CAMDEN COUNTY COLLEGE
WOLVERTON LIBRARY
ENERGY ASSESSMENT

for

NEW JERSEY
BOARD OF PUBLIC UTILITIES

CHA PROJECT NO. 24364

November 2012

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APPENDICES

REPORT DISCLAIMER

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

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

1.0 EXECUTIVE SUMMARY

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

Building Name	Address	Square Feet	Construction Date
Camden County College Wolverton Library	200 College Drive Building 3 Blackwood, New Jersey	50,000	Original: 1973 Renovation: 2002

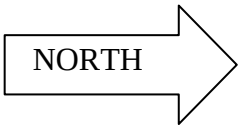
The Energy Conservation Measures (ECMs) identified in this report will allow for a more efficient use of energy and if pursued have the opportunity to qualify for the New Jersey SmartStart Buildings Program. Potential annual savings of $11,900 for the recommended ECMs may be realized with a payback of 8.8 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	125,900	1,000	>20	3,000	>20	
2	HVAC Air Handling Equipment Replacement	138,100	8,400	16.4	0	16.4	
3	HVAC Install Variable Speed Drives, High Efficiency Motor	13,600	2,500	5.4	3,800	3.9	X
4	HVAC Install Demand Control Ventilation	12,100	2,800	4.3	0	4.3	X
4	HVAC Building Automation System Upgrade / Re-commissioning	25,000	2,100	11.9	0	11.9	X
5	Lighting Replacement Upgrades	49,300	1,500	>20	6,500	>20	
6	Install Lighting Controls (Occupancy Sensors)	4,500	4,000	1.1	3,600	0.2	X
7	Lighting Replacements with Lighting Controls (Occupancy Sensors)	53,900	4,500	12.0	7,300	10.4	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.

Wolverton Library located on the Camden County College campus in Blackwood, NJ, is a 50,000 square foot three story building with a basement, and contains various student service offices, classrooms, typical library floors, reference stacks, internet access stations, student lounge, study areas/carrels/rooms, computer labs, administrative and faculty offices and support spaces. A HVAC make up air handling unit is located in a basement mechanical room; boilers and chiller are in a lower level mechanical room with a rooftop cooling tower. The original building was constructed in 1973, with a later renovation in 2002. The Connector building was constructed to the south of Madison Hall 2007; construction shown in photo below. 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, Wolverton Library is a 50,000 square foot, three-story building with a basement which contains various student service offices, classrooms, typical library floors, reference stacks, internet access stations, student lounge, study areas/carrels/rooms, computer labs, administrative and faculty offices and support spaces. The 2002 renovation provided refurbished interiors and certain new HVAC equipment. A main entrance on the east side of the building, first floor opens into the first floor library circulation desk; an additional entrance is on the north side of the building.

Wolverton Library has approximately XXX students and XXX faculty and staff, and appears to be fully utilized during our field inspection. The building can be assumed to be fully occupied until 8:00 pm during the week, and by approximately one quarter of the occupants during the weekend. The hours of operation are:

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

The original building is constructed of structural steel framing with masonry walls and brick veneer on the first floor, and a pebble stone veneer exterior finish on the upper two stories. Insulation is incorporated into the wall assembly for an improved envelope, particularly during the 2002 renovation. The basement floor contains various student service offices (Audio/Visual Aids Office, Identification Card Office and Deaf and Hearing Impaired Students Program Offices), classrooms, a mechanical room and support spaces; the first floor contain library staff offices, main circulation/check-out desk area, reference stacks, internet access stations, a student lounge, study areas and support spaces. The second floor contains book shelving areas, study carrels, small group/study rooms and support spaces. The third floor has computer labs/instruction, a math lab, classrooms, offices and support spaces. 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 asphalt rolled roofing system. Windows occur on all exposed sides of the building (~35% average on walls where used). Windows are original single pane windows with tint. The main entrance doors are glass with metal frames; the majority of the first floor has an overhang from the larger floor plate above. The building has exposed walls facing the north, south and west directions with a uniform height (refer to photo above). The three story building is approximately 30’ in height. The basement floor has concrete slab-on-grade floor, and the remaining floors have a reinforced concrete decks between floors.

3.2 Utility Usage

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

The facility receives electricity from the main electric meter, which does not currently utilize any sub-metering. Electricity usage was determined as a percentage of total square footage of all the buildings contained on the meter. From June 2011 through April 2012, the electric usage for the building was approximately 480,353 kWh at a cost of about $64,141. Review of electricity bills during this period showed that the electricity was charged at the following rates: supply unit consumption cost of $0.119 per

kWh; demand unit cost of $5.94 per kW; and blended unit cost of $0.131 per kWh. From June 2011 through April 2012, the facility had an estimated electricity demand of 170 kW

The facility receives natural gas from the main natural gas meter. Usage was determined as a percentage of the total square footage of all the buildings included on the meter. From July 2011 through May 2012, gas-fired equipment consumed about 9,300 therms of natural gas. Based on the annual cost of $6,750, 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 Hess for the 12 month period from June 2011 through April 2012 resulted in less cost to the library than having Atlantic City Electric for both supply and delivery (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 Meter Electric Supply Costs – Hess vs Atlantic City Electric

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 Wolverton Library. Specifics on the mechanical equipment can be found within the equipment inventory located in Appendix B.

3.3.1 Cooling Chilled Water System

One, Multistack water cooled packaged chiller with digital scroll compressors and factory control panel was installed in 2002, and is located in the ground floor mechanical room. The chilled water system operates from May until September, and the chiller is shut down during the fall and winter.

The chiller is piped to a primary loop pumping system with two 15.0 HP pumps that operate in lead-lag located in the ground floor mechanical room. The primary pumps are variable speed with high efficiency motors. Chilled water is provided to the makeup air handling unit and the fan coil units located throughout the building. Chilled water system piping and valves appear to be insulated.

3.3.2 Forced Draft Cooling Tower

A Baltimore Air Coil forced draft cooling tower is located on the building rooftop. The cooling tower was installed in 2002, and provides condenser water cooling for the building chiller. The cooling tower operates whenever the chiller is running to provide cooling for the building. Two 10.0 HP pumps operate in lead-lag and circulate water between the cooling tower and the chiller inside the mechanical room. The pumps are variable speed with high efficiency motors, and a three-way control valve mixing assembly.
The cooling tower condition is good. It is recommended the cooling tower fill be cleaned on a regular maintenance schedule.

3.3.3 Heating Hot Water System

The building is heated with hot water supplied by two Weil McLain cast iron sectional, gas-fired boilers with factory gas burner and controls. The boilers were installed in 2005 and are located in the ground floor mechanical room. The hot water system operates from October until April, and the boiler is shut down during the summer. The boiler is piped to a primary loop pumping system with two 7.5 HP pumps that operate in lead-lag. The pumps are variable speed with high efficiency motors. Hot water is provided to the makeup air unit and fan coil units throughout the building. Hot water system piping and valves appear to be insulated.

3.3.4 Package Cooling and Heating Makeup Air Handling Unit

One 1973 chilled water cooling, hot water heating makeup air handling unit (AHU-2) is located in the ground floor mechanical room. The MAU contains chilled water cooling coil, a hot water heating coil, return, relief/exhaust, and outside air; the unit is ducted to provide makeup air to fan coil units located in the attic and above the spaces they serve on other floors.

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

All spaces and areas throughout the building are cooled and heated by approximately 72 horizontal ceiling mounted fan coil units (FCUs). Outside air is provided by the dedicated makeup air unit; chilled water coils provide cooling, and hot water coils provide heating. Fan coil units are controlled by individual wall mounted thermostats in each space.

3.3.6 Hot Water Unit Heaters

Two wall mounted cabinet hot water unit heaters provide heating to the ground floor mechanical room. Each unit heater is controlled by a dedicated space thermostat.

3.3.7 Exhaust Systems

Exhaust fans are used for restrooms and custodial closets throughout the building.

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

3.4 Control Systems

The building is controlled by a CM3 BAS. The system consists of DDC field devices and components. All and controls and field devices are integrated into a computerized front end operating the CM3 BAS software for equipment sequencing, scheduling, monitoring, and alarming. This includes the hot water system boilers/pumps, chilled water system chiller/pumps, RTUs, fan coil units and exhaust system fans. Smaller split systems operate stand alone and are not tied into the BAS.

Each fan coil unit 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.

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

3.5 Lighting/Electrical Systems

Since building construction, the facility has re-ballasted and re-lamped all fixtures. The facility primarily utilizes fixtures with T-8 32 watt bulbs, 42 watt compact fluorescent fixtures, and older style 60 watt incandescent bulbs are also used in select areas. The primary means of controlling the lights is by manual switches operated by the staff.

The exterior lighting consists of 400 watt metal halide fixtures and 250 watt metal halide fixtures. These light fixtures are mounted on the exterior walls of the building facility.

3.6 Plumbing Systems

3.6.1 Domestic Hot Water System

The boiler room contains one 150 gallon Lochinvar higher efficiency natural gas hot water condensing heater installed in 2005; this serves the entire library building. Hot water is provided to lavatories, janitor's closets, etc., and the majority of hot water piping appears to be insulated. Hot water demand is very low, and is mainly for the toilets. Domestic hot water temperature is maintained at 130°F, and chemical disinfection soap is provided at the toilet rooms.

3.6.2 Plumbing Fixtures

The majority of the school's original lavatories, water closets, and urinals have been replaced with low flow plumbing fixtures during renovations and do not require upgrades. Lavatories are 2.5 GPM with push type faucets, water closets are 1.6 GPF, and urinals are 1.0 GPF.

4.0 ENERGY CONSERVATION MEASURES

4.1 ECM-1 HVAC Condensing Boiler Addition

Wolverton Library is heated with hot water supplied by two Weil McLain cast iron sectional gas-fired boilers from 2005. The boilers are non-condensing and have an estimated efficiency of 83%.

Due to the relatively low efficiency of the two 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 two 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 30,000 therms and $24,000.

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
125,900	0	0	1,200	1,000	0	1,000	(0.8)	3,000	>20	>20

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

This measure is not recommended.

4.2 ECM-2 HVAC Air Handling Equipment Replacement

One packaged chilled water cooling, hot water heating and ventilation AHU from 1973 provides dedicated makeup air for the library building. Replacing the makeup air unit with an energy recovery unit with supply fan and return fan variable speed drives, and a desiccant media energy recovery wheel was evaluated.

The assumption of this calculation is that the operating hours, number of units, and capacities stay the same. The energy savings are a result of the reducing the energy (chilled water and hot water BTU/hr) required to precondition outside air by recovering energy from the building exhaust air via the desiccant wheel. For maximum effectiveness, the exhaust air stream will have to total 80% of the total ERU supply air CFM. The ECM also involves rerouting exhaust air ductwork from toilets, janitor's closets, etc. down to the lower level mechanical room. The exact extent of the exhaust duct risers is unknown, and therefore a lump sum was added to cover connecting duct risers in the core of the building.

Air handling units have an expected life of 20 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 1,126,000 kWh, 24,000 therms and $167,200.

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

ECM-2 HVAC Air Handling Equipment Replacement

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
138,100	56,300	0	1,200	8,400	0	8,400	0.2	0	16.4	16.4

* 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 unit should be replaced with and energy recovery unit such as that assessed in this ECM thru attrition when it fails.

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

The cooling tower condensing water system is served by two 10.0 HP pump (CDP-1, CDP-2). The pumps are a constant volume pumps with a standard efficiency motors.

The cooling tower (CT-1) is a forced draft type with (1)7.5 HP and (1) 3.0 HP constant volume supply fan motors that provide air over the tower fill to accomplish the heat exchange. The 7.5 HP motor is already a premium efficiency motor and therefore does not need replacement; only the 3 HP motor will be assessed.

The assumption of this calculation is that the operating hours and capacities of the 2002 cooling tower stays the same. The energy savings result from operating a higher efficiency cooling tower fan motors with speed control, and condenser water pump motors with flow control. The existing fan motors operate at a constant speed even though the building load does not require all of the cooling tower's capacity to maintain building loop water temperatures. By replacing the cooling tower fan motors, adding VFDs and inverter duty high efficiency motors, and reducing the flow (by slowing the motors down), significant electrical energy can be saved. Cooling tower condenser water temperature can be used to control cooling tower fan speed and condenser water pump flow for additional energy savings.

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 374,000 kWh and $49,200.

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

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

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
13,600	18,700	0	0	2,500	0	2,500	2.6	3,800	5.4	3.9

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

This measure is recommended.

4.4 ECM-4, HVAC Demand Control Ventilation

One Packaged air handling unit (AHU-2) and many fan coil units serve cooling to the library. It is assumed the air handling unit provides the originally specified ventilation air flow. Reducing outside air during occupied time periods will reduce heating and cooling energy used during the occupied period. This can be accomplished using carbon dioxide sensors to monitor air quality. The quantity of ventilation will be based on maintaining an acceptable carbon dioxide (CO_2) level in the space as an indicator of indoor air quality. A limit of 1000 PPM of CO_2 is recommended in ASHRAE Standard 62-2010, Ventilation for Acceptable Indoor Air Quality. Sensors will be installed to measure the building air CO_2 concentration, and the control sequence of operation programmed into the BAS. During unoccupied periods the outside air dampers should be closed.

Equipment supply and outside airflows were obtained from existing design drawings where possible, or from vendors per serial/model numbers found in the field. For the analysis, estimated savings for demand control ventilation are based on reducing the outdoor air volume from 30% to 10%. The energy savings results from the difference in thermal energy and reduced fan horsepower electricity usage.

Temperature controls have an expected life of 18 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 121,700 kWh, 49,000 therms and $55,200.

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

ECM-4 HVAC Install Demand Control Ventilation

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
12,100	6,090	0	2,450	2,800	0	2,800	3.1	0	4.3	4.3

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

This measure is recommended.

4.5 ECM-5 HVAC Building Automation System Upgrade/Re-commissioning

The current BAS consists of an older CM3 BAS for monitoring and sequencing all HVAC systems and equipment. Due to the condition of the system and software, HVAC system sequencing, monitoring, and scheduling are limited. To reduce the energy used by HVAC systems, the BAS software should be upgrades and the system re-commissioned with current software and functionality, and complete re-commissioning, testing and balancing of all HVAC systems. This should be coordinated with a complete systems testing and balancing effort that must occur prior to system re-commissioning efforts.

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

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

Additional benefits of this system are that it can provide useful trending information such as daily, monthly, and seasonal energy usage, and also provide alarm messages via the internet indicating that a piece of equipment needs repair or maintenance. The BAS should also allow the facility to monitor the energy consuming equipment in the building remotely in real-time, track the facility energy performance, and remotely adjust setpoints 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 114,000 kWh, 7,000 therms, and $20,600. 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-5 HVAC Building Automation System Upgrade / Re-placement

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	Nat Gas Therms	Total $						
$					$	$		$	Years	Years
25,000	11,400	0	700	2,100	0	2,100	(0.2)	0	11.9	11.9

* 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 Lighting Replacement Upgrades

The building uses 2 foot 17 W T-8 fluorescent bulbs with electronic ballasts. 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 two 250 watt and seven 400 watt metal halide wall pack fixtures. The exterior fixtures are utilized for building lighting during nighttime hours and are in operation from sun down until sun up. Alternative LED lighting solutions are available to replace these fixtures that will reduce the total wattage to 78 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. In addition to electrical energy savings, LED lights have a longer useful lifetime than the existing lighting fixtures, and will provide significant maintenance 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 10,000 kWh with an annual electrical demand reduction of about 58 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 150,000 kWh and $22,600.

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

ECM-6 Lighting Replacement Upgrades

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
49,300	10,000	5	0	1,500	0	1,500	-0.5	6,500	>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.

4.7 ECM-7 Lighting Controls Installation

The current Wolverton Library lighting is controlled by manual switches. Lights are generally turned on in the morning and shut off at night by the staff. During occupied times, there are rooms that are not occupied, however the lights remain on. Adding occupancy controls to the individual rooms will automatically control the lights based on occupancy. The occupancy sensor can be wall mounted near the switch or placed at the ceiling for larger room coverage. All occupancy sensors are equipped with a manual override feature. These sensors are generally not recommended in public toilet rooms.

Lighting controls have an expected life of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 453,000 kWh and $59,500.

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

ECM-7 Lighting Controls Installation (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
4,500	30,200	0	0	4,000	0	4,000	12.1	3,600	1.1	0.2

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

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

4.8 ECM-8 Lighting Replacements with Lighting Controls

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

The lighting retrofits and controls have an expected lifetime of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 531,000 kWh and $67,800.

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

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

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
53,900	35,400	0	0	4,500	0	4,500	0.3	7,300	12.0	10.4

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

This measure is recommended.

4.9 System Improvement Opportunities

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

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

5.0 PROJECT INCENTIVES

5.1 Incentives Overview

5.1.1 New Jersey Pay For Performance Program

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

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

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

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

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

Electric

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

Gas

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

Incentive cap: 25% of total project cost

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

Electric

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

Gas

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

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

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

See Appendix D for calculations.

5.1.2 New Jersey Smart Start Program

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

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

5.1.3 Direct Install Program

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

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

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

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

5.1.4 Energy Savings Improvement Plans (ESIP)

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

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

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

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

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

6.0 ALTERNATIVE ENERGY SCREENING EVALUATION

6.1 Solar

6.1.1 Photovoltaic Rooftop Solar Power Generation

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

The PVWATTS solar power generation model was utilized to calculate PV power generation. The closest city available in the model is Newark, New Jersey and a fixed tilt array type was utilized to calculate energy production. The PVWATT solar power generation model is provided in Appendix 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 80 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 – 80 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
$320,000	0.0	96,053	0	12,600	12,600	0	9,125	>25	14.7

* 30% federal tax credit
** Solar Renewable Energy Certificate Program (SREC) for 2012 is $120/1000kwh

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

6.1.2 Solar Thermal Hot Water Plant

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

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

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

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

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

Solar Thermal Hot Water Plant

Budgetary Cost	Annual Utility Savings				Total Savings	Federal Tax Credit *	Payback (without incentive)	Payback (with incentives)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$	$	$	Years	Years
$15,000	0.0	4,400	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 Wolverton had an estimated electricity demand of 170 kW.

This measure is not recommended because 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 Community Center Building are as follows:

Energy Intensity	Camden County College Wolverton Library	National Average
EPA Score	N/A	N/A
Site (kBtu/sf/year)	82	92
Source (kBtu/sf/year)	228	246

The Wolverton Library does not qualify for performance benchmarking in Portfolio Manager because the program does not currently support college campuses. 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-3	HVAC Install Variable Speed Drives, High Efficiency Motor	13,600	2,500	5.4	3,800	3.9	X
4	HVAC Install Demand Control Ventilation	12,100	2,800	4.3	0	4.3	X
4	HVAC Building Automation System Upgrade / Re-commissioning	25,000	2,100	11.9	0	11.9	X
7	Lighting Replacements with Lighting Controls (Occupancy Sensors)	53,900	4,500	12.0	7,300	10.4	X

APPENDIX A

Utility Usage Analysis, Energy Suppliers List

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

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

Electric Heat

Electric
Delivery Atlantic City Electric
Supplier Hess

Gas
Delivery South Jersey Gas
Supplier Woodruff Energy

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

Electric Usage Comparison

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

Gas Breakdown Estimates Based on Max Annual Therm Usage

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

Main Boiler Plant Electricity Usage (Cooling Season)

Electric Rate $ 0.131 $/kWh

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

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

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

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

Notes

1. Calculated Values

Cooling System

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

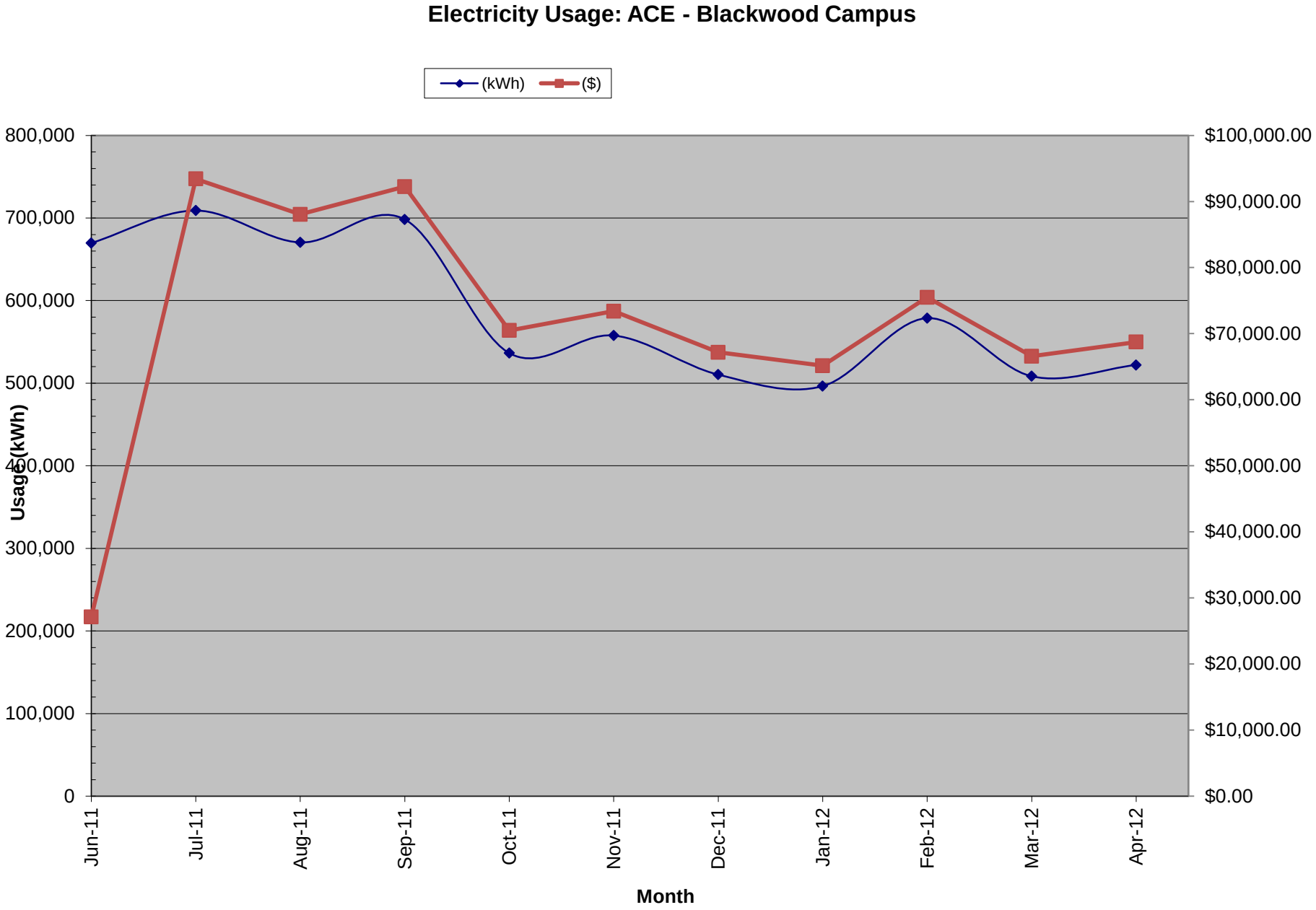
Building Name	~Electrical Consumption	Cost
Building		$ -
Taft Hall	580,947.75	$ 76,355
Truman Hall	580,947.75	$ 76,355

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

Electric Service
Delivery - ACE
Supplier - Hess

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

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


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

Main Natural Gas Meter

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

Master Meter List

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

Building Meters and Totals

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

Main Boiler House

Therms	Cost
52,617.40	$ 38,630.26

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

Main Boiler House Gas Usage

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

Usage (Therms)
Meter Number

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

Usage (Therms)
Meter Number

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

Usage (Therms)
Meter Number

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

APPENDIX B

Equipment Inventory

New Jersey BPU Energy Audit Program
CHA #24364
Camden County College
Wolverton Library
Original Construction Date: 1973
Renovation/Addtion Date: 2004

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.
ACC-1	1	Multistack	MS30C2H2W000000	NOT AVAILABLE	HVAC Cooling / CHW Modular Chiller Electric	Chiller: 439 GPM / Condensor: 536 GPM / CLG: 183 Tons / EER: 15.4	Basement Mechanical Room	Library	2002	10	Good Condition
CP-1 / CP-2	2	B & G	1510BF3BC	CL7077-01M10 / CL7077-02M10	Primary Loop Pump / Electric	15 HP / 1775 RPM / High Efficiency 93%	Basement Mechanical Room	Library Building / Cooling Chilled Water Loop	2002	10	3-way Control Valve w/ VSDs
CT-1	1	Baltimore Air Coil	15200	U024702401	Cooling Tower / Electric	540 GPM, 10°F Water ΔT at 78°F WB / (1) 7.5 HP Fans Hi-speed Fan, (1) 3.0 HP Low-speed Fan / 91% & 87.5% Efficiency Motors	Rooftop	Library Building / Condenser Cooling Water	2002	10	Good Condition, Requires Cleaning
CDP-1 / CDP-2	2	B & G	1510BF3BC	CL7078-02M10 / CL7078-01M10	Primary Loop Pump / Electric	10 HP / 1765 RPM / High Efficiency 91%	Basement Mechanical Room	Library Building / Cooling Condenser Water Loop	2002	10	w/ VSD
B-1	1	Weil-McLain	1078	NOT AVAILABLE	HVAC Hot Water Heating / Natural Gas	1379 MBH Input / 1129 MBH Output / 80% Efficiency	Basement Mechanical Room	Library Building	2005	28	Cast Iron Sectional
B-2	1	Weil-McLain	1078	NOT AVAILABLE	HVAC Hot Water Heating / Natural Gas	Input: 1379 MBH / Output: 1129 MBH / 80% Efficiency	Basement Mechanical Room	Library Building	2005	28	Cast Iron Sectional
HP-1 / HP-2	2	B & G	1510GF2BC	CL7079-02M10 / CL7079-01M10	Primary Loop Pump / Electric	7.5 HP / 1800 RPM / High Efficiency 91%	Basement Mechanical Room	Library Building / Heating Hot Water Loop	2005	13	w/ VSD
DHW	1	Lochinvar	EWNN150PM	F02H00H2753	Domestic Hot Water / Natural Gas Condensing Unit	150 MBH / 85 gal	Basement Mechanical Room	Library Building	2005	5	w/ Power Flame Burner Full Modulation Central Model # WCR1-6-12
AHU-2	1	TRANE	L-25	K1J206642	HVAC / DX Cooling, Hot Water Heating	15000 CFM / CLG: 520 MBH HTG: 300 MBH / (2) 10.0 HP SFs / Standard Efficiency	Basement Mechanical Room	Library Building / Makeup Air to FCUs	1973	-19	N/A
UH-1	1	Mestek	RW-1120-04	NOT AVAILABLE	HVAC / Electric Heatiing	Fractional HP Fan Motor / Hot Water Heating Element	In Area Being Served	Basement Mechanical Room	1973	-19	N/A
UH-2	1	Mestek	RW-1120-04	NOT AVAILABLE	HVAC / Electric Heatiing	Fractional HP Fan Motor / Hot Water Heating Element	In Area Being Served	Basement Mechanical Room	1973	-19	N/A

New Jersey BPU Energy Audit Program
CHA #24364
Camden County College
Wolverton Library
Original Construction Date: 1973
Renovation/Addtion Date: 2004

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.
FC-A, 1 thru 3, 3A, 5, 5A, 6 10 thru 55, 57 thru 72	70	Airtherm	031-1L-CP-B 031-1R-CP-B 041-1L-CP-B 041-1R-CP-B 081-1L-CP-B 081-1R-CP-B 101-1L-CP-B 101-IR-CP-B 121-1L-CP-B 121-1R-CP-B	NOT AVAILABLE	HVAC / Chilled Water Cooling, Hot Water Heating	Various Heating and Cooling Capacities, Fractional HP fan motors	Basement 1st Floor 2nd Floor 3rd Floor	Library Building Occupied Spaces	2002	10	N/A

Energy Audit of Camden County College (Wolverton Library)

CHA Project No. 24364

Existing Lighting

Cost of Electricity: **$0.119** **$/kWh**

$5.940 **$/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
55	Vestibule	6	**2T 17 R F 3 (ELE)**	F23ILL	47	0.28	SW	2500	None	705	
175A	Circulation Desk	10	**4' 2-LAMP T-8 (32W)**	F42ILL	59	0.59	SW	2500	None	1,475	
35A	Room 106	1	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.09	SW	2500	None	223	
35A	Room 107	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	2125	C-OCC	378	
35A	Room 108	13	**4' 3-LAMP T-8 (32W)**	F43ILL	89	1.16	SW	2125	C-OCC	2,459	
35A	Room 100	4	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.36	SW	2125	C-OCC	757	
35A	Room 101	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	2500	None	445	
175A	Mechanical Room 102	2	**4' 2-LAMP T-8 (32W)**	F42ILL	59	0.12	SW	2125	OCC	251	
35A	Room 103	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	2125	OCC	378	
35A	Room 104	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	2125	OCC	378	
35A	Room 105	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	2250	C-OCC	401	
227	1st Floor Library	53	**W60CF1**	F81EL	60	3.18	SW	2250	C-OCC	7,155	
55	Reference Area	23	**2T 17 R F 3 (ELE)**	F23ILL	47	1.08	SW	2125	OCC	2,297	
175A	Reference Area	36	**4' 2-LAMP T-8 (32W)**	F42ILL	59	2.12	SW	2125	OCC	4,514	
175A	1st Floor Men's Bathroom	3	**4' 2-LAMP T-8 (32W)**	F42ILL	59	0.18	SW	2125	OCC	376	
175A	1st Floor Women's Bathroom	3	**4' 2-LAMP T-8 (32W)**	F42ILL	59	0.18	SW	2000	OCC	354	
55	1st Floor Library	61	**2T 17 R F 3 (ELE)**	F23ILL	47	2.87	SW	2125	OCC	6,092	
175A	South Stairway	8	**4' 2-LAMP T-8 (32W)**	F42ILL	59	0.47	SW	2125	OCC	1,003	
175A	North Stairway	8	**4' 2-LAMP T-8 (32W)**	F42ILL	59	0.47	SW	2125	OCC	1,003	
175A	3rd Floor Book Storage	70	**4' 2-LAMP T-8 (32W)**	F42ILL	59	4.13	SW	2125	OCC	8,776	
71	3rd Floor Lobby	10	**I 60**	I60/1	60	0.60	SW	2125	OCC	1,275	
55	Computer Lab	52	**2T 17 R F 3 (ELE)**	F23ILL	47	2.44	SW	2125	OCC	5,194	
35A	Room 301	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	2125	OCC	378	
35A	Room 302	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	2125	OCC	378	
35A	Room 303	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	2500	None	445	
35A	Room 303	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	2125	OCC	378	
35A	Room 304	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	2125	OCC	378	
35A	Room 305	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	500	None	89	
35A	Room 306	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	2125	OCC	378	
175A	3rd Floor Library	72	**4' 2-LAMP T-8 (32W)**	F42ILL	59	4.25	SW	2500	None	10,620	
55	Tutoring Center	62	**2T 17 R F 3 (ELE)**	F23ILL	47	2.91	SW	2500	None	7,285	
35A	Room 308	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	2500	None	445	
35A	Room 309	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	2125	OCC	378	
35A	Room 310	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	1063	None	189	
35A	Room 311	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	2125	OCC	378	
35A	Room 312	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	1063	None	189	
175A	3rd Floor Men's Bathroom	3	**4' 2-LAMP T-8 (32W)**	F42ILL	59	0.18	SW	1063	None	188	
175A	3rd Floor Women's Bathroom	3	**4' 2-LAMP T-8 (32W)**	F42ILL	59	0.18	SW	2125	OCC	376	
175A	3rd Floor Book Shelves	48	**4' 2-LAMP T-8 (32W)**	F42ILL	59	2.83	SW	500	None	1,416	
55	2nd Floor Lobby	63	**2T 17 R F 3 (ELE)**	F23ILL	47	2.96	SW	500	None	1,481	
55	2nd Floor Lobby	108	**2T 17 R F 3 (ELE)**	F23ILL	47	5.08	SW	500	None	2,538	
227	2nd Floor Lobby	21	**W60CF1**	F81EL	60	1.26	SW	2125	OCC	2,678	
55	Testing & Assesment	40	**2T 17 R F 3 (ELE)**	F23ILL	47	1.88	SW	1063	None	1,998	
35A	Room 202	4	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.36	SW	2125	OCC	757	
35A	Room 203	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	1063	None	189	

Energy Audit of Camden County College (Wolverton Library)

CHA Project No. 24364

Existing Lighting

Cost of Electricity: **$0.119** **$/kWh**

$5.940 **$/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
35A	Room 204	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	2250	None	401	
175A	2nd Floor Men's Bathroom	3	**4' 2-LAMP T-8 (32W)**	F42ILL	59	0.18	SW	2250	None	398	
175A	2nd Floor Women's Bathroom	3	**4' 2-LAMP T-8 (32W)**	F42ILL	59	0.18	SW	500	None	89	
35A	Room 206 - A	3	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.27	SW	520	None	139	
35A	Room 206 - B	6	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.53	SW	520	C-OCC	278	
35A	Room 206 - C	2	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.18	SW	520	None	93	
55	Room 206 - D	10	**2T 17 R F 3 (ELE)**	F23ILL	47	0.47	SW	500	None	235	
175A	Room 201	1	**4' 2-LAMP T-8 (32W)**	F42ILL	59	0.06	SW	4380	None	258	
175A	Basement Cooridor	32	**4' 2-LAMP T-8 (32W)**	F42ILL	59	1.89	SW	4380	None	8,269	
227	Basement Cooridor	6	**W60CF1**	F81EL	60	0.36	SW	8760	None	3,154	
55	Basement Room - 008	4	**2T 17 R F 3 (ELE)**	F23ILL	47	0.19	SW	8760	None	1,647	
35A	Basement Room - 008	15	**4' 3-LAMP T-8 (32W)**	F43ILL	89	1.34	SW	2125	OCC	2,837	
175A	Basement Room - 006	1	**4' 2-LAMP T-8 (32W)**	F42ILL	59	0.06	SW	2125	OCC	125	
175A	Basement Room - 005	10	**4' 2-LAMP T-8 (32W)**	F42ILL	59	0.59	SW	500	None	295	
35A	Basement Room - 003	3	**4' 3-LAMP T-8 (32W)**	F43ILL	89	0.27	SW	500	None	134	
35A	Basement Room - 002	12	**4' 3-LAMP T-8 (32W)**	F43ILL	89	1.07	SW	8760	None	9,356	
35A	Basement Room - 012	21	**4' 3-LAMP T-8 (32W)**	F43ILL	89	1.87	SW	500	None	935	
175A	Basement Room - 013	1	**4' 2-LAMP T-8 (32W)**	F42ILL	59	0.06	SW	3285	OCC	194	
35A	Basement Room - 011	20	**4' 3-LAMP T-8 (32W)**	F43ILL	89	1.78	SW	3285	OCC	5,847	
35A	Basement Room - 009	16	**4' 3-LAMP T-8 (32W)**	F43ILL	89	1.42	SW	8760	None	12,474	
175A	Basement Room - 010	1	**4' 2-LAMP T-8 (32W)**	F42ILL	59	0.06	SW	8760	None	517	
175A	Basement Mechanical Room	15	**4' 2-LAMP T-8 (32W)**	F42ILL	59	0.89	SW	500	None	443	
146	Exterior	7	**High Bay MH 400**	MH400/1	458	3.21	SW	2125	OCC	6,813	
169	Exterior	2	**SP 250 MH ROOF**	MH250/1	295	0.59	SW	500	None	295	
	Total	**1,019**				**63.07**				**134,640**	

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	125,900	1,000	125.9	3,000	122.9	
ECM-2	HVAC Air Handling Equipment Replacement	138,100	8,400	16.4	0	16.4	X
ECM-3	HVAC Install Speed Frequency Drives, High Efficiency Motors	13,600	2,500	5.4	3,765	3.9	X
ECM-4	HVAC Install Demand Control Ventilation	12,100	2,800	4.3	0	4.3	X
ECM-5	HVAC Building Automation System Upgrade / Re-placement	25,000	2,100	11.9	0	11.9	
ECM-6	Lighting Replacement Upgrades	49,300	1,500	32.9	6,539	28.5	
ECM-7	Lighting Controls Installation (Occupancy Sensors)	4,540	4,000	1.1	3,582	0.2	X
ECM-8	Lighting Replacements with Lighting Controls (Occupancy Sensors)	53,868	4,500	12.0	7,229	10.4	X

Camden County College Blackwood Campus- NJBPU
CHA Project #24364
Wolverton Library

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
125,900	0	0	1,200	1,000	0	1,000	(0.8)	3,000	>20	>20

ECM-2 HVAC Air Handling Equipment Replacement

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
138,100	56,300	0	1,200	8,400	0	8,400	0.2	0	16.4	16.4

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

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
13,600	18,700	0	0	2,500	0	2,500	2.6	3,765	5.4	3.9

ECM-4 HVAC Install Demand Control Ventilation

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
12,100	6,090	0	2,450	2,800	0	2,800	3.1	0	4.3	4.3

ECM-5 HVAC Building Automation System Upgrade / Re-placement

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
25,000	11,400	0	700	2,100	0	2,100	(0.2)	0	11.9	11.9

ECM-6 Lighting Replacement Upgrades

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
49,300	10,000	5	0	1,500	0	1,500	-0.5	6,539	>20	>20

ECM-7 Lighting Controls Installation (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
4,540	30,200	0	0	4,000	0	4,000	12.1	3,582	1.1	0.2

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

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
53,868	35,400	0	0	4,500	0	4,500	0.3	7,229	12.0	10.4

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Utility Costs		Yearly Usage	MTCDE	Building Area	Annual Utility Cost	
$ 0.131	$/kWh blended		0.00042021	50,000	Electric	Natural Gas
$ 0.119	$/kWh consumpti	475,694	0.00042021		$63,519	$6,752
$ 5.61	$/kW	168	0			
$ 0.80	$/Therm	9,307	0.00533471			
$ -	$/kgals	-	0			

Wolverton Library

	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	1,200	0	0	$ 1,000	$ 125,900	125.9	6.4	25	$ 3,000	Y	$ 75,000	$ 3,000	122.9	0	0	30,000	0	0	$ 24,000	(0.8)
ECM-2	HVAC Air Handling Equipment Replacement	0.0	56,300	1,200	0	0	$ 8,400	$ 138,100	16.4	30.1	20	$ -		$ -	$ -	16.4	0	1,126,000	24,000	0	0	$ 167,200	0.2
ECM-3	HVAC Install Speed Frequency Drives, High Efficiency Motors	0.0	18,700	0	0	0	$ 2,500	$ 13,600	5.4	7.9	20	$ 3,765	Y	$ 9,500	$ 3,765	3.9	0	374,000	0	0	0	$ 49,200	2.6
ECM-4	HVAC Install Demand Control Ventilation	0.0	0	2,451	6,087	0	$ 2,800	$ 12,100	4.3	15.6	18	$ -	Y	$ 8,500	$ -	4.3	0	0	44,126	109,570	0	$ 49,700	3.1
ECM-5	HVAC Building Automation System Upgrade / Re-placement	0.0	11,400	700	0	0	$ 2,100	$ 25,000	11.9	8.5	10	$ -		$ -	$ -	11.9	0	114,000	7,000	0	0	$ 20,600	(0.2)
ECM-6	Lighting Replacement Upgrades	4.8	10,000	0	0	0	$ 1,500	$49,300	32.9	4.2	15	$ 6,539		$ -	$ 6,539	28.5	72	150,000	0	0	0	$ 22,600	(0.5)
ECM-7	Lighting Controls Installation (Occupancy Sensors)	0.0	30,200	0	0	0	$ 4,000	$4,540	1.1	12.7	15	$ 3,582		$ -	$ 3,582	0.2	0	453,000	0	0	0	$ 59,500	12.1
ECM-8	Lighting Replacements with Lighting Controls (Occupancy Sensors)	4.8	35,400	0	0	0	$ 4,500	$ 53,867.75	12.0	14.9	15	$ 7,229	Y	$ 37,700	$ 7,229	10.4	72	531,000	0	0	0	$ 67,800	0.3
	Total (Does Not Include ECM-5 & ECM-6)	**4.8**	**121,800**	**5,551**	**6,087**	**0**	**$ 21,300**	**$ 368,568**	17.3		18	$ 13,994		$ 130,700	$ 13,994	16.6	**71.9**	**2,145,000**	**105,126**	**109,570**	**0**	**$ 378,500**	0.0
	Total Measures with Positive ROI	**4.8**	**110,400**	**3,651**	**6,087**	**0**	**$ 18,200**	**$ 217,668**	12.0		17.6	$ 10,994		$ 55,700	$ 10,994	11.4	**71.9**	**2,031,000**	**68,126**	**109,570**	**0**	**$ 333,900**	0.5
	% of Existing	**3%**	**26%**	**60%**	**1%**	**#DIV/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 $250,000

Camden County College Blackwood Campus- NJBPU
CHA Project #24364
Wolverton Library

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	9,307	Therms	Based on historical utility data.
Existing Boiler Plant Efficiency	80%		Estimated or Measured
Baseline Boiler Load	744,582	Mbtu/yr	Baseline Fuel Use x Existing Efficiency x 100 Mbtu/Therms
Baseline Fuel Cost	$ 7,438		
Proposed Boiler Plant Efficiency	92%		New Condensing Boiler Efficiency
Proposed Fuel Use	8,093	Therms	Baseline Boiler Load / Proposed Efficiency / 100 Mbtu/Therms
Proposed Fuel Cost	$ 6,467		
Annual Utility Savings	**1,200**	**Therms**	
Annual Savings	$ 1,000		
Boiler Addition Project Cost	**$ 125,900**		
Simple Payback	126	Years	Negative number indicates

Camden County College Blackwood Campus- NJBPU
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Wolverton Library

ECM-1: HVAC Condensing Boiler Added - Cost

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
3,000 MBH NG Condensing Boiler	1	EA	$ 45,000	$ 2,000		$ 49,500	$ 2,700	$ -	$ 52,200	
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	
						$ -	$ -	$ -	$ -	

$ 95,400	Subtotal
$ 9,540	10% Contingency
$ 20,988	20% Contractor O&P
$ -	0% Engineering
$ 125,900	**Total**

Camden County College Blackwood Campus- NJBPU
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Wolverton Library

EQUIPMENT	AREA SERVED	COOLING CAPACITY (MBH)	HEATING CAPACITY (MBH)
AHU-2	Wolverton Library Makeup Air Unit	520	300
		520	*300* *MBH*

ECM-2: HVAC Air Handling Equipment Replacment

ECM Summary

A makeup air handling unit provides dedicated makeup air for a building constantly, 24/7. Replacing the makeup air unit with an energy recovery unit with supply fan and return fan variable speed drives, and a desiccant media energy recovery wheel can allow the energy used to condition air being exhausted by toilets and other appropriate spaces to be recycled instead of wholly removing it from the building. The savings are achieved by reducing the energy (chilled water and hot water BTU/hr) required to precondition outside air by recovering energy from the building exhaust air via the dessicant wheel.
Project will include re-routing exhaust air ductwork from the building down to the AHU in the basement mechanical room.

ASSUMPTIONS			Comments
Natural Gas Cost	$0.80	/ Therm	
Electric Cost	$0.131	/ kWh	
Average run hours per Week	66	Hours	
Space Balance Point	55	F	
Space Temperature Setpoint	74	deg F	Setpoint.
Heating BTU/Hr Rating of existing equipment	300,000	Btu / Hr	
Cooling BTU/Hr Rating of existing equipment	520,000	Btu / Hr	
Existing Annual Natural Gas Usage	4,752	Therms	Based on average run hours per week for 24 weeks (heating season of 6 months)
Existing Annual Electric Usage	281,641	kWh	Based on average run hours per week for 28 weeks (cooling season of 6 months)

Item	Value	Units	Comments
Proposed ERU Heating BTU/hr reduction	25.0%		Based on max savings of 40% at peak conditions, reduced for conservative yearly average
Proposed ERU Cooling BTU/hr reduction	20.0%		Based on max savings of 40% at peak conditions, reduced for conservative yearly average
Proposed Annual Natural Gas Usage	3,564	Therms	
Proposed Annual Electric Usage	225,313	kWh	Unit will cycle on w/ temp of room. Possible operating time shown below

ANNUAL SAVINGS		
Annual Natural Gas Usage Savings	**1,200**	**Therms**
Annual Electrical Usage Savings	**56,300**	**kWh**
Annual Cost Savings	$8,359	
Total Project Cost	$138,100	
Simple Payback	17	years

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

Camden County College Blackwood Campus- NJBPU
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ECM-2: HVAC Air Handling Equipment Replacment - Cost

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
Existing (1) AHU demolition	1	EA	$ 100	$ 1,500		$ 110	$ 2,025	$ -	$ 2,100	
(1) AHU 45 tons with CHW cooling and HW heating	1	EA	$ 60,000	$ 8,200		$ 66,000	$ 11,070	$ -	$ 77,100	Cost for indoor ERU of $4/cfm
- CHW Valve & Piping to RTUs HW coil	1	EA	$ 500	$ 200		$ 550	$ 270	$ -	$ 800	
- HW Valve & Piping to RTUs HW coil	1	EA	$ 500	$ 200		$ 550	$ 270	$ -	$ 800	
- Reprogram DDC system for (1) RTU	1	EA	$ 75	$ 500		$ 83	$ 675	$ -	$ 800	
Electrical - misc.	1	LS	$ 1,000	$ 3,000		$ 1,100	$ 4,050	$ -	$ 5,200	
Mechanical exhaust ductwork - misc.	1	LS	$ 10,000	$ 5,000		$ 11,000	$ 6,750	$ -	$ 17,800	

$ 104,600	Subtotal
$ 10,460	10% Contingency
$ 23,012	20% Contractor O&P
$ -	0% Engineering
$ 138,100	**Total**

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

Variable Inputs

Blended Electric Rate	$0.131
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 hot 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
CPD-1, CPD-2	2	10.0	10.0	86.1%	91.7%	6.93	6.51
					Total:	6.93	6.51

SAVINGS ANALYSIS

OAT - DB Avg Temp F	OAT - WB Avg 120	Annual Hours in Bin	Heating 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* (A-55)/(55-10)) 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%	21	6.2	99.7%	19	2
92.5	74	34	34	92%	236	5.3	100.0%	181	55
87.5	72	131	131	86%	908	4.5	100.0%	596	312
82.5	69	500	500	81%	3,466	3.8	99.8%	1,929	1,537
77.5	67	620	620	75%	4,298	3.2	98.2%	2,032	2,265
72.5	64	664	664	69%	4,602	2.7	95.9%	1,839	2,763
67.5	62	854	854	64%	5,919	2.2	92.7%	1,985	3,934
62.5	58	927	927	58%	6,425	1.7	88.8%	1,792	4,633
57.5	53	600	600	53%	4,159	1.3	84.1%	954	3,205
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		30,034			11,326	18,708

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 100 deg. OAT and 50% at 55 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	18,700	kWh
Annual Savings	$ 2,458	
Install Variable Speed Drives	$ 13,600	
-CHW Pump Cost		
Simple Payback	6	Years

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

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
10 HP VFD	1	ea	$ 1,625	$ 585		$ 1,788	$ 790	$ -	$ 2,600	
10 HP Motors	1	ea	$ 660	$ 100		$ 726	$ 135	$ -	$ 900	
Reprogram DDC system	1	ea	$ 100	$ 350		$ 110	$ 473	$ -	$ 600	
Electrical - misc.	1	ls	$ 200	$ 150		$ 220	$ 203	$ -	$ 400	
2-way or 3-way control valve(s) for system sequence	1	ea	$ 1,000	$ 2,000		$ 1,100	$ 2,700	$ -	$ 3,800	
Pipe pressure sensor/transmitter	1	ea	$ 850	$ 500		$ 935	$ 675	$ -	$ 1,600	
Misc. piping modification	1	ea	$ 200	$ 150		$ 220	$ 203	$ -	$ 400	
						$ -	$ -	$ -	$ -	

$ 10,300	Subtotal
$ 1,030	10% Contingency
$ 2,266	20% Contractor O&P
$ -	0% Engineering
$ 13,600	**Total**

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	Total CFM	O.A. CFM	O.A. %	
Org. scheduled CFM	15,000	5,000	33%	
Derated CFM	15,000	1,500	10%	
SA Enthalpy	26.4	BTU/lbma		
SA Set point, Winter	68.0	°F		
SA Set point, Summer	74.0	°F		
Heating "On" Point	55.0	°F		
Cooling System Eff.	1.1	kW/Ton		(Includes ancillary equipment)
Heating System Eff.	80%			(Includes distribution losses)

ECM-M8A: Install Demand Control Ventilation

Description:
Outside air can be significantly reduced for most of the time that the building is occupied.
Savings will result from the avoided heating and cooling of excessive outside air.

Method:
The outdoor air introduced into the spaces is currently constant based on design occupancy conditions.
This ECM proposes the installation of CO2 sensors in the space to allow for reduced outdoor air flows when conditions allow.
An average reduction of 50% is assumed possible with the implementation of DCV
The DCV system will automatically adjust the outdoor air damper position through the EMS to reduce outdoor air flows based on indoor CO2 levels.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
			Existing					Proposed Demand Ventilation					Savings	
Avg. DB Bin Temp °F	OA Enthalpy Btu/lb	Occupied Bin HOURS	OA CFM	Cooling Load MBH	Heating Load MBH	Cooling kWh	Heating therms	Derated O.A. CFM	Cooling Load MBH	Heating Load MBH	Cooling kWh	Heating therms	Cooling kWh	Heating therms
102.5	49.1	-	5,000	511	0	0	-	1,500	153	0	0	-	0	-
97.5	42.5	1	5,000	362	0	37	-	1,500	109	0	11	-	26	-
92.5	39.5	13	5,000	295	0	345	-	1,500	88	0	104	-	242	-
87.5	36.6	51	5,000	230	0	1,035	-	1,500	69	0	311	-	725	-
82.5	34	196	5,000	171	0	2,944	-	1,500	51	0	883	-	2061	-
77.5	31.6	244	5,000	117	0	2,498	-	1,500	35	0	749	-	1748	-
72.5	29.2	261	5,000	63	0	1,440	-	1,500	19	0	432	-	1008	-
67.5	27	336	5,000	14	0	397	-	1,500	4	0	119	-	278	-
62.5	24.5	364	5,000	0	0	0	-	1,500	0	0	0	-	0	-
57.5	21.4	236	5,000	0	0	0	-	1,500	0	0	0	-	0	-
52.5	18.7	240	5,000	0	84	0	251	1,500	0	25	0	75	0	176
47.5	16.2	240	5,000	0	111	0	332	1,500	0	33	0	100	0	233
42.5	14.4	258	5,000	0	138	0	444	1,500	0	41	0	133	0	311
37.5	12.6	402	5,000	0	165	0	827	1,500	0	49	0	248	0	579
32.5	10.7	288	5,000	0	192	0	691	1,500	0	58	0	207	0	484
27.5	8.6	131	5,000	0	219	0	359	1,500	0	66	0	108	0	251
22.5	6.8	99	5,000	0	246	0	304	1,500	0	74	0	91	0	213
17.5	5.5	49	5,000	0	273	0	167	1,500	0	82	0	50	0	117
12.5	4.1	18	5,000	0	300	0	69	1,500	0	90	0	21	0	48
7.5	2.6	9	5,000	0	327	0	35	1,500	0	98	0	11	0	25
2.5	1	5	5,000	0	354	0	23	1,500	0	106	0	7	0	16
-2.5	0	-	5,000	0	381	0	-	1,500	0	114	0	-	0	-
-7.5	-1.5	-	5,000	0	408	0	-	1,500	0	122	0	-	0	-
Total		**3,441**		**1,762**		**8,696**	**3,502**		**529**		**2,609**	**1,051**	**6,087**	**2,451**

ANNUAL SAVINGS		
Annual Natural Gas	**2,451**	**Therms**
Annual Electrical Usag	**6,087**	**kWh**
Annual Cost Savings	$2,759	
Total Project Cost	$12,100	
Simple Payback	4.4	years

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ECM-M8A: Install Demand Control Ventilation - 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.		
CO2 sensor	4	ea	$ 400	$ 100	$ -	$ 1,760	$ 540	$ -	$ 2,300	
Replace damper actuators	1	ea	$ -	$ 50	$ -	$ -	$ 68	$ -	$ 68	
Control system programming	1	ls	$ 500	$ 1,000	$ -	$ 550	$ 1,350	$ -	$ 1,900	
electrical/wiring	1	ls	$ 1,000	$ 2,000	$ -	$ 1,100	$ 2,700	$ -	$ 3,800	

$ 8,068	Subtotal
$ 1,614	20% Contingency
$ 1,210	15% Contractor O&P
$ 1,210	15% Engineering
$ 12,100	**Total**

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ECM-4: Re-commission Facility BAS and Integrate Existing HVAC Equipment

ECM Description Summary

The HVAC Building Automation System (BAS) controls consists of an outdated BAS for monitoring and sequencing all HVAC systems and equipment. Due to BAS condition and software, HVAC system sequencing, monitoring, scheduling and monitoring are limited; pneumatic control filed devices, instrument air tubing and compressor are also maintenance intensive. To reduce the energy used by HVAC systems, the BAS system requires replacement by a modern DDC control system with current software and functionality, and complete re-

50,000 Sq Footage

EXISTING CONDITIONS		
Existing Facility Total Electric usage	475,694	kWh
Existing Facility Total Gas usage	9,307	Therms
Existing Facility Cooling Electric usage	114,166	kWh[1]
Existing Facility Heating Natural Gas usage	7073.5	Therms[2]
PROPOSED CONDITIONS		
Proposed Facility Cooling Electric Usage	102,750	kWh
Proposed Facility Natural Gas Usage	6366.2	Therms
SAVINGS		
Retro-Commissioning Electric Savings	11,400	**kWh**
Retro-Commissioning Natural Gas Savings	700	**Therms**
Total cost savings	$ 2,058	
Estimated Total Project Cost	$ 25,000	[4]
Simple Payback	12.1	**years**

Assumptions

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

ECM-5 Lighting Replacements

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
$	kW	kWh	therms	$	$	$	$	Years	Years
$49,300	**4.8**	**10,000**	**0**	**$1,528**	**0**	**$1,528**	**$6,539**	**32.3**	**28.0**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-6 Install Occupancy Sensors

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
$	kW	kWh	therms	$	$	$	$	Years	Years
$4,540	**0.0**	**30,200**	**0**	**$3,582**	**0**	**$3,582**	**$690**	**1.3**	**1.1**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-7 Lighting Replacements with Occupancy Sensors

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
$	kW	kWh	therms	$	$	$	$	Years	Years
$53,868	**4.8**	**35,400**	**0**	**$4,540**	**0**	**$4,540**	**$7,229**	**11.9**	**10.3**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

Energy Audit of Camden County College (Wolverton Library)

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ECM-5 Lighting Replacements

Cost of Electricity: **$0.119 $/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
55	Vestibule	6	2T 17 R F 3 (ELE)	F23ILL	47	0.3	SW	2500	705	6	2T 17 R F 3 (ELE)	F23ILL	47	0.3	SW	2,500	705	-	0.0	$ -	$ -			
175A	Circulation Desk	10	4' 2-LAMP T-8 (32W)	F42ILL	59	0.6	SW	2500	1,475	10	4' 2-LAMP T-8	F42ILL	59	0.6	SW	2,500	1,475	-	0.0	$ -	$ 1,147.50	$250		
35A	Room 106	1	4' 3-LAMP T-8 (32W)	F43ILL	89	0.1	SW	2500	223	1	4' 3-LAMP T-8 (32W)	F43ILL	89	0.1	SW	2,500	223	-	0.0	$ -	$ -			
35A	Room 107	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2,125	378	-	0.0	$ -	$ -			
35A	Room 108	13	4' 3-LAMP T-8 (32W)	F43ILL	89	1.2	SW	2125	2,459	13	4' 3-LAMP T-8 (32W)	F43ILL	89	1.2	SW	2,125	2,459	-	0.0	$ -	$ -			
35A	Room 100	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	SW	2125	757	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	SW	2,125	757	-	0.0	$ -	$ -	$100		
35A	Room 101	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2500	445	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2,500	445	-	0.0	$ -	$ -	$50		
175A	Mechanical Room 102	2	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	SW	2125	251	2	4' 2-LAMP T-8	F42ILL	59	0.1	SW	2,125	251	-	0.0	$ -	$ 229.50			
35A	Room 103	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2,125	378	-	0.0	$ -	$ -	$50		
35A	Room 104	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2,125	378	-	0.0	$ -	$ -			
35A	Room 105	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2250	401	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2,250	401	-	0.0	$ -	$ -			
227	1st Floor Library	53	W60CF1	F81EL	60	3.2	SW	2250	7,155	53	CF42W	CF42/1-L	48	2.5	SW	2,250	5,724	1,431	0.6	$ 215.06	$ 4,770.00		22.2	22.2
55	Reference Area	23	2T 17 R F 3 (ELE)	F23ILL	47	1.1	SW	2125	2,297	23	2T 17 R F 3 (ELE)	F23ILL	47	1.1	SW	2,125	2,297	-	0.0	$ -	$ -			
175A	Reference Area	36	4' 2-LAMP T-8 (32W)	F42ILL	59	2.1	SW	2125	4,514	36	4' 2-LAMP T-8	F42ILL	59	2.1	SW	2,125	4,514	-	0.0	$ -	$ 4,131.00			
175A	1st Floor Men's Bathroom	3	4' 2-LAMP T-8 (32W)	F42ILL	59	0.2	SW	2125	376	3	4' 2-LAMP T-8	F42ILL	59	0.2	SW	2,125	376	-	0.0	$ -	$ 344.25			
175A	1st Floor Women's Bathroom	3	4' 2-LAMP T-8 (32W)	F42ILL	59	0.2	SW	2000	354	3	4' 2-LAMP T-8	F42ILL	59	0.2	SW	2,000	354	-	0.0	$ -	$ 344.25			
55	1st Floor Library	61	2T 17 R F 3 (ELE)	F23ILL	47	2.9	SW	2125	6,092	61	2T 17 R F 3 (ELE)	F23ILL	47	2.9	SW	2,125	6,092	-	0.0	$ -	$ -			
175A	South Stairway	8	4' 2-LAMP T-8 (32W)	F42ILL	59	0.5	SW	2125	1,003	8	4' 2-LAMP T-8	F42ILL	59	0.5	SW	2,125	1,003	-	0.0	$ -	$ 918.00			
175A	North Stairway	8	4' 2-LAMP T-8 (32W)	F42ILL	59	0.5	SW	2125	1,003	8	4' 2-LAMP T-8	F42ILL	59	0.5	SW	2,125	1,003	-	0.0	$ -	$ 918.00			
175A	3rd Floor Book Storage	70	4' 2-LAMP T-8 (32W)	F42ILL	59	4.1	SW	2125	8,776	70	4' 2-LAMP T-8	F42ILL	59	4.1	SW	2,125	8,776	-	0.0	$ -	$ 8,032.50			
71	3rd Floor Lobby	10	I 60	I60/1	60	0.6	SW	2125	1,275	10	CF 26	CFQ26/1-L	27	0.3	SW	2,125	574	701	0.3	$ 106.70	$ 405.00		3.8	3.8
55	Computer Lab	52	2T 17 R F 3 (ELE)	F23ILL	47	2.4	SW	2125	5,194	52	2T 17 R F 3 (ELE)	F23ILL	47	2.4	SW	2,125	5,194	-	0.0	$ -	$ -	$1,300		
35A	Room 301	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2,125	378	-	0.0	$ -	$ -			
35A	Room 302	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2,125	378	-	0.0	$ -	$ -			
35A	Room 303	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2500	445	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2,500	445	-	0.0	$ -	$ -			
35A	Room 303	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2,125	378	-	0.0	$ -	$ -			
35A	Room 304	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2,125	378	-	0.0	$ -	$ -			
35A	Room 305	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	500	89	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	500	89	-	0.0	$ -	$ -	$50		
35A	Room 306	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2,125	378	-	0.0	$ -	$ -			
175A	3rd Floor Library	72	4' 2-LAMP T-8 (32W)	F42ILL	59	4.2	SW	2500	10,620	72	4' 2-LAMP T-8	F42ILL	59	4.2	SW	2,500	10,620	-	0.0	$ -	$ 8,262.00			
55	Tutoring Center	62	2T 17 R F 3 (ELE)	F23ILL	47	2.9	SW	2500	7,285	62	2T 17 R F 3 (ELE)	F23ILL	47	2.9	SW	2,500	7,285	-	0.0	$ -	$ -	$1,550		
35A	Room 308	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2500	445	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2,500	445	-	0.0	$ -	$ -	$50		
35A	Room 309	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2,125	378	-	0.0	$ -	$ -			
35A	Room 310	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	1062.5	189	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	1,063	189	-	0.0	$ -	$ -			
35A	Room 311	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2,125	378	-	0.0	$ -	$ -			
35A	Room 312	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	1062.5	189	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	1,063	189	-	0.0	$ -	$ -			
175A	3rd Floor Men's Bathroom	3	4' 2-LAMP T-8 (32W)	F42ILL	59	0.2	SW	1062.5	188	3	4' 2-LAMP T-8	F42ILL	59	0.2	SW	1,063	188	-	0.0	$ -	$ 344.25			
175A	3rd Floor Women's Bathroom	3	4' 2-LAMP T-8 (32W)	F42ILL	59	0.2	SW	2125	376	3	4' 2-LAMP T-8	F42ILL	59	0.2	SW	2,125	376	-	0.0	$ -	$ 344.25			
175A	3rd Floor Book Shelves	48	4' 2-LAMP T-8 (32W)	F42ILL	59	2.8	SW	500	1,416	48	4' 2-LAMP T-8	F42ILL	59	2.8	SW	500	1,416	-	0.0	$ -	$ 5,508.00			
55	2nd Floor Lobby	63	2T 17 R F 3 (ELE)	F23ILL	47	3.0	SW	500	1,481	63	2T 17 R F 3 (ELE)	F23ILL	47	3.0	SW	500	1,481	-	0.0	$ -	$ -			
55	2nd Floor Lobby	108	2T 17 R F 3 (ELE)	F23ILL	47	5.1	SW	500	2,538	108	2T 17 R F 3 (ELE)	F23ILL	47	5.1	SW	500	2,538	-	0.0	$ -	$ -			
227	2nd Floor Lobby	21	W60CF1	F81EL	60	1.3	SW	2125	2,678	21	CF42W	CF42/1-L	48	1.0	SW	2,125	2,142	536	0.3	$ 81.48	$ 1,890.00		23.2	23.2
55	Testing & Assesment	40	2T 17 R F 3 (ELE)	F23ILL	47	1.9	SW	1062.5	1,998	40	2T 17 R F 3 (ELE)	F23ILL	47	1.9	SW	1,063	1,998	-	0.0	$ -	$ -			
35A	Room 202	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	SW	2125	757	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	SW	2,125	757	-	0.0	$ -	$ -			
35A	Room 203	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	1062.5	189	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	1,063	189	-	0.0	$ -	$ -	$14		
35A	Room 204	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2250	401	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2,250	401	-	0.0	$ -	$ -			
175A	2nd Floor Men's Bathroom	3	4' 2-LAMP T-8 (32W)	F42ILL	59	0.2	SW	2250	398	3	4' 2-LAMP T-8	F42ILL	59	0.2	SW	2,250	398	-	0.0	$ -	$ 344.25			
175A	2nd Floor Women's Bathroom	3	4' 2-LAMP T-8 (32W)	F42ILL	59	0.2	SW	500	89	3	4' 2-LAMP T-8	F42ILL	59	0.2	SW	500	89	-	0.0	$ -	$ 344.25			
35A	Room 206 - A	3	4' 3-LAMP T-8 (32W)	F43ILL	89	0.3	SW	520	139	3	4' 3-LAMP T-8 (32W)	F43ILL	89	0.3	SW	520	139	-	0.0	$ -	$ -			
35A	Room 206 - B	6	4' 3-LAMP T-8 (32W)	F43ILL	89	0.5	SW	520	278	6	4' 3-LAMP T-8 (32W)	F43ILL	89	0.5	SW	520	278	-	0.0	$ -	$ -			
35A	Room 206 - C	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	520	93	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	520	93	-	0.0	$ -	$ -	$50		
55	Room 206 - D	10	2T 17 R F 3 (ELE)	F23ILL	47	0.5	SW	500	235	10	2T 17 R F 3 (ELE)	F23ILL	47	0.5	SW	500	235	-	0.0	$ -	$ -			
175A	Room 201	1	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	SW	4380	258	1	4' 2-LAMP T-8	F42ILL	59	0.1	SW	4,380	258	-	0.0	$ -	$ 114.75			
175A	Basement Cooridor	32	4' 2-LAMP T-8 (32W)	F42ILL	59	1.9	SW	4380	8,269	32	4' 2-LAMP T-8	F42ILL	59	1.9	SW	4,380	8,269	-	0.0	$ -	$ 3,672.00			
227	Basement Cooridor	6	W60CF1	F81EL	60	0.4	SW	8760	3,154	6	CF42W	CF42/1-L	48	0.3	SW	8,760	2,523	631	0.1	$ 79.94	$ 540.00		6.8	6.8
55	Basement Room - 008	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	SW	8760	1,647	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	SW	8,760	1,647	-	0.0	$ -	$ -			
35A	Basement Room - 008	15	4' 3-LAMP T-8 (32W)	F43ILL	89	1.3	SW	2125	2,837	15	4' 3-LAMP T-8 (32W)	F43ILL	89	1.3	SW	2,125	2,837	-	0.0	$ -	$ -	$375		
175A	Basement Room - 006	1	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	SW	2125	125	1	4' 2-LAMP T-8	F42ILL	59	0.1	SW	2,125	125	-	0.0	$ -	$ 114.75	$25		
175A	Basement Room - 005	10	4' 2-LAMP T-8 (32W)	F42ILL	59	0.6	SW	500	295	10	4' 2-LAMP T-8	F42ILL	59	0.6	SW	500	295	-	0.0	$ -	$ 1,147.50	$250		
35A	Basement Room - 003	3	4' 3-LAMP T-8 (32W)	F43ILL	89	0.3	SW	500	134	3	4' 3-LAMP T-8 (32W)	F43ILL	89	0.3	SW	500	134	-	0.0	$ -	$ -	$75		
35A	Basement Room - 002	12	4' 3-LAMP T-8 (32W)	F43ILL	89	1.1	SW	8760	9,356	12	4' 3-LAMP T-8 (32W)	F43ILL	89	1.1	SW	8,760	9,356	-	0.0	$ -	$ -	$300		
35A	Basement Room - 012	21	4' 3-LAMP T-8 (32W)	F43ILL	89	1.9	SW	500	935	21	4' 3-LAMP T-8 (32W)	F43ILL	89	1.9	SW	500	935	-	0.0	$ -	$ -	$525		
175A	Basement Room - 013	1	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	SW	3285	194	1	4' 2-LAMP T-8	F42ILL	59	0.1	SW	3,285	194	-	0.0	$ -	$ 114.75	$25		
35A	Basement Room - 011	20	4' 3-LAMP T-8 (32W)	F43ILL	89	1.8	SW	3285	5,847	20	4' 3-LAMP T-8 (32W)	F43ILL	89	1.8	SW	3,285	5,847	-	0.0	$ -	$ -	$500		
35A	Basement Room - 009	16	4' 3-LAMP T-8 (32W)	F43ILL	89	1.4	SW	8760	12,474	16	4' 3-LAMP T-8 (32W)	F43ILL	89	1.4	SW	8,760	12,474	-	0.0	$ -	$ -	$400		
175A	Basement Room - 010	1	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	SW	8760	517	1	4' 2-LAMP T-8	F42ILL	59	0.1	SW	8,760	517	-	0.0	$ -	$ 114.75			
175A	Basement Mechanical Room	15	4' 2-LAMP T-8 (32W)	F42ILL	59	0.9	SW	500	443	15	4' 2-LAMP T-8	F42ILL	59	0.9	SW	500	443	-	0.0	$ -	$ 1,721.25	$375		
146	Exterior	7	High Bay MH 400	MH400/1	458	3.2	SW	2125	6,813	7	P 54 C F 4	FC20	20	0.1	SW	2,125	298	6,515	3.1	$ 991.32	$ 2,100.00	$175	2.1	1.9
169	Exterior	2	SP 250 MH ROOF	MH250/1	295	0.6	SW	500	295	2	FXLED78	FXLED78/1	78	0.2	SW	500	217	0.4	$ 56.68	$ 1,411.00	$50	24.9	24.0
	Total	**1,019**				**63.1**			**134,640**	**1,019**			**4,826**	**58.3**			**124,609**	**10,031**	**4.8**	**$1,531**	**$49,300**	**$6,539**		
																	Demand Savings			**4.8**	**$341**			
																	kWh Savings			**10,000**	**$1,186**			
																	Total savings				**$1,528**		**32.3**	**28.0**

Energy Audit of Camden County College (Wolverton Library)

CHA Project No. 24364

ECM-6 Install Occupancy Sensors

Cost of Electricity: **$0.119 $/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
55	Vestibule	6	2T 17 R F 3 (ELE)	F23ILL	47	0.3	SW	2500	705.0	6	2T 17 R F 3 (ELE)	F23ILL	47	0.3	None	2500	705.0	0.0	0.0	$0.00	$0.00	$0.00		
175A	Circulation Desk	10	4' 2-LAMP T-8 (32W)	F42ILL	59	0.6	SW	2500	1,475.0	10	4' 2-LAMP T-8 (32W)	F42ILL	59	0.6	None	2500	1,475.0	0.0	0.0	$0.00	$0.00	$0.00		
35A	Room 106	1	4' 3-LAMP T-8 (32W)	F43ILL	89	0.1	SW	2500	222.5	1	4' 3-LAMP T-8 (32W)	F43ILL	89	0.1	None	2500	222.5	0.0	0.0	$0.00	$0.00	$0.00		
35A	Room 107	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378.3	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	C-OCC	1200	213.6	164.7	0.0	$19.53	$202.50	$35.00	1.1	0.9
35A	Room 108	13	4' 3-LAMP T-8 (32W)	F43ILL	89	1.2	SW	2125	2,458.6	13	4' 3-LAMP T-8 (32W)	F43ILL	89	1.2	C-OCC	1200	1,388.4	1,070.2	0.0	$126.94	$202.50	$35.00	1.2	1.0
35A	Room 100	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	SW	2125	756.5	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	C-OCC	1200	427.2	329.3	0.0	$39.06	$202.50	$35.00	3.9	3.2
35A	Room 101	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2500	445.0	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	2500	445.0	0.0	0.0	$0.00	$0.00	$0.00		
175A	Mechanical Room 102	2	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	SW	2125	250.8	2	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	OCC	1200	141.6	109.2	0.0	$12.95	$118.75	$20.00	9.2	7.6
35A	Room 103	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378.3	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1200	213.6	164.7	0.0	$19.53	$118.75	$20.00	6.1	5.1
35A	Room 104	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378.3	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1200	213.6	164.7	0.0	$19.53	$118.75	$20.00	6.1	5.1
35A	Room 105	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2250	400.5	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	C-OCC	1000	178.0	222.5	0.0	$26.39	$202.50	$35.00	7.7	6.3
227	1st Floor Library	53	W60CF1	F81EL	60	3.2	SW	2250	7,155.0	53	W60CF1	F81EL	60	3.2	C-OCC	1000	3,180.0	3,975.0	0.0	$471.47	$202.50	$35.00	0.4	0.4
55	Reference Area	23	2T 17 R F 3 (ELE)	F23ILL	47	1.1	SW	2125	2,297.1	23	2T 17 R F 3 (ELE)	F23ILL	47	1.1	OCC	1200	1,297.2	999.9	0.0	$118.60	$118.75	$20.00	1.0	0.8
175A	Reference Area	36	4' 2-LAMP T-8 (32W)	F42ILL	59	2.1	SW	2125	4,513.5	36	4' 2-LAMP T-8 (32W)	F42ILL	59	2.1	OCC	1200	2,548.8	1,964.7	0.0	$233.03	$118.75	$20.00	0.5	0.4
175A	1st Floor Men's Bathroom	3	4' 2-LAMP T-8 (32W)	F42ILL	59	0.2	SW	2125	376.1	3	4' 2-LAMP T-8 (32W)	F42ILL	59	0.2	OCC	1200	212.4	163.7	0.0	$19.42	$118.75	$20.00	6.1	5.1
175A	1st Floor Women's Bathroom	3	4' 2-LAMP T-8 (32W)	F42ILL	59	0.2	SW	2000	354.0	3	4' 2-LAMP T-8 (32W)	F42ILL	59	0.2	OCC	1000	177.0	177.0	0.0	$20.99	$118.75	$0.00	5.7	5.7
55	1st Floor Library	61	2T 17 R F 3 (ELE)	F23ILL	47	2.9	SW	2125	6,092.4	61	2T 17 R F 3 (ELE)	F23ILL	47	2.9	OCC	1200	3,440.4	2,652.0	0.0	$314.55	$118.75	$20.00	0.4	0.3
175A	South Stairway	8	4' 2-LAMP T-8 (32W)	F42ILL	59	0.5	SW	2125	1,003.0	8	4' 2-LAMP T-8 (32W)	F42ILL	59	0.5	OCC	1200	566.4	436.6	0.0	$51.78	$118.75	$20.00	2.3	1.9
175A	North Stairway	8	4' 2-LAMP T-8 (32W)	F42ILL	59	0.5	SW	2125	1,003.0	8	4' 2-LAMP T-8 (32W)	F42ILL	59	0.5	OCC	1200	566.4	436.6	0.0	$51.78	$118.75	$20.00	2.3	1.9
175A	3rd Floor Book Storage	70	4' 2-LAMP T-8 (32W)	F42ILL	59	4.1	SW	2125	8,776.3	70	4' 2-LAMP T-8 (32W)	F42ILL	59	4.1	OCC	1200	4,956.0	3,820.3	0.0	$453.11	$118.75	$20.00	0.3	0.2
71	3rd Floor Lobby	10	I 60	I60/1	60	0.6	SW	2125	1,275.0	10	I 60	I60/1	60	0.6	OCC	1200	720.0	555.0	0.0	$65.83	$118.75	$20.00	0.4	0.3
55	Computer Lab	52	2T 17 R F 3 (ELE)	F23ILL	47	2.4	SW	2125	5,193.5	52	2T 17 R F 3 (ELE)	F23ILL	47	2.4	OCC	1200	2,932.8	2,260.7	0.0	$268.14	$118.75	$20.00	0.4	0.3
35A	Room 301	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378.3	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1200	213.6	164.7	0.0	$19.53	$118.75	$20.00	6.1	5.1
35A	Room 302	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378.3	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1200	213.6	164.7	0.0	$19.53	$118.75	$20.00	6.1	5.1
35A	Room 303	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2500	445.0	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	2500	445.0	0.0	0.0	$0.00	$0.00	$0.00		
35A	Room 303	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378.3	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1200	213.6	164.7	0.0	$19.53	$118.75	$20.00	6.1	5.1
35A	Room 304	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378.3	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1000	178.0	200.3	0.0	$23.75	$118.75	$20.00	5.0	4.2
35A	Room 305	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	500	89.0	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	500	89.0	0.0	0.0	$0.00	$0.00	$0.00		
35A	Room 306	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378.3	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1200	213.6	164.7	0.0	$19.53	$118.75	$20.00	6.1	5.1
175A	3rd Floor Library	72	4' 2-LAMP T-8 (32W)	F42ILL	59	4.2	SW	2500	10,620.0	72	4' 2-LAMP T-8 (32W)	F42ILL	59	4.2	None	2500	10,620.0	0.0	0.0	$0.00	$0.00	$0.00		
55	Tutoring Center	62	2T 17 R F 3 (ELE)	F23ILL	47	2.9	SW	2500	7,285.0	62	2T 17 R F 3 (ELE)	F23ILL	47	2.9	None	2500	7,285.0	0.0	0.0	$0.00	$0.00	$0.00		
35A	Room 308	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2500	445.0	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	2500	445.0	0.0	0.0	$0.00	$0.00	$0.00		
35A	Room 309	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378.3	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1200	213.6	164.7	0.0	$19.53	$118.75	$0.00	6.1	6.1
35A	Room 310	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	1062.5	189.1	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	1062.5	189.1	0.0	0.0	$0.00	$0.00	$0.00		
35A	Room 311	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378.3	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1200	213.6	164.7	0.0	$19.53	$118.75	$20.00	6.1	5.1
35A	Room 312	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	1062.5	189.1	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	1062.5	189.1	0.0	0.0	$0.00	$0.00	$0.00		
175A	3rd Floor Men's Bathroom	3	4' 2-LAMP T-8 (32W)	F42ILL	59	0.2	SW	1062.5	188.1	3	4' 2-LAMP T-8 (32W)	F42ILL	59	0.2	None	1062.5	188.1	0.0	0.0	$0.00	$0.00	$0.00		
175A	3rd Floor Women's Bathroom	3	4' 2-LAMP T-8 (32W)	F42ILL	59	0.2	SW	2125	376.1	3	4' 2-LAMP T-8 (32W)	F42ILL	59	0.2	OCC	1200	212.4	163.7	0.0	$19.42	$118.75	$20.00	6.1	5.1
175A	3rd Floor Book Shelves	48	4' 2-LAMP T-8 (32W)	F42ILL	59	2.8	SW	500	1,416.0	48	4' 2-LAMP T-8 (32W)	F42ILL	59	2.8	None	500	1,416.0	0.0	0.0	$0.00	$0.00	$0.00		
55	2nd Floor Lobby	63	2T 17 R F 3 (ELE)	F23ILL	47	3.0	SW	500	1,480.5	63	2T 17 R F 3 (ELE)	F23ILL	47	3.0	None	500	1,480.5	0.0	0.0	$0.00	$0.00	$0.00		
55	2nd Floor Lobby	108	2T 17 R F 3 (ELE)	F23ILL	47	5.1	SW	500	2,538.0	108	2T 17 R F 3 (ELE)	F23ILL	47	5.1	None	500	2,538.0	0.0	0.0	$0.00	$0.00	$0.00		
227	2nd Floor Lobby	21	W60CF1	F81EL	60	1.3	SW	2125	2,677.5	21	W60CF1	F81EL	60	1.3	OCC	1200	1,512.0	1,165.5	0.0	$138.24	$118.75	$20.00	0.9	0.7
55	Testing & Assesment	40	2T 17 R F 3 (ELE)	F23ILL	47	1.9	SW	1062.5	1,997.5	40	2T 17 R F 3 (ELE)	F23ILL	47	1.9	None	1062.5	1,997.5	0.0	0.0	$0.00	$0.00	$0.00		
35A	Room 202	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	SW	2125	756.5	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	OCC	1200	427.2	329.3	0.0	$39.06	$118.75	$0.00	3.0	3.0
35A	Room 203	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	1062.5	189.1	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	1062.5	189.1	0.0	0.0	$0.00	$0.00	$0.00		
35A	Room 204	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2250	400.5	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	2250	400.5	0.0	0.0	$0.00	$0.00	$0.00		
175A	2nd Floor Men's Bathroom	3	4' 2-LAMP T-8 (32W)	F42ILL	59	0.2	SW	2250	398.3	3	4' 2-LAMP T-8 (32W)	F42ILL	59	0.2	None	2250	398.3	0.0	0.0	$0.00	$0.00	$0.00		
175A	2nd Floor Women's Bathroom	3	4' 2-LAMP T-8 (32W)	F42ILL	59	0.2	SW	500	88.5	3	4' 2-LAMP T-8 (32W)	F42ILL	59	0.2	None	500	88.5	0.0	0.0	$0.00	$0.00	$0.00		
35A	Room 206 - A	3	4' 3-LAMP T-8 (32W)	F43ILL	89	0.3	SW	520	138.8	3	4' 3-LAMP T-8 (32W)	F43ILL	89	0.3	None	520	138.8	0.0	0.0	$0.00	$0.00	$0.00		
35A	Room 206 - B	6	4' 3-LAMP T-8 (32W)	F43ILL	89	0.5	SW	520	277.7	6	4' 3-LAMP T-8 (32W)	F43ILL	89	0.5	C-OCC	390	208.3	69.4	0.0	$8.23	$202.50	$35.00	24.6	20.3
35A	Room 206 - C	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	520	92.6	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	520	92.6	0.0	0.0	$0.00	$0.00	$0.00		
55	Room 206 - D	10	2T 17 R F 3 (ELE)	F23ILL	47	0.5	SW	500	235.0	10	2T 17 R F 3 (ELE)	F23ILL	47	0.5	None	500	235.0	0.0	0.0	$0.00	$0.00	$0.00		
175A	Room 201	1	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	SW	4380	258.4	1	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	None	4380	258.4	0.0	0.0	$0.00	$0.00	$0.00		
175A	Basement Cooridor	32	4' 2-LAMP T-8 (32W)	F42ILL	59	1.9	SW	4380	8,269.4	32	4' 2-LAMP T-8 (32W)	F42ILL	59	1.9	None	4380	8,269.4	0.0	0.0	$0.00	$0.00	$0.00		
227	Basement Cooridor	6	W60CF1	F81EL	60	0.4	SW	8760	3,153.6	6	W60CF1	F81EL	60	0.4	None	8760	3,153.6	0.0	0.0	$0.00	$0.00	$0.00		
55	Basement Room - 008	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	SW	8760	1,646.9	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	None	8760	1,646.9	0.0	0.0	$0.00	$0.00	$0.00		
35A	Basement Room - 008	15	4' 3-LAMP T-8 (32W)	F43ILL	89	1.3	SW	2125	2,836.9	15	4' 3-LAMP T-8 (32W)	F43ILL	89	1.3	OCC	1200	1,602.0	1,234.9	0.0	$146.47	$118.75	$20.00	0.8	0.6
175A	Basement Room - 006	1	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	SW	2125	125.4	1	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	OCC	1200	70.8	54.6	0.0	$6.47	$118.75	$20.00	18.3	15.3
175A	Basement Room - 005	10	4' 2-LAMP T-8 (32W)	F42ILL	59	0.6	SW	500	295.0	10	4' 2-LAMP T-8 (32W)	F42ILL	59	0.6	None	500	295.0	0.0	0.0	$0.00	$0.00	$0.00		
35A	Basement Room - 003	3	4' 3-LAMP T-8 (32W)	F43ILL	89	0.3	SW	500	133.5	3	4' 3-LAMP T-8 (32W)	F43ILL	89	0.3	None	500	133.5	0.0	0.0	$0.00	$0.00	$0.00		
35A	Basement Room - 002	12	4' 3-LAMP T-8 (32W)	F43ILL	89	1.1	SW	8760	9,355.7	12	4' 3-LAMP T-8 (32W)	F43ILL	89	1.1	None	8760	9,355.7	0.0	0.0	$0.00	$0.00	$0.00		
35A	Basement Room - 012	21	4' 3-LAMP T-8 (32W)	F43ILL	89	1.9	SW	500	934.5	21	4' 3-LAMP T-8 (32W)	F43ILL	89	1.9	None	500	934.5	0.0	0.0	$0.00	$0.00	$0.00		
175A	Basement Room - 013	1	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	SW	3285	193.8	1	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	OCC	1825	107.7	86.1	0.0	$10.22	$118.75	$20.00	11.6	9.7
35A	Basement Room - 011	20	4' 3-LAMP T-8 (32W)	F43ILL	89	1.8	SW	3285	5,847.3	20	4' 3-LAMP T-8 (32W)	F43ILL	89	1.8	OCC	1825	3,248.5	2,598.8	0.0	$308.24	$118.75	$20.00	0.4	0.3
35A	Basement Room - 009	16	4' 3-LAMP T-8 (32W)	F43ILL	89	1.4	SW	8760	12,474.2	16	4' 3-LAMP T-8 (32W)	F43ILL	89	1.4	None	8760	12,474.2	0.0	0.0	$0.00	$0.00	$0.00		
175A	Basement Room - 010	1	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	SW	8760	516.8	1	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	None	8760	516.8	0.0	0.0	$0.00	$0.00	$0.00		
175A	Basement Mechanical Room	15	4' 2-LAMP T-8 (32W)	F42ILL	59	0.9	SW	500	442.5	15	4' 2-LAMP T-8 (32W)	F42ILL	59	0.9	None	500	442.5	0.0	0.0	$0.00	$0.00	$0.00		
146	Exterior	7	High Bay MH 400	MH400/1	458	3.2	SW	2125	6,812.8	7	High Bay MH 400	MH400/1	458	3.2	OCC	1000	3,206.0	3,606.8	0.0	$427.79	$118.75	$0.00	0.3	0.3
169	Exterior	2	SP 250 MH ROOF	MH250/1	295	0.6	SW	500	295.0	2	SP 250 MH ROOF	MH250/1	295	0.6	None	500	295.0	0.0	0.0	$0.00	$0.00	$0.00		
	Total	**1,019**				**63.1**			**134,640**	**1,019**				**63**				**104,476**	**30,164**	**$4,540**	**690**			
																		Demand Savings		**$0**				
																		kWh Savings		**$3,582**				
																		Total Savings		**$3,582**			**1.3**	**1.1**

Energy Audit of Camden County College (Wolverton Library)

CHA Project No. 24364

ECM-7 Lighting Replacements with Occupancy Sensors

Cost of Electricity: **$0.119 $/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
55	Vestibule	6	2T 17 R F 3 (ELE)	F23ILL	47	0.3	SW	2500	705	6	2T 17 R F 3 (ELE)	F23ILL	47	0.3	None	2,500	705	-	0.0	$ -	$ -	$ -		
175A	Circulation Desk	10	4' 2-LAMP T-8 (32W)	F42ILL	59	0.6	SW	2500	1,475	10	4' 2-LAMP T-8	F42ILL	59	0.6	None	2,500	1,475	-	0.0	$ -	$ 1,147.50	$ 250		
35A	Room 106	1	4' 3-LAMP T-8 (32W)	F43ILL	89	0.1	SW	2500	223	1	4' 3-LAMP T-8 (32W)	F43ILL	89	0.1	None	2,500	223	-	0.0	$ -	$ -	$ -		
35A	Room 107	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	C-OCC	1,200	214	165	0.0	$ 19.53	$ 202.50	$ 35	10.4	8.6
35A	Room 108	13	4' 3-LAMP T-8 (32W)	F43ILL	89	1.2	SW	2125	2,459	13	4' 3-LAMP T-8 (32W)	F43ILL	89	1.2	C-OCC	1,200	1,388	1,070	0.0	$ 126.94	$ 202.50	$ 35	1.6	1.3
35A	Room 100	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	SW	2125	757	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	C-OCC	1,200	427	329	0.0	$ 39.06	$ 202.50	$ 135	5.2	1.7
35A	Room 101	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2500	445	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	2,500	445	-	0.0	$ -	$ -	$ 50		
175A	Mechanical Room 102	2	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	SW	2125	251	2	4' 2-LAMP T-8	F42ILL	59	0.1	OCC	1,200	142	109	0.0	$ 12.95	$ 348.25	$ 20	26.9	25.4
35A	Room 103	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1,200	214	165	0.0	$ 19.53	$ 118.75	$ 70	6.1	2.5
35A	Room 104	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1,200	214	165	0.0	$ 19.53	$ 118.75	$ 20	6.1	5.1
35A	Room 105	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2250	401	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	C-OCC	1,000	178	223	0.0	$ 26.39	$ 202.50	$ 35	7.7	6.3
227	1st Floor Library	53	W60CF1	F81EL	60	3.2	SW	2250	7,155	53	CF42W	CF42/1-L	48	2.5	C-OCC	1,000	2,544	4,611	0.6	$ 592.24	$ 4,972.50	$ 35	8.4	8.3
55	Reference Area	23	2T 17 R F 3 (ELE)	F23ILL	47	1.1	SW	2125	2,297	23	2T 17 R F 3 (ELE)	F23ILL	47	1.1	OCC	1,200	1,297	1,000	0.0	$ 118.60	$ 118.75	$ 20	1.0	0.8
175A	Reference Area	36	4' 2-LAMP T-8 (32W)	F42ILL	59	2.1	SW	2125	4,514	36	4' 2-LAMP T-8	F42ILL	59	2.1	OCC	1,200	2,549	1,965	0.0	$ 233.03	$ 4,249.75	$ 20	18.2	18.2
175A	1st Floor Men's Bathroom	3	4' 2-LAMP T-8 (32W)	F42ILL	59	0.2	SW	2125	376	3	4' 2-LAMP T-8	F42ILL	59	0.2	OCC	1,200	212	164	0.0	$ 19.42	$ 463.00	$ 20	23.8	22.8
175A	1st Floor Women's Bathroom	3	4' 2-LAMP T-8 (32W)	F42ILL	59	0.2	SW	2000	354	3	4' 2-LAMP T-8	F42ILL	59	0.2	OCC	1,000	177	177	0.0	$ 20.99	$ 463.00	$ -	22.1	22.1
55	1st Floor Library	61	2T 17 R F 3 (ELE)	F23ILL	47	2.9	SW	2125	6,092	61	2T 17 R F 3 (ELE)	F23ILL	47	2.9	OCC	1,200	3,440	2,652	0.0	$ 314.55	$ 118.75	$ 20	0.4	0.3
175A	South Stairway	8	4' 2-LAMP T-8 (32W)	F42ILL	59	0.5	SW	2125	1,003	8	4' 2-LAMP T-8	F42ILL	59	0.5	OCC	1,200	566	437	0.0	$ 51.78	$ 1,036.75	$ 20	20.0	19.6
175A	North Stairway	8	4' 2-LAMP T-8 (32W)	F42ILL	59	0.5	SW	2125	1,003	8	4' 2-LAMP T-8	F42ILL	59	0.5	OCC	1,200	566	437	0.0	$ 51.78	$ 1,036.75	$ 20	20.0	19.6
175A	3rd Floor Book Storage	70	4' 2-LAMP T-8 (32W)	F42ILL	59	4.1	SW	2125	8,776	70	4' 2-LAMP T-8	F42ILL	59	4.1	OCC	1,200	4,956	3,820	0.0	$ 453.11	$ 8,151.25	$ 20	18.0	17.9
71	3rd Floor Lobby	10	I 60	I60/1	60	0.6	SW	2125	1,275	10	CF 26	CFQ26/1-L	27	0.3	OCC	1,200	324	951	0.3	$ 136.32	$ 523.75	$ 20	3.8	3.7
55	Computer Lab	52	2T 17 R F 3 (ELE)	F23ILL	47	2.4	SW	2125	5,194	52	2T 17 R F 3 (ELE)	F23ILL	47	2.4	OCC	1,200	2,933	2,261	0.0	$ 268.14	$ 118.75	$ 1,320	0.4	-4.5
35A	Room 301	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1,200	214	165	0.0	$ 19.53	$ 118.75	$ 20	6.1	5.1
35A	Room 302	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1,200	214	165	0.0	$ 19.53	$ 118.75	$ 20	6.1	5.1
35A	Room 303	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2500	445	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	2,500	445	-	0.0	$ -	$ -	$ -		
35A	Room 303	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1,200	214	165	0.0	$ 19.53	$ 118.75	$ 20	6.1	5.1
35A	Room 304	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1,000	178	200	0.0	$ 23.75	$ 118.75	$ 20	5.0	4.2
35A	Room 305	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	500	89	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	500	89	-	0.0	$ -	$ -	$ 50		
35A	Room 306	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1,200	214	165	0.0	$ 19.53	$ 118.75	$ 20	6.1	5.1
175A	3rd Floor Library	72	4' 2-LAMP T-8 (32W)	F42ILL	59	4.2	SW	2500	10,620	72	4' 2-LAMP T-8	F42ILL	59	4.2	None	2,500	10,620	-	0.0	$ -	$ 8,262.00	$ -		
55	Tutoring Center	62	2T 17 R F 3 (ELE)	F23ILL	47	2.9	SW	2500	7,285	62	2T 17 R F 3 (ELE)	F23ILL	47	2.9	None	2,500	7,285	-	0.0	$ -	$ -	$ 1,550		
35A	Room 308	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2500	445	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	2,500	445	-	0.0	$ -	$ -	$ 50		
35A	Room 309	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1,200	214	165	0.0	$ 19.53	$ 118.75	$ -	6.1	6.1
35A	Room 310	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	1062.5	189	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	1,063	189	-	0.0	$ -	$ -	$ -		
35A	Room 311	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2125	378	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1,200	214	165	0.0	$ 19.53	$ 118.75	$ 20	6.1	5.1
35A	Room 312	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	1062.5	189	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	1,063	189	-	0.0	$ -	$ -	$ -		
175A	3rd Floor Men's Bathroom	3	4' 2-LAMP T-8 (32W)	F42ILL	59	0.2	SW	1062.5	188	3	4' 2-LAMP T-8	F42ILL	59	0.2	None	1,063	188	-	0.0	$ -	$ 344.25	$ -		
175A	3rd Floor Women's Bathroom	3	4' 2-LAMP T-8 (32W)	F42ILL	59	0.2	SW	2125	376	3	4' 2-LAMP T-8	F42ILL	59	0.2	OCC	1,200	212	164	0.0	$ 19.42	$ 463.00	$ 20	23.8	22.8
175A	3rd Floor Book Shelves	48	4' 2-LAMP T-8 (32W)	F42ILL	59	2.8	SW	500	1,416	48	4' 2-LAMP T-8	F42ILL	59	2.8	None	500	1,416	-	0.0	$ -	$ 5,508.00	$ -		
55	2nd Floor Lobby	63	2T 17 R F 3 (ELE)	F23ILL	47	3.0	SW	500	1,481	63	2T 17 R F 3 (ELE)	F23ILL	47	3.0	None	500	1,481	-	0.0	$ -	$ -	$ -		
55	2nd Floor Lobby	108	2T 17 R F 3 (ELE)	F23ILL	47	5.1	SW	500	2,538	108	2T 17 R F 3 (ELE)	F23ILL	47	5.1	None	500	2,538	-	0.0	$ -	$ -	$ -		
227	2nd Floor Lobby	21	W60CF1	F81EL	60	1.3	SW	2125	2,678	21	CF42W	CF42/1-L	48	1.0	OCC	1,200	1,210	1,468	0.3	$ 192.07	$ 2,008.75	$ 20	10.5	10.4
55	Testing & Assesment	40	2T 17 R F 3 (ELE)	F23ILL	47	1.9	SW	1062.5	1,998	40	2T 17 R F 3 (ELE)	F23ILL	47	1.9	None	1,063	1,998	-	0.0	$ -	$ -	$ -		
35A	Room 202	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	SW	2125	757	4	4' 3-LAMP T-8 (32W)	F43ILL	89	0.4	OCC	1,200	427	329	0.0	$ 39.06	$ 118.75	$ -	3.0	3.0
35A	Room 203	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	1062.5	189	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	1,063	189	-	0.0	$ -	$ -	$ 14		
35A	Room 204	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2250	401	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	2,250	401	-	0.0	$ -	$ -	$ -		
175A	2nd Floor Men's Bathroom	3	4' 2-LAMP T-8 (32W)	F42ILL	59	0.2	SW	2250	398	3	4' 2-LAMP T-8	F42ILL	59	0.2	None	2,250	398	-	0.0	$ -	$ 344.25	$ -		
175A	2nd Floor Women's Bathroom	3	4' 2-LAMP T-8 (32W)	F42ILL	59	0.2	SW	500	89	3	4' 2-LAMP T-8	F42ILL	59	0.2	None	500	89	-	0.0	$ -	$ 344.25	$ -		
35A	Room 206 - A	3	4' 3-LAMP T-8 (32W)	F43ILL	89	0.3	SW	520	139	3	4' 3-LAMP T-8 (32W)	F43ILL	89	0.3	None	520	139	-	0.0	$ -	$ -	$ -		
35A	Room 206 - B	6	4' 3-LAMP T-8 (32W)	F43ILL	89	0.5	SW	520	278	6	4' 3-LAMP T-8 (32W)	F43ILL	89	0.5	C-OCC	390	208	69	0.0	$ 8.23	$ 202.50	$ 35	24.6	20.3
35A	Room 206 - C	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	520	93	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	None	520	93	-	0.0	$ -	$ -	$ 50		
55	Room 206 - D	10	2T 17 R F 3 (ELE)	F23ILL	47	0.5	SW	500	235	10	2T 17 R F 3 (ELE)	F23ILL	47	0.5	None	500	235	-	0.0	$ -	$ -	$ -		
175A	Room 201	1	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	SW	4380	258	1	4' 2-LAMP T-8	F42ILL	59	0.1	None	4,380	258	-	0.0	$ -	$ 114.75	$ -		
175A	Basement Cooridor	32	4' 2-LAMP T-8 (32W)	F42ILL	59	1.9	SW	4380	8,269	32	4' 2-LAMP T-8	F42ILL	59	1.9	None	4,380	8,269	-	0.0	$ -	$ 3,672.00	$ -		
227	Basement Cooridor	6	W60CF1	F81EL	60	0.4	SW	8760	3,154	6	CF42W	CF42/1-L	48	0.3	None	8,760	2,523	631	0.1	$ 79.94	$ 540.00	$ -	6.8	6.8
55	Basement Room - 008	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	SW	8760	1,647	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	None	8,760	1,647	-	0.0	$ -	$ -	$ -		
35A	Basement Room - 008	15	4' 3-LAMP T-8 (32W)	F43ILL	89	1.3	SW	2125	2,837	15	4' 3-LAMP T-8 (32W)	F43ILL	89	1.3	OCC	1,200	1,602	1,235	0.0	$ 146.47	$ 118.75	$ 395	0.8	-1.9
175A	Basement Room - 006	1	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	SW	2125	125	1	4' 2-LAMP T-8	F42ILL	59	0.1	OCC	1,200	71	55	0.0	$ 6.47	$ 233.50	$ 45	36.1	29.1
175A	Basement Room - 005	10	4' 2-LAMP T-8 (32W)	F42ILL	59	0.6	SW	500	295	10	4' 2-LAMP T-8	F42ILL	59	0.6	None	500	295	-	0.0	$ -	$ 1,147.50	$ 250		
35A	Basement Room - 003	3	4' 3-LAMP T-8 (32W)	F43ILL	89	0.3	SW	500	134	3	4' 3-LAMP T-8 (32W)	F43ILL	89	0.3	None	500	134	-	0.0	$ -	$ -	$ 75		
35A	Basement Room - 002	12	4' 3-LAMP T-8 (32W)	F43ILL	89	1.1	SW	8760	9,356	12	4' 3-LAMP T-8 (32W)	F43ILL	89	1.1	None	8,760	9,356	-	0.0	$ -	$ -	$ 300		
35A	Basement Room - 012	21	4' 3-LAMP T-8 (32W)	F43ILL	89	1.9	SW	500	935	21	4' 3-LAMP T-8 (32W)	F43ILL	89	1.9	None	500	935	-	0.0	$ -	$ -	$ 525		
175A	Basement Room - 013	1	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	SW	3285	194	1	4' 2-LAMP T-8	F42ILL	59	0.1	OCC	1,825	108	86	0.0	$ 10.22	$ 233.50	$ 45	22.9	18.4
35A	Basement Room - 011	20	4' 3-LAMP T-8 (32W)	F43ILL	89	1.8	SW	3285	5,847	20	4' 3-LAMP T-8 (32W)	F43ILL	89	1.8	OCC	1,825	3,249	2,599	0.0	$ 308.24	$ 118.75	$ 520	0.4	-1.3
35A	Basement Room - 009	16	4' 3-LAMP T-8 (32W)	F43ILL	89	1.4	SW	8760	12,474	16	4' 3-LAMP T-8 (32W)	F43ILL	89	1.4	None	8,760	12,474	-	0.0	$ -	$ -	$ 400		
175A	Basement Room - 010	1	4' 2-LAMP T-8 (32W)	F42ILL	59	0.1	SW	8760	517	1	4' 2-LAMP T-8	F42ILL	59	0.1	None	8,760	517	-	0.0	$ -	$ 114.75	$ -		
175A	Basement Mechanical Room	15	4' 2-LAMP T-8 (32W)	F42ILL	59	0.9	SW	500	443	15	4' 2-LAMP T-8	F42ILL	59	0.9	None	500	443	-	0.0	$ -	$ 1,721.25	$ 375		
146	Exterior	7	High Bay MH 400	MH400/1	458	3.2	SW	2125	6,813	7	P 54 C F 4	FC20	20	0.1	OCC	1,000	140	6,673	3.1	$ 1,010.00	$ 2,218.75	$ 175	2.2	2.0
169	Exterior	2	SP 250 MH ROOF	MH250/1	295	0.6	SW	500	295	2	FXLED78	FXLED78/1	78	0.2	None	500	78	217	0.4	$ 56.68	$ 1,411.00	$ 50	24.9	24.0
	Total	**1,019**				**63.1**			**134,640**	**1,019**				**58.3**			**99,228**		**4.8**	**$4,500**	**$ 53,867.75**	**7,229**		
																		Demand Savings		**4.8**	**$341**			
																		kWh Savings		**35,400**	**$4,199**			
																		Total Savings			**$4,540**		**11.9**	**10.3**

APPENDIX D

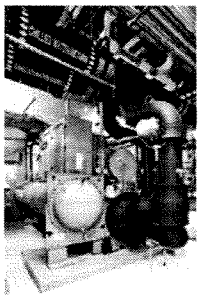
New Jersey Pay For Performance Incentive Program

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.

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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
Wolverton Library

New Jersey Pay For Performance Incentive Program

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

Total Building Area (Square Feet)	50,000
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)	$63,519	$6,752
Existing Usage (from utility)	475,694	9,307
Proposed Savings	116,487	3,651
Existing Total MMBtus	2,554	
Proposed Savings MMBtus	763	
% Energy Reduction	**29.9%**	
Proposed Annual Savings	$18,200	

	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	$5,000
Incentive #2	$12,814	$4,564	$17,378
Incentive #3	$12,814	$4,564	$17,378
Total All Incentives	**$25,627**	**$9,129**	**$39,756**

Total Project Cost	$217,668

		Allowable Incentive
% Incentives #1 of Utility Cost*	7.1%	$5,000
% Incentives #2 of Project Cost**	8.0%	$17,378
% Incentives #3 of Project Cost**	8.0%	$17,378
Total Eligible Incentives***	**$39,756**	
Project Cost w/ Incentives	$177,912	

Project Payback (years)	
w/o Incentives	w/ Incentives
12.0	9.8

* 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).

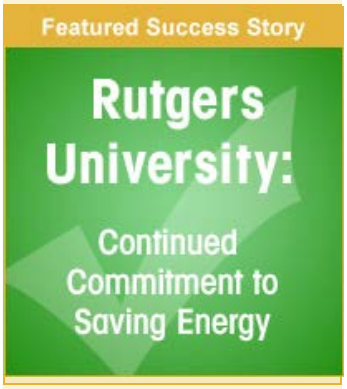
- Frankford Township School District
- Northern Hunterdon-Voorhees Regional High School
- Manalapan Township ***(180 MB** - Right Click, Save As)*

Program Updates

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

Other updates posted.

Featured Success Story



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APPENDIX F

Solar Photovoltaic Analysis

Camden County College
Wolverton Library

Cost of Electricity	$0.131	/kWh
Electricity Usage	475,694	kWh/yr
System Unit Cost	$4,000	/kW

Photovoltaic (PV) Solar Power Generation - Screening Assessment

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	Federal Tax Credit	New Jersey Renewable ** SREC	Payback (without incentive)	Payback (with incentive)
$	kW	kWh	therms	$	$	$	$	$	Years	Years
$200,000	**50.0**	**63,889**	**0**	**$8,369**	**0**	**$8,369**	**$0**	**$5,111**	**23.9**	**14.8**

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

Area Output*
1,301 m2
14,003 ft2

Perimeter Output*
166 m
546 ft

Available Roof Space for PV:
(Area Output - 10 ft x Perimeter) x 85%
7,262 ft2

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

8	watt/ft2	
58,095	DC watts	
50	kW	Enter into PV Watts

PV Watts Inputs*

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

PV Watts Output
63,889 annual kWh calculated in PV Watts program

% Offset Calc

Usage	475,694	(from utilities)
PV Generation	63,889	(generated using PV Watts)
% offset	13%	

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

AC Energy & Cost Savings

Cautions for Interpreting the Results

Wolverton Library (Camden County College)

Station Identification

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

PV System Specifications

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

Energy Specifications

Cost of Electricity:	13.1 ¢/kWh

Results

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

Output Hourly Performance Data

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

Output Results as Text

Saving Text from a Browser

Run PVWATTS v.2 for another location

Run PVWATTS v.1

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
Wolverton Learning Resource Center

Building ID: 3251951
For 12-month Period Ending: April 30, 2012[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: November 08, 2012

Facility
Wolverton Learning Resource Center
College Drive
Blackwood, NJ 08012

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1973
Gross Floor Area (ft²): 49,284

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

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	3,050,606
Natural Gas (kBtu)[4]	993,028
Total Energy (kBtu)	4,043,634

Energy Intensity[4]

Site (kBtu/ft²/yr)	82
Source (kBtu/ft²/yr)	228

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	485

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

National Median Comparison

National Median Site EUI	92
National Median Source EUI	246
% Difference from National Median Source EUI	-7%
Building Type	Library

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.

The government estimates the average time needed to fill out this form is 6 hours (includes the time for entering energy data, Licensed Professional facility inspection, and notarizing the SEP) and welcomes suggestions for reducing this level of effort. Send comments (referencing OMB control number) to the Director, Collection Strategies Division, U.S., EPA (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460.

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	Wolverton Learning Resource Center	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Library	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	49,284 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	66,382.39
02/26/2012	03/25/2012	64,643.58
01/26/2012	02/25/2012	73,586.44
12/26/2011	01/25/2012	63,128.95
11/26/2011	12/25/2011	64,897.13
10/26/2011	11/25/2011	70,914.09
09/26/2011	10/25/2011	68,210.71
08/26/2011	09/25/2011	88,785.05
07/26/2011	08/25/2011	85,244.25
06/26/2011	07/25/2011	90,150.79
05/26/2011	06/25/2011	85,156.39
83431473 Consumption (kWh (thousand Watt-hours))		**821,099.77**
83431473 Consumption (kBtu (thousand Btu))		**2,801,592.42**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**2,801,592.42**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

Meter: 430957 (therms)
Space(s): Entire Facility

Start Date	End Date	Energy Use (therms)
03/24/2012	04/23/2012	766.32
02/24/2012	03/23/2012	1,411.10
01/24/2012	02/23/2012	1,929.64
12/24/2011	01/23/2012	2,005.18
11/24/2011	12/23/2011	1,954.95
10/24/2011	11/23/2011	1,041.35
09/24/2011	10/23/2011	55.57
08/24/2011	09/23/2011	23.76
07/24/2011	08/23/2011	14.57
06/24/2011	07/23/2011	0.00
05/24/2011	06/23/2011	104.84

430957 Consumption (therms)	**9,307.28**
430957 Consumption (kBtu (thousand Btu))	**930,728.00**
Total Natural Gas Consumption (kBtu (thousand Btu))	**930,728.00**
Is this the total Natural Gas consumption at this building including all Natural Gas meters?	☐

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

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

Certifying Professional

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

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
Wolverton Learning Resource Center
College Drive
Blackwood, NJ 08012

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Wolverton Learning Resource Center	
Gross Floor Area Excluding Parking: (ft^2)	49,284
Year Built	1973
For 12-month Evaluation Period Ending Date:	April 30, 2012

Facility Space Use Summary

Building	
Space Type	Other - Library
Gross Floor Area (ft^2)	49,284
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)	82	82	0	N/A	92
Source (kBtu/ft^2)	228	228	0	N/A	246
Energy Cost					
$/year	$ 107,520.66	$ 107,520.66	N/A	N/A	$ 120,559.42
$/$ft^2$/year	$ 2.18	$ 2.18	N/A	N/A	$ 2.44
Greenhouse Gas Emissions					
$MtCO_2e$/year	485	485	0	N/A	544
$kgCO_2e/ft^2$/year	10	10	0	N/A	11

More than 50% of your building is defined as Library. This building is currently ineligible for a rating. Please note the National Median column represents the CBECS national median data for Library. This building uses 7% less energy per square foot than the CBECS national median for Library.

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