0.6	SW	2,125	1,279	506	0.2	$ 83.44	$ -		0.0	0.0
162A	Room - 113	4	4' 4-LAMP T-12	F44EL	120	0.5	SW	2125	1,020	4	F28T8	F44SSILL-R	86	0.3	SW	2,125	731	289	0.1	$ 47.68	$ -		0.0	0.0
162A	Room - 114	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	Corridor	7	4' 4-LAMP T-12	F44EL	120	0.8	SW	2000	1,680	7	F28T8	F44SSILL-R	86	0.6	SW	2,000	1,204	476	0.2	$ 79.53	$ -		0.0	0.0
162A	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	Room - 117	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	Room - 119	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	Room - 120	3	4' 4-LAMP T-12	F44EL	120	0.4	SW	2125	765	3	F28T8	F44SSILL-R	86	0.3	SW	2,125	548	217	0.1	$ 35.76	$ -		0.0	0.0
162A	Room - 126	4	4' 4-LAMP T-12	F44EL	120	0.5	SW	2125	1,020	4	F28T8	F44SSILL-R	86	0.3	SW	2,125	731	289	0.1	$ 47.68	$ -		0.0	0.0
162A	Room - 128	3	4' 4-LAMP T-12	F44EL	120	0.4	SW	2125	765	3	F28T8	F44SSILL-R	86	0.3	SW	2,125	548	217	0.1	$ 35.76	$ -	$75	0.0	-2.1
11A	Toilet Room - 129	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	128	1	F32T8	F42ILL-R	52	0.1	SW	2,125	111	17	0.0	$ 2.80	$ 240.00		85.6	85.6
162A	Room - 121	6	4' 4-LAMP T-12	F44EL	120	0.7	SW	2125	1,530	6	F28T8	F44SSILL-R	86	0.5	SW	2,125	1,097	434	0.2	$ 71.52	$ -		0.0	0.0
162A	1st Floor Men's Bathroom	3	4' 4-LAMP T-12	F44EL	120	0.4	SW	2500	900	3	F28T8	F44SSILL-R	86	0.3	SW	2,500	645	255	0.1	$ 40.79	$ -		0.0	0.0
162A	Room - 127	3	4' 4-LAMP T-12	F44EL	120	0.4	SW	2125	765	3	F28T8	F44SSILL-R	86	0.3	SW	2,125	548	217	0.1	$ 35.76	$ -		0.0	0.0
162A	Room - 135	9	4' 4-LAMP T-12	F44EL	120	1.1	SW	2125	2,295	9	F28T8	F44SSILL-R	86	0.8	SW	2,125	1,645	650	0.3	$ 107.28	$ -		0.0	0.0
162A	Room - 136	10	4' 4-LAMP T-12	F44EL	120	1.2	SW	500	600	10	F28T8	F44SSILL-R	86	0.9	SW	500	430	170	0.3	$ 46.58	$ -	$250	0.0	-5.4
162A	Room - 125	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	Room - 135A	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2500	150	1	F32T8	F42ILL-R	52	0.1	SW	2,500	130	20	0.0	$ 3.20	$ 240.00		75.0	75.0
227	2nd Floor Atrium	20	W60CF1	F81EL	60	1.2	SW	2500	3,000	20	CF42W	CF42/1-L	48	1.0	SW	2,500	2,400	600	0.2	$ 95.97	$ 3,600.00	$500	37.5	32.3
162A	Room - 202	12	4' 4-LAMP T-12	F44EL	120	1.4	SW	2500	3,600	12	F28T8	F44SSILL-R	86	1.0	SW	2,500	2,580	1,020	0.4	$ 163.14	$ -	$300	0.0	-1.8
162A	Room - 203	15	4' 4-LAMP T-12	F44EL	120	1.8	SW	2125	3,825	15	F28T8	F44SSILL-R	86	1.3	SW	2,125	2,741	1,084	0.5	$ 178.79	$ -		0.0	0.0
162A	Room - 240	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	1062.5	255	2	F28T8	F44SSILL-R	86	0.2	SW	1,063	183	72	0.1	$ 14.34	$ -		0.0	0.0
162A	2nd Floor Men's Bathroom	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	2nd Floor Women's Bathroom	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	1062.5	255	2	F28T8	F44SSILL-R	86	0.2	SW	1,063	183	72	0.1	$ 14.34	$ -		0.0	0.0
11A	Janitor	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	1062.5	64	1	F32T8	F42ILL-R	52	0.1	SW	1,063	55	9	0.0	$ 1.69	$ 240.00		142.2	142.2
162A	Room - 204	15	4' 4-LAMP T-12	F44EL	120	1.8	SW	2125	3,825	15	F28T8	F44SSILL-R	86	1.3	SW	2,125	2,741	1,084	0.5	$ 178.79	$ -		0.0	0.0
162A	Room - 207	12	4' 4-LAMP T-12	F44EL	120	1.4	SW	500	720	12	F28T8	F44SSILL-R	86	1.0	SW	500	516	204	0.4	$ 55.90	$ -		0.0	0.0
162A	Room - 206	12	4' 4-LAMP T-12	F44EL	120	1.4	SW	500	720	12	F28T8	F44SSILL-R	86	1.0	SW	500	516	204	0.4	$ 55.90	$ -		0.0	0.0
162A	Stair Tower	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	500	120	2	F28T8	F44SSILL-R	86	0.2	SW	500	86	34	0.1	$ 9.32	$ -		0.0	0.0
11A	Stair Tower	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
162A	2nd Floor Corridor	9	4' 4-LAMP T-12	F44EL	120	1.1	SW	1062.5	1,148	9	F28T8	F44SSILL-R	86	0.8	SW	1,063	822	325	0.3	$ 64.54	$ -		0.0	0.0
162A	Room - 232	4	4' 4-LAMP T-12	F44EL	120	0.5	SW	2125	1,020	4	F28T8	F44SSILL-R	86	0.3	SW	2,125	731	289	0.1	$ 47.68	$ -		0.0	0.0
227	Room - 227	4	W60CF1	F81EL	60	0.2	SW	1062.5	255	4	CF42W	CF42/1-L	48	0.2	SW	1,063	204	51	0.0	$ 10.12	$ 720.00	$28	71.1	68.3
162A	Room - 230	5	4' 4-LAMP T-12	F44EL	120	0.6	SW	2250	1,350	5	F28T8	F44SSILL-R	86	0.4	SW	2,250	968	383	0.2	$ 62.39	$ -		0.0	0.0
222A	Toilet Room - 231	1	1' 1-LAMP T-12	F1.51SS	19	0.0	SW	2250	43	1	F15T8	F1.51LS	19	0.0	SW	2,250	43	-	0.0	$ -	$ -			
4A	Room - 228	6	2-LAMP U-TUBE T-12	FU2SS	95	0.6	SW	500	285	6	F17T8	F22ILL	33	0.2	SW	500	99	186	0.4	$ 50.96	$ 540.00		10.6	10.6
162A	Room - 232	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	520	125	2	F28T8	F44SSILL-R	86	0.2	SW	520	89	35	0.1	$ 9.49	$ -		0.0	0.0
162A	Room - 213	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	520	62	1	F28T8	F44SSILL-R	86	0.1	SW	520	45	18	0.0	$ 4.75	$ -		0.0	0.0
162A	Room - 214	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	520	125	2	F28T8	F44SSILL-R	86	0.2	SW	520	89	35	0.1	$ 9.49	$ -	$50	0.0	-5.3
162A	Room - 215	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	500	60	1	F28T8	F44SSILL-R	86	0.1	SW	500	43	17	0.0	$ 4.66	$ -		0.0	0.0
162A	Room - 216	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	4380	1,051	2	F28T8	F44SSILL-R	86	0.2	SW	4,380	753	298	0.1	$ 43.99	$ -		0.0	0.0
162A	Room - 217	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	4380	526	1	F28T8	F44SSILL-R	86	0.1	SW	4,380	377	149	0.0	$ 22.00	$ -		0.0	0.0
162A	Room - 218	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	8760	2,102	2	F28T8	F44SSILL-R	86	0.2	SW	8,760	1,507	596	0.1	$ 83.14	$ -		0.0	0.0
162A	Room - 219	4	4' 4-LAMP T-12	F44EL	120	0.5	SW	8760	4,205	4	F28T8	F44SSILL-R	86	0.3	SW	8,760	3,013	1,191	0.1	$ 166.28	$ -		0.0	0.0
162A	Room - 220	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	$ -	$50	0.0	-2.1
162A	Room - 221	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	$ -	$50	0.0	-2.1
162A	Room - 223	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	500	60	1	F28T8	F44SSILL-R	86	0.1	SW	500	43	17	0.0	$ 4.66	$ -	$25	0.0	-5.4
162A	Room - 222A	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	500	60	1	F28T8	F44SSILL-R	86	0.1	SW	500	43	17	0.0	$ 4.66	$ -	$25	0.0	-5.4
162A	Room - 223A	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	8760	1,051	1	F28T8	F44SSILL-R	86	0.1	SW	8,760	753	298	0.0	$ 41.57	$ -	$25	0.0	-0.6
162A	Room - 222	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	500	120	2	F28T8	F44SSILL-R	86	0.2	SW	500	86	34	0.1	$ 9.32	$ -	$50	0.0	-5.4
162A	Room - 224	4	4' 4-LAMP T-12	F44EL	120	0.5	SW	3285	1,577	4	F28T8	F44SSILL-R	86	0.3	SW	3,285	1,130	447	0.1	$ 68.41	$ -	$100	0.0	-1.5
162A	Room - 225	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	3285	394	1	F28T8	F44SSILL-R	86	0.1	SW	3,285	283	112	0.0	$ 17.10	$ -	$25	0.0	-1.5
162A	Room - 226	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	8760	1,051	1	F28T8	F44SSILL-R	86	0.1	SW	8,760	753	298	0.0	$ 41.57	$ -	$25	0.0	-0.6
162A	2nd Floor Hallway	9	4' 4-LAMP T-12	F44EL	120	1.1	SW	8760	9,461	9	F28T8	F44SSILL-R	86	0.8	SW	8,760	6,780	2,681	0.3	$ 374.12	$ -		0.0	0.0
162A	Room - 211	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
4A	Room - 211A	1	2-LAMP U-TUBE T-12	FU2SS	95	0.1	SW	2125	202	1	F17T8	F22ILL	33	0.0	SW	2,125	70	132	0.1	$ 21.74	$ 90.00	$25	4.1	3.0
11A	Room - 211B	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	500	30	1	F32T8	F42ILL-R	52	0.1	SW	500	26	4	0.0	$ 1.10	$ 240.00	$25	219.0	196.2
162A	Room - 210	16	4' 4-LAMP T-12	F44EL	120	1.9	SW	2000	3,840	16	F28T8	F44SSILL-R	86	1.4	SW	2,000	2,752	1,088	0.5	$ 181.78	$ -	$400	0.0	-2.2
162A	Room - 209	3	4' 4-LAMP T-12	F44EL	120	0.4	SW	2000	720	3	F28T8	F44SSILL-R	86	0.3	SW	2,000	516	204	0.1	$ 34.08	$ -	$75	0.0	-2.2
162A	Room - 208	16	4' 4-LAMP T-12	F44EL	120	1.9	SW	500	960	16	F28T8	F44SSILL-R	86	1.4	SW	500	688	272	0.5	$ 74.53	$ -	$400	0.0	-5.4
11A	2nd Floor Bathroom	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	8760	526	1	F32T8	F42ILL-R	52	0.1	SW	8,760	456	70	0.0	$ 9.78	$ 240.00	$25	24.5	22.0
11A	2nd Floor Bathroom	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	500	30	1	F32T8	F42ILL-R	52	0.1	SW	500	26	4	0.0	$ 1.10	$ 240.00	$25	219.0	196.2
143	Exterior	6	HPS 100 POLE	HPS100/1	138	0.8	SW	500	414	6	FXLED39	FXLED39/1	39	0.2	SW	500	117	297	0.6	$ 81.38	$ 612.00	$150	7.5	5.7
9A	Exterior	6	High Bay MH 200 35 Feet High	MH200/1	232	1.4	SW	8760	12,194	6	FXLED78	FXLED78/1	78	0.5	SW	8,760	4,100	8,094	0.9	$ 1,129.71	$ 5,079.60	$150	4.5	4.4
	Total	**435**				**46.3**			**109,842**	**435**			**5,888**	**32.8**			**75,340**	**34,502**	**13.6**	**$5,500**	**$27,442**	**$4,178**		
																	Demand Savings			**13.6**	**$969**			
																	kWh Savings			**34,500**	**$4,534**			
																	Total savings				**$5,503**		**5.0**	**4.2**

Energy Audit of Camden County College (Helene Fuld Building)

CHA Project No. 24364

ECM-7 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
227	Lower Atrium	48	W60CF1	F81EL	60	2.9	SW	2500	7,200.0	48	W60CF1	F81EL	60	2.9	None	2500	7,200.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 102	24	4' 4-LAMP T-12	F44EL	120	2.9	SW	2500	7,200.0	24	4' 4-LAMP T-12	F44EL	120	2.9	None	2500	7,200.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Room - 102	14	4' 2-LAMP T-12	F42EL	60	0.8	SW	2500	2,100.0	14	4' 2-LAMP T-12	F42EL	60	0.8	None	2500	2,100.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 103	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510.0	2	4' 4-LAMP T-12	F44EL	120	0.2	C-OCC	1200	288.0	222.0	0.0	$29.18				
162A	Room - 105	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510.0	2	4' 4-LAMP T-12	F44EL	120	0.2	C-OCC	1200	288.0	222.0	0.0	$29.18	$180.00	$35.00	0.8	0.7
162A	Room - 104	11	4' 4-LAMP T-12	F44EL	120	1.3	SW	2125	2,805.0	11	4' 4-LAMP T-12	F44EL	120	1.3	C-OCC	1200	1,584.0	1,221.0	0.0	$160.48				
162A	Room - 106	12	4' 4-LAMP T-12	F44EL	120	1.4	SW	2500	3,600.0	12	4' 4-LAMP T-12	F44EL	120	1.4	None	2500	3,600.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 106A	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	Room - 106B	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	Corridor	13	4' 4-LAMP T-12	F44EL	120	1.6	SW	2125	3,315.0	13	4' 4-LAMP T-12	F44EL	120	1.6	OCC	1200	1,872.0	1,443.0	0.0	$189.66	$114.00	$20.00	0.6	0.5
162A	Storage Room - 110	3	4' 4-LAMP T-12	F44EL	120	0.4	SW	2250	810.0	3	4' 4-LAMP T-12	F44EL	120	0.4	C-OCC	1000	360.0	450.0	0.0	$59.14	$180.00	$35.00	3.0	2.5
11A	Mechanical Room	12	4' 2-LAMP T-12	F42EL	60	0.7	SW	2250	1,620.0	12	4' 2-LAMP T-12	F42EL	60	0.7	C-OCC	1000	720.0	900.0	0.0	$118.29	$180.00	$35.00	1.5	1.2
162A	Cafeteria	7	4' 4-LAMP T-12	F44EL	120	0.8	SW	2125	1,785.0	7	4' 4-LAMP T-12	F44EL	120	0.8	OCC	1200	1,008.0	777.0	0.0	$102.12	$114.00	$20.00	1.1	0.9
162A	Room - 113	4	4' 4-LAMP T-12	F44EL	120	0.5	SW	2125	1,020.0	4	4' 4-LAMP T-12	F44EL	120	0.5	OCC	1200	576.0	444.0	0.0	$58.36	$114.00	$20.00	2.0	1.6
162A	Room - 114	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	Corridor	7	4' 4-LAMP T-12	F44EL	120	0.8	SW	2000	1,680.0	7	4' 4-LAMP T-12	F44EL	120	0.8	OCC	1000	840.0	840.0	0.0	$110.40	$114.00	$0.00	1.0	1.0
162A	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	Room - 117	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	Room - 119	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	Room - 120	3	4' 4-LAMP T-12	F44EL	120	0.4	SW	2125	765.0	3	4' 4-LAMP T-12	F44EL	120	0.4	OCC	1200	432.0	333.0	0.0	$43.77	$114.00	$20.00	2.6	2.1
162A	Room - 126	4	4' 4-LAMP T-12	F44EL	120	0.5	SW	2125	1,020.0	4	4' 4-LAMP T-12	F44EL	120	0.5	OCC	1200	576.0	444.0	0.0	$58.36	$114.00	$20.00	1.1	0.9
162A	Room - 128	3	4' 4-LAMP T-12	F44EL	120	0.4	SW	2125	765.0	3	4' 4-LAMP T-12	F44EL	120	0.4	OCC	1200	432.0	333.0	0.0	$43.77				
11A	Toilet Room - 129	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	127.5	1	4' 2-LAMP T-12	F42EL	60	0.1	OCC	1200	72.0	55.5	0.0	$7.29	$114.00	$20.00	15.6	12.9
162A	Room - 121	6	4' 4-LAMP T-12	F44EL	120	0.7	SW	2125	1,530.0	6	4' 4-LAMP T-12	F44EL	120	0.7	OCC	1200	864.0	666.0	0.0	$87.53	$114.00	$20.00	1.3	1.1
162A	1st Floor Men's Bathroom	3	4' 4-LAMP T-12	F44EL	120	0.4	SW	2500	900.0	3	4' 4-LAMP T-12	F44EL	120	0.4	None	2500	900.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 127	3	4' 4-LAMP T-12	F44EL	120	0.4	SW	2125	765.0	3	4' 4-LAMP T-12	F44EL	120	0.4	OCC	1200	432.0	333.0	0.0	$43.77	$114.00	$20.00	2.6	2.1
162A	Room - 135	9	4' 4-LAMP T-12	F44EL	120	1.1	SW	2125	2,295.0	9	4' 4-LAMP T-12	F44EL	120	1.1	OCC	1000	1,080.0	1,215.0	0.0	$159.69	$114.00	$20.00	0.7	0.6
162A	Room - 136	10	4' 4-LAMP T-12	F44EL	120	1.2	SW	500	600.0	10	4' 4-LAMP T-12	F44EL	120	1.2	None	500	600.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 125	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	Room - 135A	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2500	150.0	1	4' 2-LAMP T-12	F42EL	60	0.1	None	2500	150.0	0.0	0.0	$0.00	$0.00	$0.00		
227	2nd Floor Atrium	20	W60CF1	F81EL	60	1.2	SW	2500	3,000.0	20	W60CF1	F81EL	60	1.2	None	2500	3,000.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 202	12	4' 4-LAMP T-12	F44EL	120	1.4	SW	2500	3,600.0	12	4' 4-LAMP T-12	F44EL	120	1.4	None	2500	3,600.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 203	15	4' 4-LAMP T-12	F44EL	120	1.8	SW	2125	3,825.0	15	4' 4-LAMP T-12	F44EL	120	1.8	OCC	1200	2,160.0	1,665.0	0.0	$218.83	$114.00	$0.00	0.5	0.5
162A	Room - 240	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	1062.5	255.0	2	4' 4-LAMP T-12	F44EL	120	0.2	None	1062.5	255.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	2nd Floor Men's Bathroom	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	2nd Floor Women's Bathroom	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	1062.5	255.0	2	4' 4-LAMP T-12	F44EL	120	0.2	None	1062.5	255.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Janitor	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	1062.5	63.8	1	4' 2-LAMP T-12	F42EL	60	0.1	None	1062.5	63.8	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 204	15	4' 4-LAMP T-12	F44EL	120	1.8	SW	2125	3,825.0	15	4' 4-LAMP T-12	F44EL	120	1.8	OCC	1200	2,160.0	1,665.0	0.0	$218.83	$114.00	$20.00	0.5	0.4
162A	Room - 207	12	4' 4-LAMP T-12	F44EL	120	1.4	SW	500	720.0	12	4' 4-LAMP T-12	F44EL	120	1.4	None	500	720.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 206	12	4' 4-LAMP T-12	F44EL	120	1.4	SW	500	720.0	12	4' 4-LAMP T-12	F44EL	120	1.4	None	500	720.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Stair Tower	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	500	120.0	2	4' 4-LAMP T-12	F44EL	120	0.2	None	500	120.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Stair Tower	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
162A	2nd Floor Corridor	9	4' 4-LAMP T-12	F44EL	120	1.1	SW	1062.5	1,147.5	9	4' 4-LAMP T-12	F44EL	120	1.1	None	1062.5	1,147.5	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 232	4	4' 4-LAMP T-12	F44EL	120	0.5	SW	2125	1,020.0	4	4' 4-LAMP T-12	F44EL	120	0.5	OCC	1200	576.0	444.0	0.0	$58.36	$114.00	$0.00	2.0	2.0
227	Room - 227	4	W60CF1	F81EL	60	0.2	SW	1062.5	255.0	4	W60CF1	F81EL	60	0.2	None	1062.5	255.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 230	5	4' 4-LAMP T-12	F44EL	120	0.6	SW	2250	1,350.0	5	4' 4-LAMP T-12	F44EL	120	0.6	None	2250	1,350.0	0.0	0.0	$0.00	$0.00	$0.00		
222A	Toilet Room - 231	1	1' 1-LAMP T-12	F1.51SS	19	0.0	SW	2250	42.8	1	1' 1-LAMP T-12	F1.51SS	19	0.0	None	2250	42.8	0.0	0.0	$0.00	$0.00	$0.00		
4A	Room - 228	6	2-LAMP U-TUBE T-12	FU2SS	95	0.6	SW	500	285.0	6	2-LAMP U-TUBE T-12	FU2SS	95	0.6	None	500	285.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 232	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	520	124.8	2	4' 4-LAMP T-12	F44EL	120	0.2	None	520	124.8	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 213	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	520	62.4	1	4' 4-LAMP T-12	F44EL	120	0.1	C-OCC	390	46.8	15.6	0.0	$2.05	$180.00	$35.00	87.8	70.7
162A	Room - 214	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	520	124.8	2	4' 4-LAMP T-12	F44EL	120	0.2	None	520	124.8	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 215	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	500	60.0	1	4' 4-LAMP T-12	F44EL	120	0.1	None	500	60.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 216	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	4380	1,051.2	2	4' 4-LAMP T-12	F44EL	120	0.2	None	4380	1,051.2	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 217	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	4380	525.6	1	4' 4-LAMP T-12	F44EL	120	0.1	None	4380	525.6	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 218	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	8760	2,102.4	2	4' 4-LAMP T-12	F44EL	120	0.2	None	8760	2,102.4	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 219	4	4' 4-LAMP T-12	F44EL	120	0.5	SW	8760	4,204.8	4	4' 4-LAMP T-12	F44EL	120	0.5	None	8760	4,204.8	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 220	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	2.0	1.6
162A	Room - 221	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				
162A	Room - 223	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	500	60.0	1	4' 4-LAMP T-12	F44EL	120	0.1	None	500	60.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 222A	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	500	60.0	1	4' 4-LAMP T-12	F44EL	120	0.1	None	500	60.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 223A	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	8760	1,051.2	1	4' 4-LAMP T-12	F44EL	120	0.1	None	8760	1,051.2	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 222	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	500	120.0	2	4' 4-LAMP T-12	F44EL	120	0.2	None	500	120.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 224	4	4' 4-LAMP T-12	F44EL	120	0.5	SW	3285	1,576.8	4	4' 4-LAMP T-12	F44EL	120	0.5	OCC	1825	876.0	700.8	0.0	$92.11	$114.00	$20.00	1.2	1.0
162A	Room - 225	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	3285	394.2	1	4' 4-LAMP T-12	F44EL	120	0.1	OCC	1825	219.0	175.2	0.0	$23.03	$114.00	$20.00	5.0	4.1
162A	Room - 226	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	8760	1,051.2	1	4' 4-LAMP T-12	F44EL	120	0.1	None	8760	1,051.2	0.0	0.0	$0.00	$0.00	$0.00		
162A	2nd Floor Hallway	9	4' 4-LAMP T-12	F44EL	120	1.1	SW	8760	9,460.8	9	4' 4-LAMP T-12	F44EL	120	1.1	None	8760	9,460.8	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 211	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		
4A	Room - 211A	1	2-LAMP U-TUBE T-12	FU2SS	95	0.1	SW	2125	201.9	1	2-LAMP U-TUBE T-12	FU2SS	95	0.1	OCC	1000	95.0	106.9	0.0	$14.05	$114.00	$0.00	8.1	8.1
11A	Room - 211B	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	500	30.0	1	4' 2-LAMP T-12	F42EL	60	0.1	None	500	30.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 210	16	4' 4-LAMP T-12	F44EL	120	1.9	SW	2000	3,840.0	16	4' 4-LAMP T-12	F44EL	120	1.9	OCC	1000	1,920.0	1,920.0	0.0	$252.35	$114.00	$0.00	0.5	0.5
162A	Room - 209	3	4' 4-LAMP T-12	F44EL	120	0.4	SW	2000	720.0	3	4' 4-LAMP T-12	F44EL	120	0.4	None	2000	720.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 208	16	4' 4-LAMP T-12	F44EL	120	1.9	SW	500	960.0	16	4' 4-LAMP T-12	F44EL	120	1.9	None	500	960.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	2nd Floor Bathroom	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	8760	525.6	1	4' 2-LAMP T-12	F42EL	60	0.1	OCC	2000	120.0	405.6	0.0	$53.31	$114.00	$20.00	2.1	1.8
11A	2nd Floor Bathroom	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	500	30.0	1	4' 2-LAMP T-12	F42EL	60	0.1	None	500	30.0	0.0	0.0	$0.00	$0.00	$0.00		
143	Exterior	6	HPS 100 POLE	HPS100/1	138	0.8	SW	500	414.0	6	HPS 100 POLE	HPS100/1	138	0.8	None	500	414.0	0.0	0.0	$0.00	$0.00	$0.00		
9A	Exterior	6	High Bay MH 200 35 Feet High	MH200/1	232	1.4	SW	8760	12,193.9	6	High Bay MH 200 35 Feet High	MH200/1	232	1.4	OCC	2000	2,784.0	9,409.9	0.0	$1,236.77	$114.00	$0.00	0.1	0.1
	Total	**435**				**46.3**			**109,842**	**435**				**46**			**81,216**	**28,626**	**0**	**$3,800**	**$4,300**	**600**		
																		Demand Savings		**0.0**	**$0**			
																		kWh Savings		**28,600**	**$3,759**			
																		Total Savings			**$3,759**		**1.1**	**1.0**

Energy Audit of Camden County College (Helene Fuld Building)

CHA Project No. 24364

ECM-8 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
227	Lower Atrium	48	W60CF1	F81EL	60	2.9	SW	2500	7,200	48	CF42W	CF42/1-L	48	2.3	None	2,500	5,760	1,440	0.6	$ 230.32	$ 8,640.00	$ -	37.5	37.5
162A	Room - 102	24	4' 4-LAMP T-12	F44EL	120	2.9	SW	2500	7,200	24	F28T8	F44SSILL-R	86	2.1	None	2,500	5,160	2,040	0.8	$ 326.29	$ -	$ 600	0.0	-1.8
11A	Room - 102	14	4' 2-LAMP T-12	F42EL	60	0.8	SW	2500	2,100	14	F32T8	F42ILL-R	52	0.7	None	2,500	1,820	280	0.1	$ 44.78	$ 3,360.00	$ -	75.0	75.0
162A	Room - 103	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	C-OCC	1,200	206	304	0.1	$ 44.75	$ 180.00	$ 35	4.0	3.2
162A	Room - 105	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	C-OCC	1,200	206	304	0.1	$ 44.75	$ -	$ -	0.0	0.0
162A	Room - 104	11	4' 4-LAMP T-12	F44EL	120	1.3	SW	2125	2,805	11	F28T8	F44SSILL-R	86	0.9	C-OCC	1,200	1,135	1,670	0.4	$ 246.13	$ -	$ 275	0.0	-1.1
162A	Room - 106	12	4' 4-LAMP T-12	F44EL	120	1.4	SW	2500	3,600	12	F28T8	F44SSILL-R	86	1.0	None	2,500	2,580	1,020	0.4	$ 163.14	$ -	$ 300	0.0	-1.8
162A	Room - 106A	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	Room - 106B	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	$ 70	2.5	1.0
162A	Corridor	13	4' 4-LAMP T-12	F44EL	120	1.6	SW	2125	3,315	13	F28T8	F44SSILL-R	86	1.1	OCC	1,200	1,342	1,973	0.4	$ 290.88	$ 114.00	$ 20	0.4	0.3
162A	Storage Room - 110	3	4' 4-LAMP T-12	F44EL	120	0.4	SW	2250	810	3	F28T8	F44SSILL-R	86	0.3	C-OCC	1,000	258	552	0.1	$ 79.82	$ 180.00	$ 35	2.3	1.8
11A	Mechanical Room	12	4' 2-LAMP T-12	F42EL	60	0.7	SW	2250	1,620	12	F32T8	F42ILL-R	52	0.6	C-OCC	1,000	624	996	0.1	$ 137.75	$ 3,060.00	$ 35	22.2	22.0
162A	Cafeteria	7	4' 4-LAMP T-12	F44EL	120	0.8	SW	2125	1,785	7	F28T8	F44SSILL-R	86	0.6	OCC	1,200	722	1,063	0.2	$ 156.63	$ 114.00	$ 20	0.7	0.6
162A	Room - 113	4	4' 4-LAMP T-12	F44EL	120	0.5	SW	2125	1,020	4	F28T8	F44SSILL-R	86	0.3	OCC	1,200	413	607	0.1	$ 89.50	$ 114.00	$ 20	1.3	1.1
162A	Room - 114	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	Corridor	7	4' 4-LAMP T-12	F44EL	120	0.8	SW	2000	1,680	7	F28T8	F44SSILL-R	86	0.6	OCC	1,000	602	1,078	0.2	$ 158.65	$ 114.00	$ -	0.7	0.7
162A	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	Room - 117	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	Room - 119	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	Room - 120	3	4' 4-LAMP T-12	F44EL	120	0.4	SW	2125	765	3	F28T8	F44SSILL-R	86	0.3	OCC	1,200	310	455	0.1	$ 67.13	$ 114.00	$ 20	1.7	1.4
162A	Room - 126	4	4' 4-LAMP T-12	F44EL	120	0.5	SW	2125	1,020	4	F28T8	F44SSILL-R	86	0.3	OCC	1,200	413	607	0.1	$ 89.50	$ 114.00	$ 20	1.3	1.1
162A	Room - 128	3	4' 4-LAMP T-12	F44EL	120	0.4	SW	2125	765	3	F28T8	F44SSILL-R	86	0.3	OCC	1,200	310	455	0.1	$ 67.13	$ 114.00	$ 75	1.7	0.6
11A	Toilet Room - 129	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	128	1	F32T8	F42ILL-R	52	0.1	OCC	1,200	62	65	0.0	$ 9.13	$ 354.00	$ 20	38.8	36.6
162A	Room - 121	6	4' 4-LAMP T-12	F44EL	120	0.7	SW	2125	1,530	6	F28T8	F44SSILL-R	86	0.5	OCC	1,200	619	911	0.2	$ 134.25	$ 114.00	$ 20	0.8	0.7
162A	1st Floor Men's Bathroom	3	4' 4-LAMP T-12	F44EL	120	0.4	SW	2500	900	3	F28T8	F44SSILL-R	86	0.3	None	2,500	645	255	0.1	$ 40.79	$ -	$ -	0.0	0.0
162A	Room - 127	3	4' 4-LAMP T-12	F44EL	120	0.4	SW	2125	765	3	F28T8	F44SSILL-R	86	0.3	OCC	1,200	310	455	0.1	$ 67.13	$ 114.00	$ 20	1.7	1.4
162A	Room - 135	9	4' 4-LAMP T-12	F44EL	120	1.1	SW	2125	2,295	9	F28T8	F44SSILL-R	86	0.8	OCC	1,000	774	1,521	0.3	$ 221.72	$ 114.00	$ 20	0.5	0.4
162A	Room - 136	10	4' 4-LAMP T-12	F44EL	120	1.2	SW	500	600	10	F28T8	F44SSILL-R	86	0.9	None	500	430	170	0.3	$ 46.58	$ -	$ 250	0.0	-5.4
162A	Room - 125	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	Room - 135A	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2500	150	1	F32T8	F42ILL-R	52	0.1	None	2,500	130	20	0.0	$ 3.20	$ 240.00	$ -	75.0	75.0
227	2nd Floor Atrium	20	W60CF1	F81EL	60	1.2	SW	2500	3,000	20	CF42W	CF42/1-L	48	1.0	None	2,500	2,400	600	0.2	$ 95.97	$ 3,600.00	$ 500	37.5	32.3
162A	Room - 202	12	4' 4-LAMP T-12	F44EL	120	1.4	SW	2500	3,600	12	F28T8	F44SSILL-R	86	1.0	None	2,500	2,580	1,020	0.4	$ 163.14	$ -	$ 300	0.0	-1.8
162A	Room - 203	15	4' 4-LAMP T-12	F44EL	120	1.8	SW	2125	3,825	15	F28T8	F44SSILL-R	86	1.3	OCC	1,200	1,548	2,277	0.5	$ 335.63	$ 114.00	$ -	0.3	0.3
162A	Room - 240	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	1062.5	255	2	F28T8	F44SSILL-R	86	0.2	None	1,063	183	72	0.1	$ 14.34	$ -	$ -	0.0	0.0
162A	2nd Floor Men's Bathroom	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	2nd Floor Women's Bathroom	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	1062.5	255	2	F28T8	F44SSILL-R	86	0.2	None	1,063	183	72	0.1	$ 14.34	$ -	$ -	0.0	0.0
11A	Janitor	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	1062.5	64	1	F32T8	F42ILL-R	52	0.1	None	1,063	55	9	0.0	$ 1.69	$ 240.00	$ -	142.2	142.2
162A	Room - 204	15	4' 4-LAMP T-12	F44EL	120	1.8	SW	2125	3,825	15	F28T8	F44SSILL-R	86	1.3	OCC	1,200	1,548	2,277	0.5	$ 335.63	$ 114.00	$ 20	0.3	0.3
162A	Room - 207	12	4' 4-LAMP T-12	F44EL	120	1.4	SW	500	720	12	F28T8	F44SSILL-R	86	1.0	None	500	516	204	0.4	$ 55.90	$ -	$ -	0.0	0.0
162A	Room - 206	12	4' 4-LAMP T-12	F44EL	120	1.4	SW	500	720	12	F28T8	F44SSILL-R	86	1.0	None	500	516	204	0.4	$ 55.90	$ -	$ -	0.0	0.0
162A	Stair Tower	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	500	120	2	F28T8	F44SSILL-R	86	0.2	None	500	86	34	0.1	$ 9.32	$ -	$ -	0.0	0.0
11A	Stair Tower	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
162A	2nd Floor Corridor	9	4' 4-LAMP T-12	F44EL	120	1.1	SW	1062.5	1,148	9	F28T8	F44SSILL-R	86	0.8	None	1,063	822	325	0.3	$ 64.54	$ -	$ -	0.0	0.0
162A	Room - 232	4	4' 4-LAMP T-12	F44EL	120	0.5	SW	2125	1,020	4	F28T8	F44SSILL-R	86	0.3	OCC	1,200	413	607	0.1	$ 89.50	$ 114.00	$ -	1.3	1.3
227	Room - 227	4	W60CF1	F81EL	60	0.2	SW	1062.5	255	4	CF42W	CF42/1-L	48	0.2	None	1,063	204	51	0.0	$ 10.12	$ 720.00	$ 28	71.1	68.3
162A	Room - 230	5	4' 4-LAMP T-12	F44EL	120	0.6	SW	2250	1,350	5	F28T8	F44SSILL-R	86	0.4	None	2,250	968	383	0.2	$ 62.39	$ -	$ -	0.0	0.0
222A	Toilet Room - 231	1	1' 1-LAMP T-12	F1.51SS	19	0.0	SW	2250	43	1	F15T8	F1.51LS	19	0.0	None	2,250	43	-	0.0	$ -	$ -	$ -		
4A	Room - 228	6	2-LAMP U-TUBE T-12	FU2SS	95	0.6	SW	500	285	6	F17T8	F22ILL	33	0.2	None	500	99	186	0.4	$ 50.96	$ 540.00	$ -	10.6	10.6
162A	Room - 232	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	520	125	2	F28T8	F44SSILL-R	86	0.2	None	520	89	35	0.1	$ 9.49	$ -	$ -	0.0	0.0
162A	Room - 213	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	520	62	1	F28T8	F44SSILL-R	86	0.1	C-OCC	390	34	29	0.0	$ 6.22	$ 180.00	$ 35	29.0	23.3
162A	Room - 214	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	520	125	2	F28T8	F44SSILL-R	86	0.2	None	520	89	35	0.1	$ 9.49	$ -	$ 50	0.0	-5.3
162A	Room - 215	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	500	60	1	F28T8	F44SSILL-R	86	0.1	None	500	43	17	0.0	$ 4.66	$ -	$ -	0.0	0.0
162A	Room - 216	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	4380	1,051	2	F28T8	F44SSILL-R	86	0.2	None	4,380	753	298	0.1	$ 43.99	$ -	$ -	0.0	0.0
162A	Room - 217	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	4380	526	1	F28T8	F44SSILL-R	86	0.1	None	4,380	377	149	0.0	$ 22.00	$ -	$ -	0.0	0.0
162A	Room - 218	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	8760	2,102	2	F28T8	F44SSILL-R	86	0.2	None	8,760	1,507	596	0.1	$ 83.14	$ -	$ -	0.0	0.0
162A	Room - 219	4	4' 4-LAMP T-12	F44EL	120	0.5	SW	8760	4,205	4	F28T8	F44SSILL-R	86	0.3	None	8,760	3,013	1,191	0.1	$ 166.28	$ -	$ -	0.0	0.0
162A	Room - 220	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	$ 70	2.5	1.0
162A	Room - 221	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	$ 50	2.5	1.4
162A	Room - 223	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	500	60	1	F28T8	F44SSILL-R	86	0.1	None	500	43	17	0.0	$ 4.66	$ -	$ 25	0.0	-5.4
162A	Room - 222A	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	500	60	1	F28T8	F44SSILL-R	86	0.1	None	500	43	17	0.0	$ 4.66	$ -	$ 25	0.0	-5.4
162A	Room - 223A	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	8760	1,051	1	F28T8	F44SSILL-R	86	0.1	None	8,760	753	298	0.0	$ 41.57	$ -	$ 25	0.0	-0.6
162A	Room - 222	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	500	120	2	F28T8	F44SSILL-R	86	0.2	None	500	86	34	0.1	$ 9.32	$ -	$ 50	0.0	-5.4
162A	Room - 224	4	4' 4-LAMP T-12	F44EL	120	0.5	SW	3285	1,577	4	F28T8	F44SSILL-R	86	0.3	OCC	1,825	628	949	0.1	$ 134.42	$ 114.00	$ 120	0.8	0.0
162A	Room - 225	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	3285	394	1	F28T8	F44SSILL-R	86	0.1	OCC	1,825	157	237	0.0	$ 33.61	$ 114.00	$ 45	3.4	2.1
162A	Room - 226	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	8760	1,051	1	F28T8	F44SSILL-R	86	0.1	None	8,760	753	298	0.0	$ 41.57	$ -	$ 25	0.0	-0.6
162A	2nd Floor Hallway	9	4' 4-LAMP T-12	F44EL	120	1.1	SW	8760	9,461	9	F28T8	F44SSILL-R	86	0.8	None	8,760	6,780	2,681	0.3	$ 374.12	$ -	$ -	0.0	0.0
162A	Room - 211	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
4A	Room - 211A	1	2-LAMP U-TUBE T-12	FU2SS	95	0.1	SW	2125	202	1	F17T8	F22ILL	33	0.0	OCC	1,000	33	169	0.1	$ 26.62	$ 204.00	$ 25	7.7	6.7
11A	Room - 211B	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	500	30	1	F32T8	F42ILL-R	52	0.1	None	500	26	4	0.0	$ 1.10	$ 240.00	$ 25	219.0	196.2
162A	Room - 210	16	4' 4-LAMP T-12	F44EL	120	1.9	SW	2000	3,840	16	F28T8	F44SSILL-R	86	1.4	OCC	1,000	1,376	2,464	0.5	$ 362.63	$ 114.00	$ 400	0.3	-0.8
162A	Room - 209	3	4' 4-LAMP T-12	F44EL	120	0.4	SW	2000	720	3	F28T8	F44SSILL-R	86	0.3	None	2,000	516	204	0.1	$ 34.08	$ -	$ 75	0.0	-2.2
162A	Room - 208	16	4' 4-LAMP T-12	F44EL	120	1.9	SW	500	960	16	F28T8	F44SSILL-R	86	1.4	None	500	688	272	0.5	$ 74.53	$ -	$ 400	0.0	-5.4
11A	2nd Floor Bathroom	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	8760	526	1	F32T8	F42ILL-R	52	0.1	OCC	2,000	104	422	0.0	$ 55.98	$ 354.00	$ 45	6.3	5.5
11A	2nd Floor Bathroom	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	500	30	1	F32T8	F42ILL-R	52	0.1	None	500	26	4	0.0	$ 1.10	$ 240.00	$ 25	219.0	196.2
143	Exterior	6	HPS 100 POLE	HPS100/1	138	0.8	SW	500	414	6	FXLED39	FXLED39/1	39	0.2	None	500	117	297	0.6	$ 81.38	$ 612.00	$ 150	7.5	5.7
9A	Exterior	6	High Bay MH 200 35 Feet High	MH200/1	232	1.4	SW	8760	12,194	6	FXLED78	FXLED78/1	78	0.5	OCC	2,000	936	11,258	0.9	$ 1,545.52	$ 5,193.60	$ 150	3.4	3.3
	Total	**435**				**46.3**			**109,842**	**435**				**32.8**			**58,223**		**13.6**	**$7,800**	**$31,700**	**4,778**		
																		Demand Savings		**13.6**	**$969**			
																		kWh Savings		**51,600**	**$6,782**			
																		Total Savings			**$7,751**		**4.1**	**3.5**

APPENDIX D

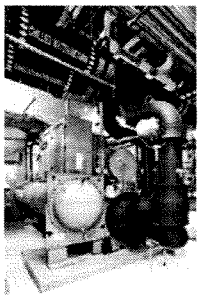
New Jersey Pay For Performance Incentive Program

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
Helene Fuld 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)	36,000
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)	$46,853	$2,473
Existing Usage (from utility)	350,879	3,095
Proposed Savings	370,100	-8,960
Existing Total MMBtus	1,507	
Proposed Savings MMBtus	367	
% Energy Reduction	**24.4%**	
Proposed Annual Savings	$42,480	

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

	Incentives $		
	Elec	Gas	Total
Incentive #1	$0	$0	$0
Incentive #2	$40,711	-$11,200	$29,511
Incentive #3	$40,711	-$11,200	$29,511
Total All Incentives	**$81,422**	**-$22,400**	**$59,022**

Total Project Cost	$132,000

		Allowable Incentive
% Incentives #1 of Utility Cost*	0.0%	$0
% Incentives #2 of Project Cost**	22.4%	$29,511
% Incentives #3 of Project Cost**	22.4%	$29,511
Total Eligible Incentives***	**$59,022**	
Project Cost w/ Incentives	$72,978	

Project Payback (years)	
w/o Incentives	w/ Incentives
3.1	1.7

* 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
Helene Fuld (Administration Building)

Cost of Electricity	$0.160	/kWh
Electricity Usage	434,749	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
$240,000	**60.0**	**76,667**	**0**	**$12,267**	**0**	**$12,267**	**$0**	**$6,133**	**19.6**	**13.0**

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

Area Output*
1,649 m2
17,754 ft2

Perimeter Output*
231 m
758 ft

Available Roof Space for PV:
(Area Output - 10 ft x Perimeter) x 85%
8,646 ft2

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

8 watt/ft2
69,169 DC watts
60 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
76,667 annual kWh calculated in PV Watts program

% Offset Calc

Usage	434,749	(from utilities)
PV Generation	76,667	(generated using PV Watts)
% offset	18%	

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

AC Energy & Cost Savings

Cautions for Interpreting the Results

Helene Fuld (Camden County College)

Station Identification

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

PV System Specifications

DC Rating:	60.0 kW
DC to AC Derate Factor:	0.830
AC Rating:	49.8 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	4204	550.72
2	3.50	4950	648.45
3	4.81	7254	950.27
4	5.27	7500	982.50
5	5.81	8326	1090.71
6	6.13	8232	1078.39
7	5.76	7919	1037.39
8	5.63	7710	1010.01
9	5.03	6816	892.90
10	4.04	5868	768.71
11	2.90	4184	548.10
12	2.46	3704	485.22
Year	4.51	76667	10043.38

Output Hourly Performance Data

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

Output Results as Text

Saving Text from a Browser

Run PVWATTS v.2 for another location

Run PVWATTS v.1

Please send questions and comments to Webmaster

Disclaimer and copyright notice.

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

APPENDIX G

EPA Portfolio Manager

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Helene Fuld School of Nursing

Building ID: 3251839
For 12-month Period Ending: April 30, 2012[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: November 08, 2012

Facility
Helene Fuld School of Nursing
College Drive
Blackwood, NJ 08012

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1993
Gross Floor Area (ft²): 36,000

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

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	2,228,346
Natural Gas - (kBtu)[4]	0
Total Energy (kBtu)	2,228,346

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)	316

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	Helene Fuld School of Nursing	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	36,000 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	48,489.69
02/26/2012	03/25/2012	47,219.56
01/26/2012	02/25/2012	53,751.97
12/26/2011	01/25/2012	46,113.18
11/26/2011	12/25/2011	47,404.77
10/26/2011	11/25/2011	51,799.92
09/26/2011	10/25/2011	49,825.21
08/26/2011	09/25/2011	64,853.94
07/26/2011	08/25/2011	62,267.53
06/26/2011	07/25/2011	65,851.56
05/26/2011	06/25/2011	62,203.35
83431473 Consumption (kWh (thousand Watt-hours))		**599,780.68**
83431473 Consumption (kBtu (thousand Btu))		**2,046,451.68**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**2,046,451.68**
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
Helene Fuld School of Nursing
College Drive
Blackwood, NJ 08012

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Helene Fuld School of Nursing	
Gross Floor Area Excluding Parking: (ft^2)	36,000
Year Built	1993
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)	36,000
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	$ 73,595.06	$ 73,595.06	N/A	N/A	$ 123,649.21
$/$ft^2$/year	$ 2.04	$ 2.04	N/A	N/A	$ 3.43
Greenhouse Gas Emissions					
$MtCO_2e$/year	316	316	0	N/A	531
$kgCO_2e/ft^2$/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.