CAMDEN COUNTY COLLEGE
TAFT HALL
ENERGY ASSESSMENT

for

NEW JERSEY
BOARD OF PUBLIC UTILITIES

CHA PROJECT NO. 24364

November 2012

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REPORT DISCLAIMER

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

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

1.0 EXECUTIVE SUMMARY

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

Building Name	Address	Square Feet	Construction Date
Camden County College Taft Hall	200 College Drive Building 4 Blackwood, New Jersey	42,400	Original: 1973

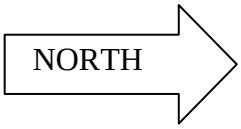
The Energy Conservation Measures (ECMs) identified in this report will allow for a more efficient use of energy and if pursued have the opportunity to qualify for the New Jersey SmartStart Buildings Program. Potential annual savings of $71,600 for the recommended ECMs may be realized with a payback of 5.2 years. A summary of the costs, savings, and paybacks for the recommended ECMs follows:

Summary of Energy Conservation Measures							
Energy Conservation Measure		Approx. Costs ($)	Approx. Savings ($/year)	Payback (Years) w/o Incentive	Potential Incentive ($)*	Payback (Years) w/ Incentive	Recommended For Implementation
ECM-1	Replace Domestic Water Heater (DWH)	6,200	2,300	2.7	200	2.6	X
ECM-2	HVAC Water Cooled Chiller Addition	325,200	55,700	5.8	13,000	5.6	X
ECM-3	HVAC Install Variable Speed Drives, High Efficiency Motors	29,500	4,300	6.9	7,600	5.1	X
ECM-4	Building Automation System Upgrade / Re-Commission	4,000	4,000	1.0	0	1.0	X
ECM-5	Lighting Replacement Upgrades	126,400	5,000	>20	7,400	>20	
ECM-6	Install Lighting Controls (Occupancy Sensors)	5,100	5,300	1.0	700	0.8	X
ECM-7	Lighting Replacements with Lighting Controls (Occupancy Sensors)	131,400	7,900	16.6	8,100	15.6	

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.

Taft Hall located on the Camden County College campus in Blackwood, NJ, is a 42,400 square foot three story building with classrooms, offices, a dental hygiene clinic, dental/biology/chemistry laboratories and an X-ray facility and support spaces. HVAC air handling units and boilers are located in a mechanical room; chilled water utility for HVAC equipment is piped from the Central Plant Building chillers. The building was constructed in 1973, and was recently renovated; it functions primarily as a dental hygiene teaching facility. 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, Taft Hall is a 42,400 square foot, three-story building with classrooms, offices, a dental hygiene clinic, a dental laboratory, an X-ray facility, biology and chemistry laboratories and support spaces. The renovation provided refurbished interior and new HVAC equipment. A main entrance on the east side of the building opens into a lobby area.

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

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

The original building is constructed of structural steel framing with masonry walls and pebble stone veneer exterior finish. Insulation is incorporated into some wall assemblies for an improved envelope during the recent renovation. The first floor contains classrooms, offices and support spaces; the second floor has a dental hygiene clinic, a dental laboratory and an X-ray facility; and the third floor has biology and chemistry laboratories 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 floors on the east and west facades of the building (~25% of the walls where used), and are original single pane windows with tint. The main entrance doors are part glass, and part metal panel with metal frames. 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 35’ in height. The first 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 994,078 kWh at a cost of about $207,875. 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 146 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 14,034 therms of natural gas. Based on the annual cost of $4,739,

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 Taft Hall. Specifics on the mechanical equipment can be found within the equipment inventory located in Appendix B.

3.3.1 Cooling Chilled Water System

The building is cooled with chilled water supplied from the Central Power Plant chilled water system. The Central Power Plant contains three Trane water cooled centrifugal chillers with three Baltimore Air Coil forced draft open downdraft cooling towers. The chillers were installed in 1973, and are located inside the physical plant building; the cooling towers were installed in 1973 and are located on the roof of the same building. The chilled water system operates year round to provide cooling for HVAC systems in the Truman Hall and Taft Hall.

The chillers are piped to a primary loop pumping system with three 50 HP pumps that operate in lead-lag also located in the Central Power Plant mechanical room. Two pumps in Taft Hall provide HVAC cooling chilled water to AHU-1 coil (P-1A, P-1B); two pumps in Taft Hall provide HVAC cooling chilled water to AHU-2 coil (P-2A, P-2B); and one pump provides chilled water to FCUs throughout the building (P-8). All pumps are constant volume with standard efficiency motors. Air handler and fan coil units piping use 3-way control valves for capacity control. Chilled water system piping and valves appear to be insulated.

The overall condition of the chilled water system equipment in the Central Power Plant was mostly poor. During our field inspection, only one of the three chillers was operational due to mechanical condition. The chillers use R-11 refrigerant which is not environmentally friendly, is not produced any more and is difficult to obtain. The three buildings utilizing Central Power Plant chilled water system should be de-coupled in the same way other campus buildings have been previously.

3.3.2 Heating Hot Water System

Originally, the Central Power Plant hot water system provided heating hot water for HVAC systems and domestic hot water systems in Taft Hall. In addition to the Central Power Plant heating hot water utility, the building also contains four Aerco condensing boilers. The boilers were installed in 2011, and are located in the same mechanical room as the original hot water system equipment. The boiler piping is connected to the building hot water system piping. The boilers operate standalone to provide heating hot water; it is assumed the Central Power Plant hot water utility is no longer used in the building.
Each boiler is piped to a dedicated pump (HP-1, HP-2, HP-3, HP-4), each with a 3 HP standard efficiency motor. The pumps are constant flow, and their piping is manifolded into common supply and return lines. It is assumed building hot water system capacity is controlled by starting an additional boiler as heating demand increases, and the reverse occurs as heating demand decreases. Hot water is provided to air handling units, fan coil units, hot water cabinet unit heaters and fin tube radiators. AHU and terminal equipment piping use 3-way control valves for capacity control. Hot water system piping and valves appear to be insulated.

3.3.3 Package Cooling and Heating Air Handling Units

Two 1973chilled water cooling, hot water heating AHUs are located in two separate mechanical rooms. Each AHU contains chilled water cooling coil, a hot water heating coil, return, relief/exhaust, and outside air; the units are ducted to the supply and return duct systems above the ceiling. The air handling units

provide makeup air for the 1st, 2nd and 3rd floor FCUs (AHU-1), and serve the bio-chemistry lab support spaces (AHU-2).

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

Rooms, offices and spaces throughout the building are cooled and heated by approximately 55 horizontal ceiling mounted fan coil units (FCUs). Outside air is provided by an air handling unit, and connected to the return ductwork of each FCU; chilled water coils provide cooling, and hot water coils provide heating. Fan coil units are controlled by individual wall mounted thermostats in each space.

3.3.5 Hot Water Unit Heaters

Approximately 5 recessed ceiling mounted cabinet hot water unit heaters provide heating to the two stairwells, the receiving room and the mechanical room. Each unit heater is controlled by a dedicated space thermostat.

3.3.6 Hydronic Heating Systems (Duct Mounted Heating Coils and Unit Heaters)

Spaces and areas with exterior wall exposures are heated by perimeter hot water fintube radiators with wall mounted thermostats. Other HVAC equipment (AHUs, FCUs) provide ventilation and outside air for these spaces.

3.3.7 Exhaust Systems

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

Exhaust system fans generally operate during building occupancy.

3.4 Control Systems

The building contains a mixture of pneumatic and electronic standalone controls for the hot water system boilers/pumps, air handling units, fan coil units and exhaust systems. The system consists of original, outdated pneumatic and electronic field devices and components which have become hard to replace and maintain.

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

3.5 Lighting/Electrical Systems

The majority of the lighting in the facility uses 40 watt T-12 light fixtures. The building is also equipped with several 32 watt T-8 fixtures and 42 watt compact fluorescent fixtures. The lights are manually controlled by switches to turn on and off each day.

The exterior lighting consists of wall mounted fixtures, which are either 400 watt metal halide or 100 watt high pressure sodium fixtures. These fixtures are mounted on the exterior wall of the facility.

3.6 Plumbing Systems

3.6.1 Domestic Hot Water System

The mechanical room contains one 80 gallon electric tank hot water heater installed in 2007 serving the entire building. Hot water is provided to labs, lavatories, janitor's closets, and the majority of hot water piping appears to be insulated. Water demand is primarily for the restrooms in Taft Hall. Domestic hot water temperature is maintained at 130°F, and chemical disinfection soap is provided in the restrooms.

3.6.2 Plumbing Fixtures

The building's lavatories, water closets, and urinals are original, and require upgrades. These should be replaced during the next renovation project to include lavatories having 0.5 GPM faucets, 1.6 GPF water closets and .75 GPF urinals.

4.0 ENERGY CONSERVATION MEASURES

4.1 ECM-1 Replace Domestic Water Heater

The building has one domestic hot water heater. The Bradford White unit is a tank type electric water heater installed in 2007. During periods of little or no domestic hot water use, the units must still heat the water within their storage tank. Energy required maintaining the 80 gallons of hot water temperature setpoint during times of zero demand is known as standby losses; replacing these units with higher efficiency natural gas units was evaluated.

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

Domestic hot water heaters have an expected life of 12 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 156,000 kWh (-5,520 therms from switching electric equipment to natural gas) and $27,400.

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

ECM-1 **Replace Domestic Hot Water Storage Tank and Heat Exchanger**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
6,200	13,000	20	-460	2,300	0	2,300	3.4	200	2.7	2.6

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

This measure is recommended.

4.2 ECM-2 HVAC Water Cooled Chiller Addition

The building is currently cooled with chilled water supplied from the Central Power Plant chilled water system. The addition a water cooled chiller would decouple the building from the Central Power Plant Trane chillers. The existing chillers are in poor condition, use environmentally unfriendly R-11 refrigerant and are mechanically unreliable. This would also eliminate system cooling capacity losses from the underground distribution piping between the two buildings. The addition of a high efficiency modular air cooled chiller was assessed.

The assumption of this calculation is that the operating hours of the 1973 chilled water system stay the same. The energy savings result from operating a higher efficiency water cooled chiller, smaller capacity and variable speed primary pump control. The existing chillers have very limited turndown capacity, and their efficiency has been heavily degraded due to age; also, modern technology equipment has become

much more advanced in terms of operating sequences to improve efficiency, reliability and turndown capacity. By decoupling the building from the existing central plant chillers, adding VFDs and inverter duty high efficiency motors on building chilled water supply pumps and reducing system capacity and flow when possible, significant electrical energy can be saved. Chilled water return temperature can be used to control chiller temperature reset control and system pressure differential sensors can be used to control chilled water system pump flow.

Air cooled modular chillers have an expected life of 20 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 8,477,000 kWh and $1,114,100.

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

ECM-2 HVAC Water Cooled Chiller 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
325,200	423,850	0	0	55,700	0	55,700	2.4	13,000	5.8	5.6

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

This measure is recommended.

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

The hot water system is served by four 3.0 HP pump (HP-1, HP-2, HP-3, HP-4); the building chilled water system is served by one 3 HP pump (P-1A) and one 10 HP pump (P-8). The pumps are a constant volume pumps with a standard efficiency motors.

Packaged air handling units with constant volume supply fan motors provide makeup air to the building FCUs (AHU-1).

Larger motors that operate pumps and fans continuously consume significant electrical energy. The hot water system pumps and RTUs serving these spaces operate at a constant speed (water and air flows) even though the building load does not require all the flow to maintain temperatures. By adding VFDs and inverter duty high efficiency motors, and reducing the flow (by slowing the motors down), significant electrical energy can be saved. Pressure actuated controllers are used to measure the water differential pressure in the hydronic systems and as valves close, the system pressure increases and pump speed is reduced. Space temperature sensors will be used to control the air flow of the fans based on space temperatures as the current ducted distribution systems are not variable volume systems.

For systems that have pumps and fans that cannot be slowed down (due to the nature of the system design), electrical saving can still be obtained by replacing older, less efficient motors with new higher efficiency motors.

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 652,000 kWh and $85,700.

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
29,500	32,600	0	0	4,300	0	4,300	1.9	7,600	6.9	5.1

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

The existing mixed pneumatic and electronic control are old, hard to maintain, is difficult to obtain parts, are not as user friendly as more modern standalone DDC controls and are not as functional as systems using current technology. It is recommended the stand alone controls be upgraded and full system re-commissioning executed as a future facility improvement item. The re-commissioning should include DDC controllers/field devices tuning, as well as HVAC system dampers and valves that are not equipment components. This could be coordinated with a complete systems testing and balancing that must occur prior to system re-commissioning efforts.

This would allow more accurate control of HVAC systems and minimize local thermostat adjustment by occupants. HVAC systems will be tuned up during this process, and significant savings could be obtained by making the following controls improvements:

- Re-commission all existing 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 for devices that are programmable and set occupied/ unoccupied temperatures. After hours use of the buildings that require heating/cooling should be restricted to certain areas only. Limit ventilation to these same schedules (No outdoor air and no exhaust, except for special chemical/fume applications)
- Institute set occupied space temperatures of 68°F - 72°F for heating and 74°F - 76°F for cooling and prohibit staff adjustment of the thermostats. This will require some education of the staff members on the actual cost of the building energy consumption.
- Institute a set time of the year when heating is turned on and when cooling is turned on through the control system. Economizer cooling should be used for shoulder weather whenever possible.
- Limit re-heat as much as possible. Institute discharge air reset, energy heat recovery and other strategies to reduce re-heat.

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

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

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

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

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

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

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

This measure is recommended.

4.5 ECM-4 Lighting Replacement Upgrades

The building utilizes 4 foot 40W T-12 fluorescent bulbs with magnetic ballasts. Recessed can fixtures and surface mounted standard bulb fixtures use biaxial compact fluorescent lights (CFLs). There are also some incandescent bulbs/fixtures currently being used as well. 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 eleven 400 watt metal halide wall pack fixtures and two 100 watt high pressure sodium pole fixtures. The exterior fixtures are utilized for building lighting during nighttime hours and are in operation from sun down until sun up. Alternative LED lighting solutions are available to replace these fixtures that will reduce the total wattage to 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 35,100 kWh with an electrical demand reduction of about 11 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 526,500 kWh and $74,400.

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

ECM-4 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
126,400	35,100	11	0	5,000	0	5,000	-0.4	7,400	>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.

4.6 ECM-5 Lighting Controls Installation

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

Lighting controls have an expected life of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 606,000 kWh and $79,600.

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

ECM-5 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
5,100	40,400	0	0	5,300	0	5,300	14.6	700	1.0	0.8

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

This measure is recommended.

4.7 ECM-6 Lighting Replacements with Lighting Controls

Due to interactive effects, the energy and cost savings for occupancy sensors and lighting upgrades are not cumulative. This measure is a combination of ECM-4 and ECM-5 to reflect actual expected energy and demand reduction.

The lighting retrofits and controls have an expected lifetime of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 895,500 kWh and $118,200.

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

ECM-6 Lighting Replacements with Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
$	Electric kWh	Electric kW	Nat Gas Therms	Total $	$	$		$	Years	Years
131,400	59,700	10	0	7,900	0	7,900	-0.1	8,100	16.6	15.6

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

This measure is not recommended.

4.8 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 81 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 – 81 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
$324,000	0.0	87,253	0	12700	12700	0	11,700	>25	13.3

* 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.

6.1.2 Solar Thermal Hot Water Plant

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

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

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

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

Solar Thermal Hot Water Plant

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

* 30% federal tax credit

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

6.2 Demand Response Curtailment

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

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

high electrical demand conditions or during emergencies. Part of the program also will require that program participants reduce their required load or run emergency generators with notice to test the system.

A pre-approved CSP will require a minimum of 100 kW of load reduction to participate in any curtailment program. From June 2011 through April 2012, the hall had an estimated electricity demand of 146 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 Taft Hall	National Average
EPA Score	N/A	50
Site (kBtu/sf/year)	80	104
Source (kBtu/sf/year)	225	244

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

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

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

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

8.0 CONCLUSIONS & RECOMMENDATIONS

Summary of Energy Conservation Measures							
Energy Conservation Measure		**Approx. Costs ($)**	**Approx. Savings ($/year)**	**Payback (Years) w/o Incentive**	**Potential Incentive ($)***	**Payback (Years) w/ Incentive**	**Recommended For Implementation**
ECM-1	Replace Domestic Water Heater (DWH)	6,200	2,300	2.7	200	2.6	X
ECM-2	HVAC Water Cooled Chiller Addition	325,200	55,700	5.8	13,000	5.6	X
ECM-3	HVAC Install Variable Speed Drives, High Efficiency Motors	29,500	4,300	6.9	7,600	5.1	X
ECM-4	Building Automation System Upgrade / Re-Commission	4,000	4,000	1.0	0	1.0	X
ECM-6	Install Lighting Controls (Occupancy Sensors)	5,100	5,300	1.0	700	0.8	X

APPENDIX A

Utility Usage Analysis, Energy Suppliers List

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

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

Electric Heat

Electric
Delivery Atlantic City Electric
Supplier Hess

Gas
Delivery South Jersey Gas
Supplier Woodruff Energy

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

Electric Usage Comparison

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

Gas Breakdown Estimates Based on Max Annual Therm Usage

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

Main Boiler Plant Electricity Usage (Cooling Season)

Electric Rate $ 0.131 $/kWh

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

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

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

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

Notes

1. Calculated Values

Cooling System

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

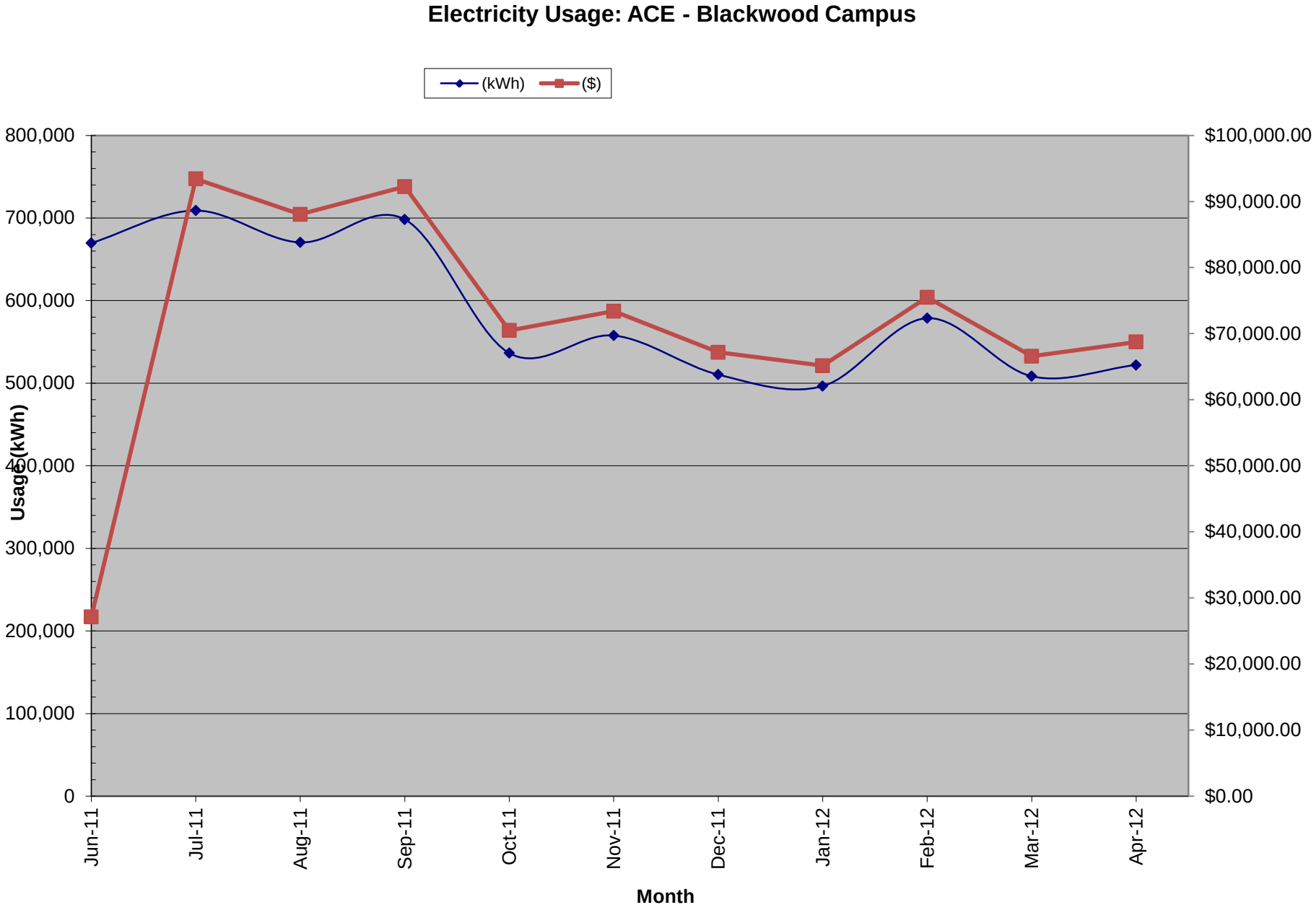
Building Name	~Electrical Consumption	Cost
Building		$ -
Taft Hall	580,947.75	$ 76,355
Truman Hall	580,947.75	$ 76,355

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

Electric Service
Delivery - ACE
Supplier - Hess

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

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


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

Main Natural Gas Meter

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

Master Meter List

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

Building Meters and Totals

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

Main Boiler House

Therms	Cost
52,617.40	$ 38,630.26

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

Main Boiler House Gas Usage

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

Usage (Therms)
Meter Number

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

Usage (Therms)
Meter Number

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

Usage (Therms)
Meter Number

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

APPENDIX B

Equipment Inventory

New Jersey BPU Energy Audit Program
CHA #24364
Camden County College
Taft Hall
Original Construction Date: 1973

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.
P-1A P-1B (Chilled Water)	2	B & G	Series 80 2.5x2.5x9.5 Series 60 2AA	NOT AVAILABLE	HVAC Cooling Chilled Water System / Electric	3 HP / 1750 RPM 3/4 HP / 1750 RPM Standard Efficiency, 81%	Mechanical Room 109	AHU-1 / Cooling Chilled Water Coil	1973	-19	Fair Condition
P-8 (Chilled Water)	1	Paco	30591 VL	NOT AVAILABLE	HVAC Cooling Chilled Water System / Electric	10 HP / 1750 RPM Standard Efficiency, 86%	Mechanical Room 109	Taft Hall / Cooling Chilled Water Terminal Equipment (FCUs)	1973	-19	Fair Condition
P-2A P-2B (Chilled Water)	2	B & G	Series 60 1.5"-A Series 60 2"-A	NOT AVAILABLE	HVAC Heating Hot Water System / Electric	3/4 HP / 1750 RPM 2 HP / 1750 RPM Standard Efficiency, 81%	Mechanical Room 109	AHU-2 / Cooling Chilled Water Coil	1973	-19	Fair Condition
P-3 (Hot Water)	1	Paco	VL 3075-5	NOT AVAILABLE	HVAC Heating Hot Water System / Electric	1.5 HP / 1750 RPM Standard Efficiency, 81%	Mechanical Room 109	Taft Hall / Heating Hot Water Loop from Central Plant	1973	-19	Fair Condition, Not Apparent If Still In Operation
P-4 (Hot Water)	1	B & G	Series 80 2x2x3.5	NOT AVAILABLE	HVAC Heating Hot Water System / Electric	3 HP / 1750 RPM Standard Efficiency, 82%	Mechanical Room 109	Taft Hall / Heating Hot Water Terminal Equipment (FCUs)	1973	-19	Fair Condition, Not Apparent If Still In Operation
B-1 B-2 B-3 B-4	4	AERCO	MLX9091-1	909-09-0135 909-09-0141 909-09-0133 909-09-0132	HVAC Hot Water Heating / Natural Gas	NG. Condensing / 909 Input / 835 Input	Mechanical Room 109	Taft Hall	2011	34	Good Condition, Condensing Low NOX
HP-1 HP-2 HP-3 HP-4	4	B & G Size 80	BF7	C135002-02H11 C135002-01H11 C135002-04H11 C135002-03H11	HVAC Hot Water Heating System / Electric	3 HP / 86.5 % Eff. / 1760 RPM / 84 GPM	Mechanical Room 109	Taft Hall / Heating Hot Water Loop	2011	19	Good Condition, 1 Pump per Boiler
DHW-1	1	Bradford White	M280RGDS5	CD7552911	Domestic Hot Water Heating / Electric	4.5 kW / 80 gal	Mechanical Room 109	Taft Building	2007	7	Condensing Low NOX / New Condition / Put in as backup
DHW HX	1	B&G	WU68-43	NOT AVAILABLE	Domestic Hot Water Heat Exchanger / Plant Hot Water	55 GPM / EWT: 40°F, LWT: 140°F / 2,750 MBH	Mechanical Mezzanine	Taft Hall / Domestic Hot Water Storage Tank	1973	-27	Poor Condition (DHW put in as backup for this)
P-5 P-6 (Domestic Hot Water)	2	B & G	Series 60 1.5A 2" Booster	NOT AVAILABLE	Domestic Hot Water Heat Exchanger / Plant Hot Water	1.0 HP / 1750 RPM 1/6 / 1750 RPM Standard Efficiency, 78%	Mechanical Room 109	Taft Hall / Hot Water Circulator to Plant	1973	-19	Fair Condition, Not Apparent If Still In Operation
P-7 (Domestic Hot Water)	1	B & G	"7G"	NOT AVAILABLE	Domestic Hot Water Circulation Pump / Electric	1.0 HP / 1750 RPM 1/6 / 1750 RPM Standard Efficiency, 78%	Mechanical Room 109	Taft Hall / Hot Water Circulator to Building	1973	-19	Fair Condition, Not Apparent If Still In Operation
AHU-1	1	TRANE	MCCB030UA0A0UA	K04D58073	HVAC / Chilled Water Cooling, Hot Water Heating	14000 CFM / CLG: 845 MBH HTG: 1,058 MBH / 7.5 HP SF Standard Efficiency	Mechanical Room 109	1st, 2nd, 3rd Floors Makeup Air	2005	5	Good Condition, Data obtained from original design drawings
AHU-2	1	TRANE	NOT AVAILABLE	NOT AVAILABLE	HVAC / Chilled Water Cooling, Hot Water Heating	2000 CFM / CLG: 130 MBH HTG: 512 MBH / 1.5 HP SF Standard Efficiency	Bio Storage 301C	Bio-chem Lab Support Spaces	1973	-19	Good Condition, Data obtained from original design drawings

New Jersey BPU Energy Audit Program
CHA #24364
Camden County College
Taft Hall
Original Construction Date: 1973

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.
FCs	~55	Modine	Size 2 Size 3 Size 5 Size 6 Size 8 Size 12 Size 16 Size 20	NOT AVAILABLE	HVAC / Chilled Water Cooling, Hot Water Heating	CLG MBH / HTG MBH Size 2: 4.33 7.3 Size 3: 6.05 11.8 Size 5: 8.31 16.6 Size 6: 11.9 19.5 Size 8: 19.1 17.6 Size 12: 23.5 22.2 Size 16: 27.9 26.0 Size 20: 36.0 30.8	Above Ceiling In Space/Area Being Served	Taft Hall Occupied Spaces	1973	-24	Good Condition
UHs	~5	Modine	(2) C08-8 (2) CW57-8	NOT AVAILABLE	HVAC / Hot Water Heating	Fractional HP Fan Motor, Various MBH Heating Capacities	In Area Being Served	Stairwells, Receiving Room & Mechanical Room	1973	-19	Fair Condition
FTR	-	NOT AVIALABLE	NOT AVAILABLE	NOT AVAILABLE	HVAC / Hot Water Heating	Baseboard Fin Tube Radiaton, Total Length and BTU/ft Not Known	In Area being Served	Outside Walls of Zones With Exterior Wall Exposures	1973	-19	Fair Condition

Energy Audit of Camden County College (Taft Hall)

CHA Project No. 24364

Existing Lighting

Cost of Electricity: **$0.150** **$/kWh**

$6.00 **$/kW**

		EXISTING CONDITIONS									
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Retrofit Control**	**Annual kWh**	
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	Retrofit control device	(kW/space) * (Annual Hours)	Notes
11A	1st Floor Hallway	20	**4' 2-LAMP T-12**	F42EL	60	1.20	SW	2500	None	3,000	
11A	1st Floor Men's Bathroom	4	**4' 2-LAMP T-12**	F42EL	60	0.24	SW	2500	None	600	
11A	1st Floor Women's Bathroom	4	**4' 2-LAMP T-12**	F42EL	60	0.24	SW	2500	None	600	
11A	Classroom - 100	15	**4' 2-LAMP T-12**	F42EL	60	0.90	SW	2125	C-OCC	1,913	
11A	Office Room - 101	6	**4' 2-LAMP T-12**	F42EL	60	0.36	SW	2125	C-OCC	765	
162A	Office Room - 101A	1	**4' 4-LAMP T-12**	F44EL	120	0.12	SW	2125	C-OCC	255	
162A	Office Room - 101B	1	**4' 4-LAMP T-12**	F44EL	120	0.12	SW	2500	None	300	
35A	Office Room - 101C	2	**4' 3-LAMP T-8 (32W)**	F43ILL	32	0.06	SW	2125	OCC	136	
35A	Office Room - 101D	2	**4' 3-LAMP T-8 (32W)**	F43ILL	32	0.06	SW	2125	OCC	136	
11A	Office Room - 101E	2	**4' 2-LAMP T-12**	F42EL	60	0.12	SW	2125	OCC	255	
11A	Office Room - 101F	1	**4' 2-LAMP T-12**	F42EL	60	0.06	SW	2250	C-OCC	135	
71	Toilet Room	1	**I 60**	I60/1	60	0.06	SW	2250	C-OCC	135	
41A	Closet	1	**4' 1-LAMP T-8 (32W)**	F41ILL	32	0.03	SW	2125	OCC	68	
11A	Classroom - 102	15	**4' 2-LAMP T-12**	F42EL	60	0.90	SW	2125	OCC	1,913	
11A	Faculty Lounge - 103	4	**4' 2-LAMP T-12**	F42EL	60	0.24	SW	2125	OCC	510	
11A	Faculty Men's Bathroom	1	**4' 2-LAMP T-12**	F42EL	60	0.06	SW	2000	OCC	120	
11A	Faculty Women's Bathroom	1	**4' 2-LAMP T-12**	F42EL	60	0.06	SW	2125	OCC	128	
162A	Room - 104A	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	OCC	510	
162A	Room - 104A (inside)	4	**4' 4-LAMP T-12**	F44EL	120	0.48	SW	2125	OCC	1,020	
162A	Room - 104B	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	OCC	510	
162A	Room - 104B (inside)	4	**4' 4-LAMP T-12**	F44EL	120	0.48	SW	2125	OCC	1,020	
11A	Office Room - 105	6	**4' 2-LAMP T-12**	F42EL	60	0.36	SW	2125	OCC	765	
11A	Classroom - 106	15	**4' 2-LAMP T-12**	F42EL	60	0.90	SW	2125	OCC	1,913	
11A	Classroom - 108	15	**4' 2-LAMP T-12**	F42EL	60	0.90	SW	2125	OCC	1,913	
11A	Classroom - 110	15	**4' 2-LAMP T-12**	F42EL	60	0.90	SW	2500	None	2,250	
111A	Mechanical Room - 109	18	**4' 1-LAMP T-12**	F41EL	32	0.58	SW	2125	OCC	1,224	
162A	Office Room - 105A	3	**4' 4-LAMP T-12**	F44EL	120	0.36	SW	2125	OCC	765	
11A	Office Room - 105B	6	**4' 2-LAMP T-12**	F42EL	60	0.36	SW	500	None	180	
11A	Office Room - 105C	9	**4' 2-LAMP T-12**	F42EL	60	0.54	SW	2125	OCC	1,148	
162A	Office Room - 105D	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2500	None	600	
111A	1st Floor Janitor Closet	1	**4' 1-LAMP T-12**	F41EL	32	0.03	SW	2500	None	80	
162A	Office Room - 112	6	**4' 4-LAMP T-12**	F44EL	120	0.72	SW	2500	None	1,800	
11A	South Stair Tower	5	**4' 2-LAMP T-12**	F42EL	60	0.30	SW	2125	OCC	638	
11A	North Stair Tower	5	**4' 2-LAMP T-12**	F42EL	60	0.30	SW	1063	None	319	
11A	2nd Floor Corridor	20	**4' 2-LAMP T-12**	F42EL	60	1.20	SW	2125	OCC	2,550	
162A	2nd Floor Handicap Toilet	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	1063	None	255	
11A	Classroom - 206	12	**4' 2-LAMP T-12**	F42EL	60	0.72	SW	1063	None	765	
11A	Closet - 206	1	**4' 2-LAMP T-12**	F42EL	60	0.06	SW	2125	OCC	128	
11A	Office Room - 207	6	**4' 2-LAMP T-12**	F42EL	60	0.36	SW	500	None	180	
11A	Office Room - 207B	4	**4' 2-LAMP T-12**	F42EL	60	0.24	SW	500	None	120	
11A	Office Room - 207C	4	**4' 2-LAMP T-12**	F42EL	60	0.24	SW	500	None	120	
11A	Office Room - 207D	2	**4' 2-LAMP T-12**	F42EL	60	0.12	SW	2125	OCC	255	
11A	Office Room - 209	3	**4' 2-LAMP T-12**	F42EL	60	0.18	SW	1063	None	191	
11A	Office Room - 205A	1	**4' 2-LAMP T-12**	F42EL	60	0.06	SW	2125	OCC	128	
11A	Office Room - 205	4	**4' 2-LAMP T-12**	F42EL	60	0.24	SW	1063	None	255	

Energy Audit of Camden County College (Taft Hall)

CHA Project No. 24364

Existing Lighting

Cost of Electricity: **$0.150** **$/kWh**

$6.00 **$/kW**

		EXISTING CONDITIONS									
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Retrofit Control**	**Annual kWh**	
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	Retrofit control device	(kW/space) * (Annual Hours)	Notes
162A	Classroom - 204	23	**4' 4-LAMP T-12**	F44EL	120	2.76	SW	2250	None	6,210	
11A	2nd Floor Wiring Closet	1	**4' 2-LAMP T-12**	F42EL	60	0.06	SW	2250	None	135	
11A	Classroom - 202	12	**4' 2-LAMP T-12**	F42EL	60	0.72	SW	500	None	360	
11A	Classroom - 203	24	**4' 2-LAMP T-12**	F42EL	60	1.44	SW	520	None	749	
11A	Closet - 203A	4	**4' 2-LAMP T-12**	F42EL	60	0.24	SW	520	C-OCC	125	
111A	Closet - 203B	4	**4' 1-LAMP T-12**	F41EL	32	0.13	SW	520	None	67	
11A	Classroom - 201	33	**4' 2-LAMP T-12**	F42EL	60	1.98	SW	500	None	990	
111A	Classroom - 203C	6	**4' 1-LAMP T-12**	F41EL	32	0.19	SW	4380	None	841	
111A	Room - 201B	4	**4' 1-LAMP T-12**	F41EL	32	0.13	SW	4380	None	561	
11A	Room - 201A	4	**4' 2-LAMP T-12**	F42EL	60	0.24	SW	8760	None	2,102	
11A	Room - 200A	1	**4' 2-LAMP T-12**	F42EL	60	0.06	SW	8760	None	526	
11A	Room - 200B	1	**4' 2-LAMP T-12**	F42EL	60	0.06	SW	2125	OCC	128	
11A	Classroom - 200	33	**4' 2-LAMP T-12**	F42EL	60	1.98	SW	2125	OCC	4,208	
111A	Closet - 202A	2	**4' 1-LAMP T-12**	F41EL	32	0.06	SW	500	None	32	
11A	2nd Floor Women's Bathroom	4	**4' 2-LAMP T-12**	F42EL	60	0.24	SW	500	None	120	
11A	3rd Floor Corridor	20	**4' 2-LAMP T-12**	F42EL	60	1.20	SW	8760	None	10,512	
11A	Room - 307	5	**4' 2-LAMP T-12**	F42EL	60	0.30	SW	500	None	150	
111A	Custodial Closet	1	**4' 1-LAMP T-12**	F41EL	32	0.03	SW	3285	OCC	105	
204	Room - 306	1	**S 96 P F 2 (MAG) 8'**	F82EHE	207	0.21	SW	3285	OCC	680	
175A	Office Room - 305	7	**4' 2-LAMP T-8 (32W)**	F42ILL	32	0.22	SW	8760	None	1,962	
111A	Office Room - 305	3	**4' 1-LAMP T-12**	F41EL	32	0.10	SW	8760	None	841	
11A	Room - 304	12	**4' 2-LAMP T-12**	F42EL	60	0.72	SW	500	None	360	
11A	Room - 303	33	**4' 2-LAMP T-12**	F42EL	60	1.98	SW	2125	OCC	4,208	
192A	Room - 303B	1	**8' 4-LAMP T-12**	F84EHE	414	0.41	SW	500	None	207	
11A	Room - 303A	4	**4' 2-LAMP T-12**	F42EL	60	0.24	SW	2000	OCC	480	
111A	Room - 301B	7	**4' 1-LAMP T-12**	F41EL	32	0.22	SW	2000	None	448	
11A	Room - 301	33	**4' 2-LAMP T-12**	F42EL	60	1.98	SW	500	None	990	
11A	Classroom - 302	24	**4' 2-LAMP T-12**	F42EL	60	1.44	SW	8760	OCC	12,614	
162A	Room - 302B	12	**4' 4-LAMP T-12**	F44EL	120	1.44	SW	500	None	720	
227	Room - 302C	3	**W60CF1**	F81EL	60	0.18	SW	500	None	90	
11A	Room - 302A	8	**4' 2-LAMP T-12**	F42EL	60	0.48	SW	8760	OCC	4,205	
11A	Room - 300	24	**4' 2-LAMP T-12**	F42EL	60	1.44	SW	2000	None	2,880	
11A	Room - 300A	8	**4' 2-LAMP T-12**	F42EL	60	0.48	SW	8760	None	4,205	
11A	3rd Floor Men's Bathroom	4	**4' 2-LAMP T-12**	F42EL	60	0.24	SW	2000	OCC	480	
11A	3rd Floor Women's Bathroom	4	**4' 2-LAMP T-12**	F42EL	60	0.24	SW	4380	OCC	1,051	
146	Exterior	11	**High Bay MH 400**	MH400/1	458	5.04	SW	4380	C-OCC	22,066	
143	Exterior	2	**HPS 100 POLE**	HPS100/1	138	0.28	SW	4380	OCC	1,209	
	Total	**641**				**45.59**				**120,182**	

APPENDIX C

ECM Calculations

Summary of Energy Conservation Measures							
Energy Conservation Measure		**Approx. Costs ($)**	**Approx. Savings ($/year)**	**Payback (Years) w/o Incentive**	**Potential Incentive ($)***	**Payback (Years) w/ Incentive**	**Recommended For Implementation**
ECM-1	Replace Domestic Hot Water Storage Tank and Heat Exchanger	6,200	2,280	2.7	200	2.6	X
ECM-2	HVAC Water Cooled Chiller Addition	325,200	55,700	5.8	13,000	5.6	X
ECM-3	HVAC Install Speed Frequency Drives, High Efficiency Motors	29,500	4,300	6.9	7,563	5.1	X
ECM-4	Upgrade / Recommission BAS System	3,975	4,000	1.0	0	1.0	X
ECM-5	Lighting Replacement Upgrades	126,400	5,000	25.3	7,403	23.8	
ECM-6	Lighting Controls Installation (Occupancy Sensors)	5,100	5,300	1.0	695	0.8	X
ECM-7	Lighting Replacements with Lighting Controls (Occupancy Sensors)	131,400	7,900	16.6	8,098	15.6	

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ECM Summary Sheet

ECM-1 Replace Domestic Hot Water Storage Tank and Heat Exchanger

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
6,200	13,000	20	-460	2,300	0	2,300	3.4	200	2.7	2.6

ECM-2 HVAC Water Cooled Chiller 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
325,200	423,850	0	0	55,700	0	55,700	2.4	13,000	5.8	5.6

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
29,500	32,600	0	0	4,300	0	4,300	1.9	7,563	6.9	5.1

ECM-4 Upgrade / Recommission BAS System

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
3,975	23,760	0	1,070	4,000	0	4,000	9.0	0	1.0	1.0

ECM-5 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
126,400	35,100	11	0	5,000	0	5,000	-0.4	7,403	>20	>20

ECM-6 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
5,100	40,400	0	0	5,300	0	5,300	14.6	695	1.0	0.8

ECM-7 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
131,400	59,700	10	0	7,900	0	7,900	-0.1	8,098	16.6	15.6

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Utility Costs		Yearly Usage	MTCDE	Building Area	Annual Utility Cost	
$ 0.131	$/kWh blended		0.00042021	42,400	Electric	Natural Gas
$ 0.119	$/kWh consumpti	990,071	0.00042021		$207,340	$4,739
$ 5.940	$/kW	144	0			
$ 0.80	$/Therm	14,034	0.00533471			
$ -	$/kgals	-	0			

Taft Hall

	Item	Savings						Cost	Simple Payback	MTCDE	Life Expectancy	NJ Smart Start Incentives	Direct Install Eligible (Y/N)*	Direct Install Incentives**	Max Incentives	Payback w/ Incentives***	Simple Projected Lifetime Savings						ROI
		kW	kWh	therms	cooling kWh	kgal/yr	$										kW	kWh	therms	cooling	kgal/yr	$	
ECM-1	Replace Domestic Hot Water Storage Tank and Heat Exchanger	15.5	13,000	-460	0	0	$ 2,280	$ 6,200	2.7	3.0	12	$ 200	Y	$ 4,300	$ 200	2.6	186	156,000	-5,520	0	0	$ 27,400	3.4
ECM-2	HVAC Water Cooled Chiller Addition	0.0	423,848	0	0	0	$ 55,700	$ 325,200	5.8	178.1	20	$ 13,000	Y	$ 75,000	$ 13,000	5.6	0	8,476,955	0	0	0	$ 1,114,100	2.4
ECM-3	HVAC Install Speed Frequency Drives, High Efficiency Motors	0.0	32,600	0	0	0	$ 4,300	$ 29,500	6.9	13.7	20	$ 7,563	y	$ 20,700	$ 7,563	5.1	0	652,000	0	0	0	$ 85,700	1.9
ECM-4	Upgrade / Recommission BAS System	0.0	23,762	1,067	0	0	$ 4,000	$ 3,975	1.0	15.7	10			$ -	$ -	1.0	0	237,617	10,666	0	0	$ 39,800	9.0
ECM-5	Lighting Replacement Upgrades	11.2	35,100	0	0	0	$ 5,000	$126,400	25.3	14.7	15	$ 7,403		$ -	$ 7,403	23.8	168	526,500	0	0	0	$ 74,400	(0.4)
ECM-6	Lighting Controls Installation (Occupancy Sensors)	0.0	40,400	0	0	0	$ 5,300	$5,100	1.0	17.0	15	$ 695		$ -	$ 695	0.8	0	606,000	0	0	0	$ 79,600	14.6
ECM-7	Lighting Replacements with Lighting Controls (Occupancy Sensors)	11.2	59,700	0	0	0	$ 7,900	$131,400	16.6	25.1	15	$ 8,098	Y	$ 75,000	$ 8,098	15.6	168	895,500	0	0	0	$ 118,200	(0.1)
	Total (Does Not Include ECM-4 & ECM-5)	**26.7**	**552,909.5**	**606.6**	**0.0**	**0.0**	**74,180.0**	**496,275.4**	6.7		15	$ 28,861		$ 175,000	$ 28,861	6.3	**354.1**	**10,418,072**	**5,146**	**0**	**0**	**$ 1,385,200**	1.8
	Total Measures with Positive ROI	**15.5**	**469,447.8**	**(460.0)**	**0.0**	**0.0**	**62,280.0**	**360,900.0**	5.8		15.4	$ 20,763		$ 100,000	$ 20,763	5.5	**186.0**	**9,522,572**	**5,146**	**0**	**0**	**$ 1,267,000**	2.5
	% of Existing	**18%**	**56%**	**4%**	**0%**	**#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 $250,00

Camden County College Blackwood Campus- NJBPU
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ECM-1: Replace Electric DHW Heater w/ Condensing Gas-Fired DHW Heater

ECM Summary

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

Item	Value	Units	Formula/Comments
Occupied days per week	5	days/wk	
Water supply Temperature	60	˚F	Termperature of water coming into building
Hot Water Temperature	130	˚F	
Hot Water Usage per day	205	gal/day	Calculated from usage below
Annual Hot Water Energy Demand	31,079	MBTU/yr	Energy required to heat annual quantity of hot water to setpoint
Existing Tank Size	80	Gallons	Per manufacturer nameplate
Hot Water Temperature	130	˚F	Per building personnel
Average Room Temperature	70	˚F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	1.0	MBH	
Annual Standby Hot Water Load	8,760	MBTU/yr	
Total Annual Hot Water Demand (w/ standby losses)	39,839	Mbtu/yr	Building demand plus standby losses
Existing Water Heater Efficiency	90%		Per Manufacturer
Total Annual Energy Required	44,266	Mbtu/yr	
Total Annual Electric Required	**13,000**	**kWh/yr**	**Electrical Savings**
Average Annual Electric Demand	1.48	kW	
Peak Electric Demand	**15.50**	**kW**	**Per Manufacturer's Nameplate (Demand Savings)**
New Tank Size	100	Gallons	Based on Rinnai tankless water heater with auxiliary storage tank
Hot Water Temperature	130	˚F	
Average Room Temperature	70	˚F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	1.3	MBH	
Annual Standby Hot Water Load	10,950	MBTU/yr	
Prop Annual Hot Water Demand (w/ standby losses)	42,029	MBTU/yr	
Proposed Avg. Hot water heater efficiency	92%		Based on Rinnai tankless high efficiency DHW Heater
Proposed Total Annual Energy Required	45,684	MBTU/yr	
Proposed Fuel Use	**460**	**Therms/yr**	
Elec Utility Demand Unit Cost	$5.94	$/kW	
Elec Utility Supply Unit Cost	$0.119	$/kWh	
NG Utility Unit Cost	$0.80	$/Therm	
Existing Operating Cost of DHW	$2,647	$/yr	
Proposed Operating Cost of DHW	$368	$/yr	
Annual Utility Cost Savings	**$2,279**	**$/yr**	

Daily Hot Water Demand

			#USES PER DAY		FULL TIME OCCUPANTS**				
FIXTURE	*BASE WATER USE GPM	DURATION OF USE (MIN)	MALE	FEMALE	MALE	FEMALE	TOTAL GAL/DAY	% HOT WATER	TOTAL HW GAL/DAY
LAVATORY (Low-Flow Lavs use 0.5 GPM)	2.5	0.25	3	3	100	100	375	50%	188
SHOWER	2.5	5	1	1			0	75%	0
KITCHEN SINK	2.5	0.5	1	1			0	75%	0
MOP SINK	2.5	2	1	1	2		10	75%	8
Dishwasher (gal per u	10	1	1	0	1		10	100%	10
						TOTAL	385		**205**

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

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Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

ECM-2: Replace Electric & Gas-Fired DHW Heaters w/ Condensing Gas-Fired DHW Heater - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Electric DHW Heater Removal	1	EA	$ -	$ 50		$ -	$ 68	$ -	$ 68	
High Efficiency Gas-Fired tankless DHW Heater	1	EA	$ 1,200	$ 500		$ 1,320	$ 675	$ -	$ 1,995	
100 gallon storage tank	1	EA	$ 400	$ 200		$ 440	$ 270	$ -	$ 710	
Miscellaneous Electrical	1	EA	$ 50	$ 100		$ 55	$ 135	$ -	$ 190	
Venting Kit	1	EA	$ 450	$ 650		$ 495	$ 878	$ -	$ 1,373	
Miscellaneous Piping and Valves	1	LS	$ 300			$ 330	$ -	$ -	$ 330	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 4,665	Subtotal
$ 467	10% Contingency
$ 1,026	20% Contractor O&P
$ -	0% Engineering
$ 6,200	**Total**

Camden County College Blackwood Campus- NJBPU
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EQUIPMENT	EQUIPMENT SERVED	CHW FLOW (GPM)	ESTIMATED COOLING CAPACITY (MBH)
P-1A	AHU-1 CHW	120	720
P-8	CHW to FCUs	390	2,340
P-2A	AHU-2 CHW	52	312
	Total Chilled Water Cooling:		*3,372* *MBH*
			281 *tons*

ECM-2: HVAC Air Cooled Chiller Addition

ECM Summary

The addition a water cooled chiller and cooling tower would decouple the building from the older, less efficient Central Power Plant Trane chillers. The existing chillers are in poor condition, use environmentally unfriendly R-11 refrigerant and are mechanically unreliable. This would also eliminate system cooling capacity losses from the underground distribution piping between the two buildings. Modern technology equipment has become much more advanced in terms of operating sequences to improve efficiency, reliability and turndown capacity. By decoupling the building from the existing central plant chillers, adding VSDs and inverter duty high efficiency motors on building chilled water supply pumps and reducing system capacity and flow when possible, significant electrical energy can be saved.

ASSUMPTIONS			Comments
Electrical Utility Cost	$0.131	/kWh	
Average run hours per Week	66	Hours	
Space Balance Point	55	F	
Space Temperature Setpoint	68	deg F	Setpoint.
Existing Annual Electrical Usage	580,948	kWh	Estimated based on central plant cooling system electrical usage
Annual Electrical Utility Cost	$76,355		

Item	Value	Units	Comments
Proposed tonnage of new Chiller system	160	Tons	Estimated- need laod calulation
Proposed EER	15.0		
Annual Chiller Electrical Usage	133,700	kWh	
Proposed HP of Cooling Tower Fan	10	HP	Estimated
Proposed Electrical Load	7	kW	
Annual Cooling Tower Electrical Usage	7,800	kWh	
Centrifugal Pump	20.0	HP	Estimated- total for both chilled water and condenser water
Pump Electrical Load	14.9	kW	
Annual Pump Electrical Usage	15,600	kWh	
Proposed Annual Electric Usage	157,100	kWh	Unit will cycle on w/ temp of room. Possible operating time shown below
Annual Electrical Cost	$20,648		

ANNUAL SAVINGS		
Annual Cost Savings	$55,707	
Total Project Cost	**$325,200**	
Simple Payback	5.8	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	100%	1
92.5	34	13	83%	11
87.5	131	51	66%	34
82.5	500	196	49%	97
77.5	620	244	32%	78
72.5	664	261	15%	40
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	767	34%	261

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ECM-2: HVAC Air Cooled Chiller Addition - 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 piping to central plant chillers demolition	1	LS	$ 1,000	$ 2,500		$ 1,100	$ 3,375	$ -	$ 4,500	
(1)Water cooled chiller 160 tons	1	EA	$ 140,000	$ 13,400		$ 154,000	$ 18,090	$ -	$ 172,100	
- CHW Valves & Piping to building chilled water system	1	EA	$ 1,000	$ 500		$ 1,100	$ 675	$ -	$ 1,800	
- Reprogram DDC system for (1) ACC	1	EA	$ 1,000	$ 2,000		$ 1,100	$ 2,700	$ -	$ 3,800	
(1) 180 Ton Cooling Tower	1	EA	$ 35,000	$ 1,925		$ 38,500	$ 2,599	$ -	$ 41,100	
- CHW Valves & Piping to building chiller	1	EA	$ 1,000	$ 500		$ 1,100	$ 675	$ -	$ 1,800	
(2) 10 HP Centrifugal-type 400 GPM Pump	2	EA	$ 5,150	$ 785		$ 11,330	$ 2,120	$ -	$ 13,400	
Electrical - misc.	1	LS	$ 1,000	$ 5,000		$ 1,100	$ 6,750	$ -	$ 7,900	

$ 246,400	Subtotal
$ 24,640	10% Contingency
$ 54,208	20% Contractor O&P
$ -	0% Engineering
$ 325,200	**Total**

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

Variable Inputs

Blended Electric Rate	$0.13
Cooling System "On" Point	70
VFD Efficiency	98.5%

ECM Description Summary

chilled water pump motors unnecessarily consume electrical energye due to operating 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), electrical energy can be saved. Pressure actuated controllers are used to measure the water pressure in the chilled water system and as valves close (due to satisying the load), 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
	1	10.0	10.0	86.5%	89.5%	6.90	6.67
	1	10.0	10.0	89.5%	91.7%	6.67	6.51
					Total:	13.57	13.18

SAVINGS ANALYSIS

OAT - DB Avg Temp F	OAT - WB Avg 120	Annual Hours in Bin	Annual Cooling Hours Bin	Pump Load %	Existing Pump kWh	Proposed Pump kW	Speed efficiency %	Proposed Pump kWh	Proposed Savings kWh
(A) See Note 3	(B) See Note 3	(C) See Note 3	(D) =IF(A>TP,0,C)	(E) =0.5+0.5* (50-A)/(50-10)) See Note 4	(F) =D*AA	(G) =BB*E^2.5/CC See Note 5	(H)	(I) =D*G	(J) =F-H
97.5	75	3	3	73%	41	6.1	97.4%	19	22
92.5	74	34	34	69%	461	5.2	95.5%	187	275
87.5	72	131	131	65%	1,777	4.5	93.2%	630	1,147
82.5	69	500	500	60%	6,784	3.8	90.4%	2,100	4,684
77.5	67	620	620	56%	8,412	3.2	87.2%	2,258	6,154
72.5	64	664	664	52%	9,009	2.6	83.5%	2,083	6,926
67.5	62	854	0	0%	0	0.0	0.0%	0	0
62.5	58	927	0	0%	0	0.0	0.0%	0	0
57.5	53	600	0	0%	0	0.0	0.0%	0	0
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	1,952		26,484			7,276	19,208

Notes:

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

Annual Utility Savings	19,200	kWh
Annual Savings	$ 2,523	
Install Variable Speed Drives	$ 23,000	
- HW Pump Cost		
Simple Payback	9	Years

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Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

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

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
10 HP VFD (Chilled water /condenser water)	2	ea	$ 2,021	$ 450		$ 4,446	$ 1,215	$ -	$ 5,661	
Reprogram DDC system	1	ea	$ 100	$ 500		$ 110	$ 675	$ -	$ 785	
Electrical - misc.	2	ls	$ 200	$ 1,000		$ 440	$ 2,700	$ -	$ 3,140	
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	2	ea	$ 850	$ 500		$ 1,870	$ 1,350	$ -	$ 3,220	
Misc. piping modification	2	ea	$ 200	$ 150		$ 440	$ 405	$ -	$ 845	
						$ -	$ -	$ -	$ -	

$ 17,451	Subtotal
$ 1,745	10% Contingency
$ 3,839	20% Contractor O&P
$ -	0% Engineering
$ 23,000	**Total**

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AIR HANDLER	AREA SERVED	FAN MOTOR HP
AHU-1	Building FCs Makeup Air	7.5

Total Combined Motor Horsepower: *7.5* *HP*

ECM-3C: Install Variable Speed Drives - AHU Fans

Utility Costs

Blended Electric Rate $0.131

ECM Description Summary

Air handling units with constant volume supply fan motors serve spaces with intermittent large occupancy loads. By adding Variable Frequency Drives (VFD's) to reducing the air flow by slowing the motors down, significant electrical energy can be saved. The fan motors will also be replaced with a premium efficiency motor. System static pressure will be permitted to float with fan speed, and pressure will not be controlled or monitored. Control strategy is to program the EMCS system to permit the AHU fan to ramp speed linearly between 100% and 50% as OAT varies between the design heating load and building balance point.

UNIT	HP	Existing Motor Eff (Note 1)	New Motor Eff (Note 1)	Existing Motor kW	New Motor kW		Building Balance Point
AHU-1	7.5	88.5%	91.0%	5.06	4.92		55.0
				5.06	4.92	VFD Eff. (CC)	98.5%

OAT - DB Avg Temp F	Bin Hours 120	Occupied Hours in Bin	AHU Hours in Bin	Existing Fan Kw	Existing Fan kWh	Fan Load %	Proposed Fan kW	Speed efficiency %	Proposed Fan kWh	Savings Fan kWh
(A)	(B)	(C)	(D)	(F)	(F)	(E)	(G)	(H)	(I)	(J)
102.5	0	0	0	5.1	0	50%	0.62	81.5%	0	0
97.5	3	1	1	5.1	6	50%	0.62	81.5%	1	5
92.5	34	13	13	5.1	68	50%	0.62	81.5%	10	57
87.5	131	51	51	5.1	260	50%	0.62	81.5%	39	221
82.5	500	196	196	5.1	993	50%	0.62	81.5%	150	843
77.5	620	244	244	5.1	1,232	50%	0.62	81.5%	187	1,045
72.5	664	261	261	5.1	1,319	50%	0.62	81.5%	200	1,120
67.5	854	336	336	5.1	1,697	50%	0.62	81.5%	257	1,440
62.5	927	364	364	5.1	1,842	50%	0.62	81.5%	279	1,563
57.5	600	236	236	5.1	1,192	50%	0.62	81.5%	181	1,012
52.5	610	240	240	5.1	1,212	52%	0.71	83.7%	204	1,008
47.5	611	240	240	5.1	1,214	57%	0.92	87.6%	251	963
42.5	656	258	258	5.1	1,303	61%	1.15	91.1%	327	977
37.5	1,023	402	402	5.1	2,033	66%	1.43	94.0%	612	1,421
32.5	734	288	288	5.1	1,458	70%	1.75	96.3%	523	936
27.5	334	131	131	5.1	664	75%	2.11	98.2%	281	382
22.5	252	99	99	5.1	501	80%	2.51	99.5%	250	251
17.5	125	49	49	5.1	248	84%	2.97	100.0%	146	103
12.5	47	18	18	5.1	93	89%	3.48	100.0%	64	29
7.5	22	9	9	5.1	44	93%	4.04	100.0%	35	9
2.5	13	5	5	5.1	26	98%	4.66	99.6%	24	2
-2.5	0	0	0	5.1	0	100%	4.99	99.0%	0	0
-7.5	0	0	0	5.1	0	100%	4.99	99.0%	0	0
TOTALS		**3,441**	**3,441**	**116**	**17,405**				**4,020**	**13,385**

Notes:

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

Annual Utility Savings	13,400	kWh
Annual Savings	$ 1,800	
Install Variable Speed Drives	$ 6,500	
- Air Handling Fan Cost		
Simple Payback	3.6	Years

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ECM-3C: Install Variable Speed Drives - AHU Fans - 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.		
7.5 HP VFD	1	ea	$ 1,375	$ 585		$ 1,513	$ 790	$ -	$ 2,302	
7.5 HP Motors		ea	$ 545	$ 95		$ -	$ -	$ -	$ -	
Reprogram DDC system	1	ea	$ 100	$ 1,000		$ 110	$ 1,350	$ -	$ 1,460	
Electrical - misc.	1	ea	$ 150	$ 150		$ 165	$ 203	$ -	$ 368	
Duct pressure sensor/transmitter	1	ea	$ 500	$ 200		$ 550	$ 270	$ -	$ 820	

$ 4,950	Subtotal
$ 495	10% Contingency
$ 1,089	20% Contractor O&P
$ -	0% Engineering
$ 6,500	**Total**

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

ECM Description Summary

42,400 Sq Footage

EXISTING CONDITIONS		
Existing Facility Total Electric usage	990,071	kWh
Existing Facility Total Gas usage	14,034	Therms
Existing Facility Cooling Electric usage	237,617	kWh[1]
Existing Facility Heating Natural Gas usage	10,666	Therms[2]
PROPOSED CONDITIONS		
Proposed Facility Cooling Electric Usage	213,855	kWh
Proposed Facility Natural Gas Usage	9,600	Therms
SAVINGS		
Retro-Commissioning Electric Savings	23,762	**kWh**
Retro-Commissioning Natural Gas Savings	1,067	**Therms**
Total cost savings	$ 3,975	
Estimated Total Project Cost	$ 21,200	[4]
Simple Payback	5.3	**years**

Assumptions

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

ECM-4 Lighting Replacements

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
$	kW	kWh	therms	$	$	$	$	Years	Years
$126,400	**11.2**	**35,100**	**0**	**$6,072**	**0**	**$6,072**	**$7,403**	**20.8**	**19.6**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-5 Install Occupancy Sensors

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
$	kW	kWh	therms	$	$	$	$	Years	Years
$5,100	**0.0**	**40,400**	**0**	**$6,060**	**0**	**$6,060**	**$695**	**0.8**	**0.7**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-6 Lighting Replacements with Occupancy Sensors

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
$	kW	kWh	therms	$	$	$	$	Years	Years
$131,400	**11.2**	**59,700**	**0**	**$9,762**	**0**	**$9,762**	**$8,098**	**13.5**	**12.6**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

Energy Audit of Camden County College (Taft Hall)

CHA Project No. 24364

ECM-4 Lighting Replacements

Cost of Electricity: **$0.150 $/kWh**

$6.00 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**	**Number of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
11A	1st Floor Hallway	20	4' 2-LAMP T-12	F42EL	60	1.2	SW	2500	3,000	20	F32T8	F42ILL-R	52	1.0	SW	2,500	2,600	400	0.2	$ 71.52	$ 5,000.00		69.9	69.9
11A	1st Floor Men's Bathroom	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	2500	600	4	F32T8	F42ILL-R	52	0.2	SW	2,500	520	80	0.0	$ 14.30	$ 1,000.00	$100	69.9	62.9
11A	1st Floor Women's Bathroom	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	2500	600	4	F32T8	F42ILL-R	52	0.2	SW	2,500	520	80	0.0	$ 14.30	$ 1,000.00		69.9	69.9
11A	Classroom - 100	15	4' 2-LAMP T-12	F42EL	60	0.9	SW	2125	1,913	15	F32T8	F42ILL-R	52	0.8	SW	2,125	1,658	255	0.1	$ 46.89	$ 3,750.00		80.0	80.0
11A	Office Room - 101	6	4' 2-LAMP T-12	F42EL	60	0.4	SW	2125	765	6	F32T8	F42ILL-R	52	0.3	SW	2,125	663	102	0.0	$ 18.76	$ 1,500.00		80.0	80.0
162A	Office Room - 101A	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	2125	255	1	F28T8	F44SSILL-R	86	0.1	SW	2,125	183	72	0.0	$ 13.29	$ -	$25	0.0	-1.9
162A	Office Room - 101B	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	2500	300	1	F28T8	F44SSILL-R	86	0.1	SW	2,500	215	85	0.0	$ 15.20	$ -	$25	0.0	-1.6
35A	Office Room - 101C	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1	SW	2125	136	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2,125	378	(242)	(0.1)	$ (44.55)	$ -			
35A	Office Room - 101D	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1	SW	2125	136	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	SW	2,125	378	(242)	(0.1)	$ (44.55)	$ -	$50		
11A	Office Room - 101E	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	255	2	F32T8	F42ILL-R	52	0.1	SW	2,125	221	34	0.0	$ 6.25	$ 500.00		80.0	80.0
11A	Office Room - 101F	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2250	135	1	F32T8	F42ILL-R	52	0.1	SW	2,250	117	18	0.0	$ 3.28	$ 250.00		76.3	76.3
71	Toilet Room	1	I 60	I60/1	60	0.1	SW	2250	135	1	CF 26	CFQ26/LL	27	0.0	SW	2,250	61	74	0.0	$ 13.51	$ 40.50		3.0	3.0
41A	Closet	1	4' 1-LAMP T-8 (32W)	F41ILL	32	0.0	SW	2125	68	1	4' 1-LAMP T-8 (32W)	F41ILL	31	0.0	SW	2,125	66	2	0.0	$ 0.39	$ -		0.0	0.0
11A	Classroom - 102	15	4' 2-LAMP T-12	F42EL	60	0.9	SW	2125	1,913	15	F32T8	F42ILL-R	52	0.8	SW	2,125	1,658	255	0.1	$ 46.89	$ 3,750.00		80.0	80.0
11A	Faculty Lounge - 103	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	2125	510	4	F32T8	F42ILL-R	52	0.2	SW	2,125	442	68	0.0	$ 12.50	$ 1,000.00		80.0	80.0
11A	Faculty Men's Bathroom	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2000	120	1	F32T8	F42ILL-R	52	0.1	SW	2,000	104	16	0.0	$ 2.98	$ 250.00		84.0	84.0
11A	Faculty Women's Bathroom	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	128	1	F32T8	F42ILL-R	52	0.1	SW	2,125	111	17	0.0	$ 3.13	$ 250.00		80.0	80.0
162A	Room - 104A	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	SW	2,125	366	145	0.1	$ 26.57	$ -		0.0	0.0
162A	Room - 104A (inside)	4	4' 4-LAMP T-12	F44EL	120	0.5	SW	2125	1,020	4	F28T8	F44SSILL-R	86	0.3	SW	2,125	731	289	0.1	$ 53.14	$ -		0.0	0.0
162A	Room - 104B	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	SW	2,125	366	145	0.1	$ 26.57	$ -		0.0	0.0
162A	Room - 104B (inside)	4	4' 4-LAMP T-12	F44EL	120	0.5	SW	2125	1,020	4	F28T8	F44SSILL-R	86	0.3	SW	2,125	731	289	0.1	$ 53.14	$ -		0.0	0.0
11A	Office Room - 105	6	4' 2-LAMP T-12	F42EL	60	0.4	SW	2125	765	6	F32T8	F42ILL-R	52	0.3	SW	2,125	663	102	0.0	$ 18.76	$ 1,500.00	$150	80.0	72.0
11A	Classroom - 106	15	4' 2-LAMP T-12	F42EL	60	0.9	SW	2125	1,913	15	F32T8	F42ILL-R	52	0.8	SW	2,125	1,658	255	0.1	$ 46.89	$ 3,750.00		80.0	80.0
11A	Classroom - 108	15	4' 2-LAMP T-12	F42EL	60	0.9	SW	2125	1,913	15	F32T8	F42ILL-R	52	0.8	SW	2,125	1,658	255	0.1	$ 46.89	$ 3,750.00		80.0	80.0
11A	Classroom - 110	15	4' 2-LAMP T-12	F42EL	60	0.9	SW	2500	2,250	15	F32T8	F42ILL-R	52	0.8	SW	2,500	1,950	300	0.1	$ 53.64	$ 3,750.00		69.9	69.9
111A	Mechanical Room - 109	18	4' 1-LAMP T-12	F41EL	32	0.6	SW	2125	1,224	18	F28T8	F41SSILL-R	23	0.4	SW	2,125	880	344	0.2	$ 63.30	$ -		0.0	0.0
162A	Office Room - 105A	3	4' 4-LAMP T-12	F44EL	120	0.4	SW	2125	765	3	F28T8	F44SSILL-R	86	0.3	SW	2,125	548	217	0.1	$ 39.86	$ -		0.0	0.0
11A	Office Room - 105B	6	4' 2-LAMP T-12	F42EL	60	0.4	SW	500	180	6	F32T8	F42ILL-R	52	0.3	SW	500	156	24	0.0	$ 7.06	$ 1,500.00	$150	212.6	191.3
11A	Office Room - 105C	9	4' 2-LAMP T-12	F42EL	60	0.5	SW	2125	1,148	9	F32T8	F42ILL-R	52	0.5	SW	2,125	995	153	0.1	$ 28.13	$ 2,250.00		80.0	80.0
162A	Office Room - 105D	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2500	600	2	F28T8	F44SSILL-R	86	0.2	SW	2,500	430	170	0.1	$ 30.40	$ -		0.0	0.0
111A	1st Floor Janitor Closet	1	4' 1-LAMP T-12	F41EL	32	0.0	SW	2500	80	1	F28T8	F41SSILL-R	23	0.0	SW	2,500	58	23	0.0	$ 4.02	$ -	$25	0.0	-6.2
162A	Office Room - 112	6	4' 4-LAMP T-12	F44EL	120	0.7	SW	2500	1,800	6	F28T8	F44SSILL-R	86	0.5	SW	2,500	1,290	510	0.2	$ 91.19	$ -	$150	0.0	-1.6
11A	South Stair Tower	5	4' 2-LAMP T-12	F42EL	60	0.3	SW	2125	638	5	F32T8	F42ILL-R	52	0.3	SW	2,125	553	85	0.0	$ 15.63	$ 1,250.00		80.0	80.0
11A	North Stair Tower	5	4' 2-LAMP T-12	F42EL	60	0.3	SW	1062.5	319	5	F32T8	F42ILL-R	52	0.3	SW	1,063	276	43	0.0	$ 9.26	$ 1,250.00		135.1	135.1
11A	2nd Floor Corridor	20	4' 2-LAMP T-12	F42EL	60	1.2	SW	2125	2,550	20	F32T8	F42ILL-R	52	1.0	SW	2,125	2,210	340	0.2	$ 62.52	$ 5,000.00		80.0	80.0
162A	2nd Floor Handicap Toilet	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	1062.5	255	2	F28T8	F44SSILL-R	86	0.2	SW	1,063	183	72	0.1	$ 15.73	$ -		0.0	0.0
11A	Classroom - 206	12	4' 2-LAMP T-12	F42EL	60	0.7	SW	1062.5	765	12	F32T8	F42ILL-R	52	0.6	SW	1,063	663	102	0.1	$ 22.21	$ 3,000.00		135.1	135.1
11A	Closet - 206	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	128	1	F32T8	F42ILL-R	52	0.1	SW	2,125	111	17	0.0	$ 3.13	$ 250.00		80.0	80.0
11A	Office Room - 207	6	4' 2-LAMP T-12	F42EL	60	0.4	SW	500	180	6	F32T8	F42ILL-R	52	0.3	SW	500	156	24	0.0	$ 7.06	$ 1,500.00		212.6	212.6
11A	Office Room - 207B	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	500	120	4	F32T8	F42ILL-R	52	0.2	SW	500	104	16	0.0	$ 4.70	$ 1,000.00		212.6	212.6
11A	Office Room - 207C	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	500	120	4	F32T8	F42ILL-R	52	0.2	SW	500	104	16	0.0	$ 4.70	$ 1,000.00		212.6	212.6
11A	Office Room - 207D	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	255	2	F32T8	F42ILL-R	52	0.1	SW	2,125	221	34	0.0	$ 6.25	$ 500.00		80.0	80.0
11A	Office Room - 209	3	4' 2-LAMP T-12	F42EL	60	0.2	SW	1062.5	191	3	F32T8	F42ILL-R	52	0.2	SW	1,063	166	26	0.0	$ 5.55	$ 750.00		135.1	135.1
11A	Office Room - 205A	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	128	1	F32T8	F42ILL-R	52	0.1	SW	2,125	111	17	0.0	$ 3.13	$ 250.00		80.0	80.0
11A	Office Room - 205	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	1062.5	255	4	F32T8	F42ILL-R	52	0.2	SW	1,063	221	34	0.0	$ 7.40	$ 1,000.00	$28	135.1	131.3
162A	Classroom - 204	23	4' 4-LAMP T-12	F44EL	120	2.8	SW	2250	6,210	23	F28T8	F44SSILL-R	86	2.0	SW	2,250	4,451	1,760	0.8	$ 320.23	$ -		0.0	0.0
11A	2nd Floor Wiring Closet	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2250	135	1	F32T8	F42ILL-R	52	0.1	SW	2,250	117	18	0.0	$ 3.28	$ 250.00		76.3	76.3
11A	Classroom - 202	12	4' 2-LAMP T-12	F42EL	60	0.7	SW	500	360	12	F32T8	F42ILL-R	52	0.6	SW	500	312	48	0.1	$ 14.11	$ 3,000.00		212.6	212.6
11A	Classroom - 203	24	4' 2-LAMP T-12	F42EL	60	1.4	SW	520	749	24	F32T8	F42ILL-R	52	1.2	SW	520	649	100	0.2	$ 28.80	$ 6,000.00		208.3	208.3
11A	Closet - 203A	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	520	125	4	F32T8	F42ILL-R	52	0.2	SW	520	108	17	0.0	$ 4.80	$ 1,000.00		208.3	208.3
111A	Closet - 203B	4	4' 1-LAMP T-12	F41EL	32	0.1	SW	520	67	4	F28T8	F41SSILL-R	23	0.1	SW	520	48	19	0.0	$ 5.40	$ -	$100	0.0	-18.5
11A	Classroom - 201	33	4' 2-LAMP T-12	F42EL	60	2.0	SW	500	990	33	F32T8	F42ILL-R	52	1.7	SW	500	858	132	0.3	$ 38.81	$ 8,250.00		212.6	212.6
111A	Classroom - 203C	6	4' 1-LAMP T-12	F41EL	32	0.2	SW	4380	841	6	F28T8	F41SSILL-R	23	0.1	SW	4,380	604	237	0.1	$ 39.37	$ -		0.0	0.0
111A	Room - 201B	4	4' 1-LAMP T-12	F41EL	32	0.1	SW	4380	561	4	F28T8	F41SSILL-R	23	0.1	SW	4,380	403	158	0.0	$ 26.24	$ -		0.0	0.0
11A	Room - 201A	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	8760	2,102	4	F32T8	F42ILL-R	52	0.2	SW	8,760	1,822	280	0.0	$ 44.35	$ 1,000.00		22.5	22.5
11A	Room - 200A	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	8760	526	1	F32T8	F42ILL-R	52	0.1	SW	8,760	456	70	0.0	$ 11.09	$ 250.00		22.5	22.5
11A	Room - 200B	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	128	1	F32T8	F42ILL-R	52	0.1	SW	2,125	111	17	0.0	$ 3.13	$ 250.00	$25	80.0	72.0
11A	Classroom - 200	33	4' 2-LAMP T-12	F42EL	60	2.0	SW	2125	4,208	33	F32T8	F42ILL-R	52	1.7	SW	2,125	3,647	561	0.3	$ 103.16	$ 8,250.00	$825	80.0	72.0
111A	Closet - 202A	2	4' 1-LAMP T-12	F41EL	32	0.1	SW	500	32	2	F28T8	F41SSILL-R	23	0.0	SW	500	23	9	0.0	$ 2.65	$ -	$50	0.0	-18.9
11A	2nd Floor Women's Bathroom	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	500	120	4	F32T8	F42ILL-R	52	0.2	SW	500	104	16	0.0	$ 4.70	$ 1,000.00	$100	212.6	191.3
11A	3rd Floor Corridor	20	4' 2-LAMP T-12	F42EL	60	1.2	SW	8760	10,512	20	F32T8	F42ILL-R	52	1.0	SW	8,760	9,110	1,402	0.2	$ 221.76	$ 5,000.00	$500	22.5	20.3
11A	Room - 307	5	4' 2-LAMP T-12	F42EL	60	0.3	SW	500	150	5	F32T8	F42ILL-R	52	0.3	SW	500	130	20	0.0	$ 5.88	$ 1,250.00	$125	212.6	191.3
111A	Custodial Closet	1	4' 1-LAMP T-12	F41EL	32	0.0	SW	3285	105	1	F28T8	F41SSILL-R	23	0.0	SW	3,285	76	30	0.0	$ 5.08	$ -	$25	0.0	-4.9
204	Room - 306	1	S 96 P F 2 (MAG) 8'	F82EHE	207	0.2	SW	3285	680	1	S 96 P F 2 (MAG) 8'	F82EHE	207	0.2	SW	3,285	680	-	0.0	$ -	$ -	$25		
175A	Office Room - 305	7	4' 2-LAMP T-8 (32W)	F42ILL	32	0.2	SW	8760	1,962	7	4' 2-LAMP T-8	F42ILL	59	0.4	SW	8,760	3,618	(1,656)	(0.2)	$ (261.95)	$ -	$175		
111A	Office Room - 305	3	4' 1-LAMP T-12	F41EL	32	0.1	SW	8760	841	3	F28T8	F41SSILL-R	23	0.1	SW	8,760	604	237	0.0	$ 37.42	$ -		0.0	0.0
11A	Room - 304	12	4' 2-LAMP T-12	F42EL	60	0.7	SW	500	360	12	F32T8	F42ILL-R	52	0.6	SW	500	312	48	0.1	$ 14.11	$ 3,000.00	$300	212.6	191.3
11A	Room - 303	33	4' 2-LAMP T-12	F42EL	60	2.0	SW	2125	4,208	33	F32T8	F42ILL-R	52	1.7	SW	2,125	3,647	561	0.3	$ 103.16	$ 8,250.00	$825	80.0	72.0
192A	Room - 303B	1	8' 4-LAMP T-12	F84EHE	414	0.4	SW	500	207	1	8' 4-LAMP T-12	F84EHE	414	0.4	SW	500	207	-	0.0	$ -	$ -	$25		
11A	Room - 303A	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	2000	480	4	F32T8	F42ILL-R	52	0.2	SW	2,000	416	64	0.0	$ 11.90	$ 1,000.00	$100	84.0	75.6
111A	Room - 301B	7	4' 1-LAMP T-12	F41EL	32	0.2	SW	2000	448	7	F28T8	F41SSILL-R	23	0.2	SW	2,000	322	126	0.1	$ 23.44	$ -	$175	0.0	-7.5
11A	Room - 301	33	4' 2-LAMP T-12	F42EL	60	2.0	SW	500	990	33	F32T8	F42ILL-R	52	1.7	SW	500	858	132	0.3	$ 38.81	$ 8,250.00	$825	212.6	191.3
11A	Classroom - 302	24	4' 2-LAMP T-12	F42EL	60	1.4	SW	8760	12,614	24	F32T8	F42ILL-R	52	1.2	SW	8,760	10,932	1,682	0.2	$ 266.11	$ 6,000.00	$600	22.5	20.3
162A	Room - 302B	12	4' 4-LAMP T-12	F44EL	120	1.4	SW	500	720	12	F28T8	F44SSILL-R	86	1.0	SW	500	516	204	0.4	$ 59.98	$ -	$300	0.0	-5.0
227	Room - 302C	3	W60CF1	F81EL	60	0.2	SW	500	90	3	CF42W	CF42/1-L	48	0.1	SW	500	72	18	0.0	$ 5.29	$ 607.50	$75	114.8	100.6
11A	Room - 302A	8	4' 2-LAMP T-12	F42EL	60	0.5	SW	8760	4,205	8	F32T8	F42ILL-R	52	0.4	SW	8,760	3,644	561	0.1	$ 88.70	$ 2,000.00	$200	22.5	20.3
11A	Room - 300	24	4' 2-LAMP T-12	F42EL	60	1.4	SW	2000	2,880	24	F32T8	F42ILL-R	52	1.2	SW	2,000	2,496	384	0.2	$ 71.42	$ 6,000.00	$600	84.0	75.6
11A	Room - 300A	8	4' 2-LAMP T-12	F42EL	60	0.5	SW	8760	4,205	8	F32T8	F42ILL-R	52	0.4	SW	8,760	3,644	561	0.1	$ 88.70	$ 2,000.00	$200	22.5	20.3
11A	3rd Floor Men's Bathroom	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	2000	480	4	F32T8	F42ILL-R	52	0.2	SW	2,000	416	64	0.0	$ 11.90	$ 1,000.00	$100	84.0	75.6
11A	3rd Floor Women's Bathroom	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	4380	1,051	4	F32T8	F42ILL-R	52	0.2	SW	4,380	911	140	0.0	$ 23.33	$ 1,000.00	$100	42.9	38.6
146	Exterior	11	High Bay MH 400	MH400/1	458	5.0	SW	4380	22,066	11	P 54 C F 4	FC20	20	0.2	SW	4,380	964	21,103	4.8	$ 3,512.32	$ -	$275	0.0	-0.1
143	Exterior	2	HPS 100 POLE	HPS100/1	138	0.3	SW	4380	1,209	2	FXLED39	FXLED39/1	39	0.1	SW	4,380	342	867	0.2	$ 144.34	$ 229.50	$50	1.6	1.2
	Total	**641**				**45.6**			**120,182**	**641**			**4,914**	**34.4**				**85,076**		**$6,100**	**$126,400**	**$7,403**		
																		Demand Savings		**11.2**	**$807**			
																		kWh Savings		**35,100**	**$5,265**			
																		Total savings			**$6,072**		**20.8**	**19.6**

Energy Audit of Camden County College (Taft Hall)

CHA Project No. 24364

ECM-5 Install Occupancy Sensors

Cost of Electricity: **$0.150 $/kWh**

$6.00 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**	**Number of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kW Saved) * ($/kWh)	Cost for renovations to lighting system		Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
11A	1st Floor Hallway	20	4' 2-LAMP T-12	F42EL	60	1.2	SW	2500	3,000.0	20	4' 2-LAMP T-12	F42EL	60	1.2	None	2500	3,000.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	1st Floor Men's Bathroom	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	2500	600.0	4	4' 2-LAMP T-12	F42EL	60	0.2	None	2500	600.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	1st Floor Women's Bathroom	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	2500	600.0	4	4' 2-LAMP T-12	F42EL	60	0.2	None	2500	600.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Classroom - 100	15	4' 2-LAMP T-12	F42EL	60	0.9	SW	2125	1,912.5	15	4' 2-LAMP T-12	F42EL	60	0.9	C-OCC	1200	1,080.0	832.5	0.0	$124.88				
11A	Office Room - 101	6	4' 2-LAMP T-12	F42EL	60	0.4	SW	2125	765.0	6	4' 2-LAMP T-12	F42EL	60	0.4	C-OCC	1200	432.0	333.0	0.0	$49.95	$202.50	$35.00	1.1	0.9
162A	Office Room - 101A	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	2125	255.0	1	4' 4-LAMP T-12	F44EL	120	0.1	C-OCC	1200	144.0	111.0	0.0	$16.65				
162A	Office Room - 101B	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	2500	300.0	1	4' 4-LAMP T-12	F44EL	120	0.1	None	2500	300.0	0.0	0.0	$0.00	$0.00	$0.00		
35A	Office Room - 101C	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1	SW	2125	136.0	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1	OCC	1200	76.8	59.2	0.0	$8.88	$118.75	$20.00	13.4	11.1
35A	Office Room - 101D	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1	SW	2125	136.0	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1	OCC	1200	76.8	59.2	0.0	$8.88	$118.75	$20.00	13.4	11.1
11A	Office Room - 101E	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	255.0	2	4' 2-LAMP T-12	F42EL	60	0.1	OCC	1200	144.0	111.0	0.0	$16.65	$118.75	$20.00	7.1	5.9
11A	Office Room - 101F	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2250	135.0	1	4' 2-LAMP T-12	F42EL	60	0.1	C-OCC	1000	60.0	75.0	0.0	$11.25	$202.50	$35.00	18.0	14.9
71	Toilet Room	1	I 60	I60/1	60	0.1	SW	2250	135.0	1	I 60	I60/1	60	0.1	C-OCC	1000	60.0	75.0	0.0	$11.25	$202.50	$35.00	18.0	14.9
41A	Closet	1	4' 1-LAMP T-8 (32W)	F41ILL	32	0.0	SW	2125	68.0	1	4' 1-LAMP T-8 (32W)	F41ILL	32	0.0	OCC	1200	38.4	29.6	0.0	$4.44	$118.75	$20.00	26.7	22.2
11A	Classroom - 102	15	4' 2-LAMP T-12	F42EL	60	0.9	SW	2125	1,912.5	15	4' 2-LAMP T-12	F42EL	60	0.9	OCC	1200	1,080.0	832.5	0.0	$124.88	$118.75	$20.00	1.0	0.8
11A	Faculty Lounge - 103	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	2125	510.0	4	4' 2-LAMP T-12	F42EL	60	0.2	OCC	1200	288.0	222.0	0.0	$33.30	$118.75	$20.00	3.6	3.0
11A	Faculty Men's Bathroom	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2000	120.0	1	4' 2-LAMP T-12	F42EL	60	0.1	OCC	1000	60.0	60.0	0.0	$9.00	$118.75	$0.00	13.2	13.2
11A	Faculty Women's Bathroom	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	127.5	1	4' 2-LAMP T-12	F42EL	60	0.1	OCC	1200	72.0	55.5	0.0	$8.33	$118.75	$20.00	14.3	11.9
162A	Room - 104A	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510.0	2	4' 4-LAMP T-12	F44EL	120	0.2	OCC	1200	288.0	222.0	0.0	$33.30	$118.75	$20.00	3.6	3.0
162A	Room - 104A (inside)	4	4' 4-LAMP T-12	F44EL	120	0.5	SW	2125	1,020.0	4	4' 4-LAMP T-12	F44EL	120	0.5	OCC	1200	576.0	444.0	0.0	$66.60	$118.75	$20.00	1.8	1.5
162A	Room - 104B	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510.0	2	4' 4-LAMP T-12	F44EL	120	0.2	OCC	1200	288.0	222.0	0.0	$33.30	$118.75	$20.00	3.6	3.0
162A	Room - 104B (inside)	4	4' 4-LAMP T-12	F44EL	120	0.5	SW	2125	1,020.0	4	4' 4-LAMP T-12	F44EL	120	0.5	OCC	1200	576.0	444.0	0.0	$66.60	$118.75	$20.00	1.0	0.8
11A	Office Room - 105	6	4' 2-LAMP T-12	F42EL	60	0.4	SW	2125	765.0	6	4' 2-LAMP T-12	F42EL	60	0.4	OCC	1200	432.0	333.0	0.0	$49.95				
11A	Classroom - 106	15	4' 2-LAMP T-12	F42EL	60	0.9	SW	2125	1,912.5	15	4' 2-LAMP T-12	F42EL	60	0.9	OCC	1200	1,080.0	832.5	0.0	$124.88	$118.75	$20.00	1.0	0.8
11A	Classroom - 108	15	4' 2-LAMP T-12	F42EL	60	0.9	SW	2125	1,912.5	15	4' 2-LAMP T-12	F42EL	60	0.9	OCC	1200	1,080.0	832.5	0.0	$124.88	$118.75	$20.00	1.0	0.8
11A	Classroom - 110	15	4' 2-LAMP T-12	F42EL	60	0.9	SW	2500	2,250.0	15	4' 2-LAMP T-12	F42EL	60	0.9	None	2500	2,250.0	0.0	0.0	$0.00	$0.00	$0.00		
111A	Mechanical Room - 109	18	4' 1-LAMP T-12	F41EL	32	0.6	SW	2125	1,224.0	18	4' 1-LAMP T-12	F41EL	32	0.6	OCC	1200	691.2	532.8	0.0	$79.92	$118.75	$20.00	1.5	1.2
162A	Office Room - 105A	3	4' 4-LAMP T-12	F44EL	120	0.4	SW	2125	765.0	3	4' 4-LAMP T-12	F44EL	120	0.4	OCC	1000	360.0	405.0	0.0	$60.75	$118.75	$20.00	2.0	1.6
11A	Office Room - 105B	6	4' 2-LAMP T-12	F42EL	60	0.4	SW	500	180.0	6	4' 2-LAMP T-12	F42EL	60	0.4	None	500	180.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Office Room - 105C	9	4' 2-LAMP T-12	F42EL	60	0.5	SW	2125	1,147.5	9	4' 2-LAMP T-12	F42EL	60	0.5	OCC	1200	648.0	499.5	0.0	$74.93	$118.75	$20.00	1.6	1.3
162A	Office Room - 105D	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2500	600.0	2	4' 4-LAMP T-12	F44EL	120	0.2	None	2500	600.0	0.0	0.0	$0.00	$0.00	$0.00		
111A	1st Floor Janitor Closet	1	4' 1-LAMP T-12	F41EL	32	0.0	SW	2500	80.0	1	4' 1-LAMP T-12	F41EL	32	0.0	None	2500	80.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Office Room - 112	6	4' 4-LAMP T-12	F44EL	120	0.7	SW	2500	1,800.0	6	4' 4-LAMP T-12	F44EL	120	0.7	None	2500	1,800.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	South Stair Tower	5	4' 2-LAMP T-12	F42EL	60	0.3	SW	2125	637.5	5	4' 2-LAMP T-12	F42EL	60	0.3	OCC	1200	360.0	277.5	0.0	$41.63	$118.75	$0.00	2.9	2.9
11A	North Stair Tower	5	4' 2-LAMP T-12	F42EL	60	0.3	SW	1062.5	318.8	5	4' 2-LAMP T-12	F42EL	60	0.3	None	1062.5	318.8	0.0	0.0	$0.00	$0.00	$0.00		
11A	2nd Floor Corridor	20	4' 2-LAMP T-12	F42EL	60	1.2	SW	2125	2,550.0	20	4' 2-LAMP T-12	F42EL	60	1.2	OCC	1200	1,440.0	1,110.0	0.0	$166.50	$118.75	$20.00	0.7	0.6
162A	2nd Floor Handicap Toilet	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	1062.5	255.0	2	4' 4-LAMP T-12	F44EL	120	0.2	None	1062.5	255.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Classroom - 206	12	4' 2-LAMP T-12	F42EL	60	0.7	SW	1062.5	765.0	12	4' 2-LAMP T-12	F42EL	60	0.7	None	1062.5	765.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Closet - 206	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	127.5	1	4' 2-LAMP T-12	F42EL	60	0.1	OCC	1200	72.0	55.5	0.0	$8.33	$118.75	$20.00	14.3	11.9
11A	Office Room - 207	6	4' 2-LAMP T-12	F42EL	60	0.4	SW	500	180.0	6	4' 2-LAMP T-12	F42EL	60	0.4	None	500	180.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Office Room - 207B	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	500	120.0	4	4' 2-LAMP T-12	F42EL	60	0.2	None	500	120.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Office Room - 207C	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	500	120.0	4	4' 2-LAMP T-12	F42EL	60	0.2	None	500	120.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Office Room - 207D	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	255.0	2	4' 2-LAMP T-12	F42EL	60	0.1	OCC	1200	144.0	111.0	0.0	$16.65	$118.75	$20.00	7.1	5.9
11A	Office Room - 209	3	4' 2-LAMP T-12	F42EL	60	0.2	SW	1062.5	191.3	3	4' 2-LAMP T-12	F42EL	60	0.2	None	1062.5	191.3	0.0	0.0	$0.00	$0.00	$0.00		
11A	Office Room - 205A	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	127.5	1	4' 2-LAMP T-12	F42EL	60	0.1	OCC	1200	72.0	55.5	0.0	$8.33	$118.75	$0.00	14.3	14.3
11A	Office Room - 205	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	1062.5	255.0	4	4' 2-LAMP T-12	F42EL	60	0.2	None	1062.5	255.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Classroom - 204	23	4' 4-LAMP T-12	F44EL	120	2.8	SW	2250	6,210.0	23	4' 4-LAMP T-12	F44EL	120	2.8	None	2250	6,210.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	2nd Floor Wiring Closet	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2250	135.0	1	4' 2-LAMP T-12	F42EL	60	0.1	None	2250	135.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Classroom - 202	12	4' 2-LAMP T-12	F42EL	60	0.7	SW	500	360.0	12	4' 2-LAMP T-12	F42EL	60	0.7	None	500	360.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Classroom - 203	24	4' 2-LAMP T-12	F42EL	60	1.4	SW	520	748.8	24	4' 2-LAMP T-12	F42EL	60	1.4	None	520	748.8	0.0	0.0	$0.00	$0.00	$0.00		
11A	Closet - 203A	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	520	124.8	4	4' 2-LAMP T-12	F42EL	60	0.2	C-OCC	390	93.6	31.2	0.0	$4.68	$202.50	$35.00	43.3	35.8
111A	Closet - 203B	4	4' 1-LAMP T-12	F41EL	32	0.1	SW	520	66.6	4	4' 1-LAMP T-12	F41EL	32	0.1	None	520	66.6	0.0	0.0	$0.00	$0.00	$0.00		
11A	Classroom - 201	33	4' 2-LAMP T-12	F42EL	60	2.0	SW	500	990.0	33	4' 2-LAMP T-12	F42EL	60	2.0	None	500	990.0	0.0	0.0	$0.00	$0.00	$0.00		
111A	Classroom - 203C	6	4' 1-LAMP T-12	F41EL	32	0.2	SW	4380	841.0	6	4' 1-LAMP T-12	F41EL	32	0.2	None	4380	841.0	0.0	0.0	$0.00	$0.00	$0.00		
111A	Room - 201B	4	4' 1-LAMP T-12	F41EL	32	0.1	SW	4380	560.6	4	4' 1-LAMP T-12	F41EL	32	0.1	None	4380	560.6	0.0	0.0	$0.00	$0.00	$0.00		
11A	Room - 201A	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	8760	2,102.4	4	4' 2-LAMP T-12	F42EL	60	0.2	None	8760	2,102.4	0.0	0.0	$0.00	$0.00	$0.00		
11A	Room - 200A	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	8760	525.6	1	4' 2-LAMP T-12	F42EL	60	0.1	None	8760	525.6	0.0	0.0	$0.00	$0.00	$0.00		
11A	Room - 200B	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	127.5	1	4' 2-LAMP T-12	F42EL	60	0.1	OCC	1200	72.0	55.5	0.0	$8.33	$118.75	$20.00	0.4	0.3
11A	Classroom - 200	33	4' 2-LAMP T-12	F42EL	60	2.0	SW	2125	4,207.5	33	4' 2-LAMP T-12	F42EL	60	2.0	OCC	1200	2,376.0	1,831.5	0.0	$274.73				
111A	Closet - 202A	2	4' 1-LAMP T-12	F41EL	32	0.1	SW	500	32.0	2	4' 1-LAMP T-12	F41EL	32	0.1	None	500	32.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	2nd Floor Women's Bathroom	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	500	120.0	4	4' 2-LAMP T-12	F42EL	60	0.2	None	500	120.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	3rd Floor Corridor	20	4' 2-LAMP T-12	F42EL	60	1.2	SW	8760	10,512.0	20	4' 2-LAMP T-12	F42EL	60	1.2	None	8760	10,512.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Room - 307	5	4' 2-LAMP T-12	F42EL	60	0.3	SW	500	150.0	5	4' 2-LAMP T-12	F42EL	60	0.3	None	500	150.0	0.0	0.0	$0.00	$0.00	$0.00		
111A	Custodial Closet	1	4' 1-LAMP T-12	F41EL	32	0.0	SW	3285	105.1	1	4' 1-LAMP T-12	F41EL	32	0.0	OCC	1825	58.4	46.7	0.0	$7.01	$118.75	$20.00	16.9	14.1
204	Room - 306	1	S 96 P F 2 (MAG) 8'	F82EHE	207	0.2	SW	3285	680.0	1	S 96 P F 2 (MAG) 8'	F82EHE	207	0.2	OCC	1825	377.8	302.2	0.0	$45.33	$118.75	$20.00	2.6	2.2
175A	Office Room - 305	7	4' 2-LAMP T-8 (32W)	F42ILL	32	0.2	SW	8760	1,962.2	7	4' 2-LAMP T-8 (32W)	F42ILL	32	0.2	None	8760	1,962.2	0.0	0.0	$0.00	$0.00	$0.00		
111A	Office Room - 305	3	4' 1-LAMP T-12	F41EL	32	0.1	SW	8760	841.0	3	4' 1-LAMP T-12	F41EL	32	0.1	None	8760	841.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Room - 304	12	4' 2-LAMP T-12	F42EL	60	0.7	SW	500	360.0	12	4' 2-LAMP T-12	F42EL	60	0.7	None	500	360.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Room - 303	33	4' 2-LAMP T-12	F42EL	60	2.0	SW	2125	4,207.5	33	4' 2-LAMP T-12	F42EL	60	2.0	OCC	1000	1,980.0	2,227.5	0.0	$334.13	$118.75	$0.00	0.4	0.4
192A	Room - 303B	1	8' 4-LAMP T-12	F84EHE	414	0.4	SW	500	207.0	1	8' 4-LAMP T-12	F84EHE	414	0.4	None	500	207.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Room - 303A	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	2000	480.0	4	4' 2-LAMP T-12	F42EL	60	0.2	OCC	1000	240.0	240.0	0.0	$36.00	$118.75	$0.00	3.3	3.3
111A	Room - 301B	7	4' 1-LAMP T-12	F41EL	32	0.2	SW	2000	448.0	7	4' 1-LAMP T-12	F41EL	32	0.2	None	2000	448.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Room - 301	33	4' 2-LAMP T-12	F42EL	60	2.0	SW	500	990.0	33	4' 2-LAMP T-12	F42EL	60	2.0	None	500	990.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Classroom - 302	24	4' 2-LAMP T-12	F42EL	60	1.4	SW	8760	12,614.4	24	4' 2-LAMP T-12	F42EL	60	1.4	OCC	2000	2,880.0	9,734.4	0.0	$1,460.16	$118.75	$20.00	0.1	0.1
162A	Room - 302B	12	4' 4-LAMP T-12	F44EL	120	1.4	SW	500	720.0	12	4' 4-LAMP T-12	F44EL	120	1.4	None	500	720.0	0.0	0.0	$0.00	$0.00	$0.00		
227	Room - 302C	3	W60CF1	F81EL	60	0.2	SW	500	90.0	3	W60CF1	F81EL	60	0.2	None	500	90.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Room - 302A	8	4' 2-LAMP T-12	F42EL	60	0.5	SW	8760	4,204.8	8	4' 2-LAMP T-12	F42EL	60	0.5	OCC	2000	960.0	3,244.8	0.0	$486.72	$118.75	$0.00	0.2	0.2
11A	Room - 300	24	4' 2-LAMP T-12	F42EL	60	1.4	SW	2000	2,880.0	24	4' 2-LAMP T-12	F42EL	60	1.4	None	2000	2,880.0	0.0	0.0	$0.00	$0.00	$0.00		
11A	Room - 300A	8	4' 2-LAMP T-12	F42EL	60	0.5	SW	8760	4,204.8	8	4' 2-LAMP T-12	F42EL	60	0.5	None	8760	4,204.8	0.0	0.0	$0.00	$0.00	$0.00		
11A	3rd Floor Men's Bathroom	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	2000	480.0	4	4' 2-LAMP T-12	F42EL	60	0.2	OCC	1000	240.0	240.0	0.0	$36.00	$118.75	$20.00	3.3	2.7
11A	3rd Floor Women's Bathroom	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	4380	1,051.2	4	4' 2-LAMP T-12	F42EL	60	0.2	OCC	2000	480.0	571.2	0.0	$85.68	$118.75	$20.00	1.4	1.2
146	Exterior	11	High Bay MH 400	MH400/1	458	5.0	SW	4380	22,066.4	11	High Bay MH 400	MH400/1	458	5.0	C-OCC	2000	10,076.0	11,990.4	0.0	$1,798.57	$202.50	$35.00	0.1	0.1
143	Exterior	2	HPS 100 POLE	HPS100/1	138	0.3	SW	4380	1,208.9	2	HPS 100 POLE	HPS100/1	138	0.3	OCC	2000	552.0	656.9	0.0	$98.53	$118.75	$20.00	1.2	1.0
	Total	**641**				**45.6**			**120,182**	**641**				**46**			**79,777**	**40,400**	**0**	**$6,100**	**$5,100**	**695**		
																		Demand Savings		**0.0**	**$0**			
																		kWh Savings		**40,400**	**$6,060**			
																		Total Savings			**$6,060**		**0.8**	**0.7**

Energy Audit of Camden County College (Taft Hall)

CHA Project No. 24364

ECM-6 Lighting Replacements with Occupancy Sensors

Cost of Electricity: **$0.150 $/kWh**

$6.00 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	NYSERDA Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
Field Code	Unique description of the location - Room number//Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
11A	1st Floor Hallway	20	4' 2-LAMP T-12	F42EL	60	1.2	SW	2500	3,000	20	F32T8	F42ILL-R	52	1.0	OCC	1,200	2,600	400	0.2	$ 71.52	$ 5,000.00	$ -	69.9	69.9
11A	1st Floor Men's Bathroom	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	2500	600	4	F32T8	F42ILL-R	52	0.2	None	2,500	520	80	0.0	$ 14.30	$ 1,000.00	$ 100	69.9	62.9
11A	1st Floor Women's Bathroom	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	2500	600	4	F32T8	F42ILL-R	52	0.2	None	2,500	520	80	0.0	$ 14.30	$ 1,000.00	$ -	69.9	69.9
11A	Classroom - 100	15	4' 2-LAMP T-12	F42EL	60	0.9	SW	2125	1,913	15	F32T8	F42ILL-R	52	0.8	C-OCC	1,200	936	977	0.1	$ 155.12	$ 3,952.50	$ 35	25.5	25.3
11A	Office Room - 101	6	4' 2-LAMP T-12	F42EL	60	0.4	SW	2125	765	6	F32T8	F42ILL-R	52	0.3	C-OCC	1,200	374	391	0.0	$ 62.05	$ 1,500.00	$ -	24.2	24.2
162A	Office Room - 101A	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	2125	255	1	F28T8	F44SSILL-R	86	0.1	C-OCC	1,200	103	152	0.0	$ 25.22	$ -	$ 25	0.0	-1.0
162A	Office Room - 101B	1	4' 4-LAMP T-12	F44EL	120	0.1	SW	2500	300	1	F28T8	F44SSILL-R	86	0.1	None	2,500	215	85	0.0	$ 15.20	$ -	$ 25	0.0	-1.6
35A	Office Room - 101C	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1	SW	2125	136	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1,200	214	(78)	(0.1)	$ (19.85)	$ 118.75	$ 20		
35A	Office Room - 101D	2	4' 3-LAMP T-8 (32W)	F43ILL	32	0.1	SW	2125	136	2	4' 3-LAMP T-8 (32W)	F43ILL	89	0.2	OCC	1,200	214	(78)	(0.1)	$ (19.85)	$ 118.75	$ 70		
11A	Office Room - 101E	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	255	2	F32T8	F42ILL-R	52	0.1	OCC	1,200	125	130	0.0	$ 20.68	$ 618.75	$ 20	29.9	29.0
11A	Office Room - 101F	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2250	135	1	F32T8	F42ILL-R	52	0.1	C-OCC	1,000	52	83	0.0	$ 13.03	$ 452.50	$ 35	34.7	32.1
71	Toilet Room	1	I 60	I60/1	60	0.1	SW	2250	135	1	CF 26	CFQ26/1-L	27	0.0	C-OCC	1,000	27	108	0.0	$ 18.58	$ 243.00	$ 35	13.1	11.2
41A	Closet	1	4' 1-LAMP T-8 (32W)	F41ILL	32	0.0	SW	2125	68	1	4' 1-LAMP T-8 (32W)	F41ILL	31	0.0	OCC	1,200	37	31	0.0	$ 4.69	$ 118.75	$ 20	25.3	21.0
11A	Classroom - 102	15	4' 2-LAMP T-12	F42EL	60	0.9	SW	2125	1,913	15	F32T8	F42ILL-R	52	0.8	OCC	1,200	936	977	0.1	$ 155.12	$ 3,868.75	$ 20	24.9	24.8
11A	Faculty Lounge - 103	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	2125	510	4	F32T8	F42ILL-R	52	0.2	OCC	1,200	250	260	0.0	$ 41.36	$ 1,118.75	$ 20	27.0	26.6
11A	Faculty Men's Bathroom	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2000	120	1	F32T8	F42ILL-R	52	0.1	OCC	1,000	52	68	0.0	$ 10.78	$ 368.75	$ -	34.2	34.2
11A	Faculty Women's Bathroom	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	128	1	F32T8	F42ILL-R	52	0.1	OCC	1,200	62	65	0.0	$ 10.34	$ 368.75	$ 20	35.7	33.7
162A	Room - 104A	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	OCC	1,200	206	304	0.1	$ 50.44	$ 118.75	$ 20	2.4	2.0
162A	Room - 104A (inside)	4	4' 4-LAMP T-12	F44EL	120	0.5	SW	2125	1,020	4	F28T8	F44SSILL-R	86	0.3	OCC	1,200	413	607	0.1	$ 100.87	$ 118.75	$ 20	1.2	1.0
162A	Room - 104B	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	OCC	1,200	206	304	0.1	$ 50.44	$ 118.75	$ 20	2.4	2.0
162A	Room - 104B (inside)	4	4' 4-LAMP T-12	F44EL	120	0.5	SW	2125	1,020	4	F28T8	F44SSILL-R	86	0.3	OCC	1,200	413	607	0.1	$ 100.87	$ 118.75	$ 20	1.2	1.0
11A	Office Room - 105	6	4' 2-LAMP T-12	F42EL	60	0.4	SW	2125	765	6	F32T8	F42ILL-R	52	0.3	OCC	1,200	374	391	0.0	$ 62.05	$ 1,618.75	$ 150	26.1	23.7
11A	Classroom - 106	15	4' 2-LAMP T-12	F42EL	60	0.9	SW	2125	1,913	15	F32T8	F42ILL-R	52	0.8	OCC	1,200	936	977	0.1	$ 155.12	$ 3,868.75	$ 20	24.9	24.8
11A	Classroom - 108	15	4' 2-LAMP T-12	F42EL	60	0.9	SW	2125	1,913	15	F32T8	F42ILL-R	52	0.8	OCC	1,200	936	977	0.1	$ 155.12	$ 3,868.75	$ 20	24.9	24.8
11A	Classroom - 110	15	4' 2-LAMP T-12	F42EL	60	0.9	SW	2500	2,250	15	F32T8	F42ILL-R	52	0.8	None	2,500	1,950	300	0.1	$ 53.64	$ 3,750.00	$ -	69.9	69.9
111A	Mechanical Room - 109	18	4' 1-LAMP T-12	F41EL	32	0.6	SW	2125	1,224	18	F28T8	F41SSILL-R	23	0.4	OCC	1,200	497	727	0.2	$ 120.74	$ 118.75	$ 20	1.0	0.8
162A	Office Room - 105A	3	4' 4-LAMP T-12	F44EL	120	0.4	SW	2125	765	3	F28T8	F44SSILL-R	86	0.3	OCC	1,000	258	507	0.1	$ 83.39	$ 118.75	$ 20	1.4	1.2
11A	Office Room - 105B	6	4' 2-LAMP T-12	F42EL	60	0.4	SW	500	180	6	F32T8	F42ILL-R	52	0.3	None	500	156	24	0.0	$ 7.06	$ 1,500.00	$ 150	212.6	191.3
11A	Office Room - 105C	9	4' 2-LAMP T-12	F42EL	60	0.5	SW	2125	1,148	9	F32T8	F42ILL-R	52	0.5	OCC	1,200	562	586	0.1	$ 93.07	$ 2,368.75	$ 20	25.5	25.2
162A	Office Room - 105D	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2500	600	2	F28T8	F44SSILL-R	86	0.2	None	2,500	430	170	0.1	$ 30.40	$ -	$ -	0.0	0.0
111A	1st Floor Janitor Closet	1	4' 1-LAMP T-12	F41EL	32	0.0	SW	2500	80	1	F28T8	F41SSILL-R	23	0.0	None	2,500	58	23	0.0	$ 4.02	$ -	$ 25	0.0	-6.2
162A	Office Room - 112	6	4' 4-LAMP T-12	F44EL	120	0.7	SW	2500	1,800	6	F28T8	F44SSILL-R	86	0.5	None	2,500	1,290	510	0.2	$ 91.19	$ -	$ 150	0.0	-1.6
11A	South Stair Tower	5	4' 2-LAMP T-12	F42EL	60	0.3	SW	2125	638	5	F32T8	F42ILL-R	52	0.3	OCC	1,200	312	326	0.0	$ 51.71	$ 1,368.75	$ -	26.5	26.5
11A	North Stair Tower	5	4' 2-LAMP T-12	F42EL	60	0.3	SW	1062.5	319	5	F32T8	F42ILL-R	52	0.3	None	1,063	276	43	0.0	$ 9.26	$ 1,250.00	$ -	135.1	135.1
11A	2nd Floor Corridor	20	4' 2-LAMP T-12	F42EL	60	1.2	SW	2125	2,550	20	F32T8	F42ILL-R	52	1.0	OCC	1,200	1,248	1,302	0.2	$ 206.82	$ 5,118.75	$ 20	24.7	24.7
162A	2nd Floor Handicap Toilet	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	1062.5	255	2	F28T8	F44SSILL-R	86	0.2	None	1,063	183	72	0.1	$ 15.73	$ -	$ -	0.0	0.0
11A	Classroom - 206	12	4' 2-LAMP T-12	F42EL	60	0.7	SW	1062.5	765	12	F32T8	F42ILL-R	52	0.6	None	1,063	663	102	0.1	$ 22.21	$ 3,000.00	$ -	135.1	135.1
11A	Closet - 206	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	128	1	F32T8	F42ILL-R	52	0.1	OCC	1,200	62	65	0.0	$ 10.34	$ 368.75	$ 20	35.7	33.7
11A	Office Room - 207	6	4' 2-LAMP T-12	F42EL	60	0.4	SW	500	180	6	F32T8	F42ILL-R	52	0.3	None	500	156	24	0.0	$ 7.06	$ 1,500.00	$ -	212.6	212.6
11A	Office Room - 207B	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	500	120	4	F32T8	F42ILL-R	52	0.2	None	500	104	16	0.0	$ 4.70	$ 1,000.00	$ -	212.6	212.6
11A	Office Room - 207C	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	500	120	4	F32T8	F42ILL-R	52	0.2	None	500	104	16	0.0	$ 4.70	$ 1,000.00	$ -	212.6	212.6
11A	Office Room - 207D	2	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	255	2	F32T8	F42ILL-R	52	0.1	OCC	1,200	125	130	0.0	$ 20.68	$ 618.75	$ 20	29.9	29.0
11A	Office Room - 209	3	4' 2-LAMP T-12	F42EL	60	0.2	SW	1062.5	191	3	F32T8	F42ILL-R	52	0.2	None	1,063	166	26	0.0	$ 5.55	$ 750.00	$ -	135.1	135.1
11A	Office Room - 205A	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	128	1	F32T8	F42ILL-R	52	0.1	OCC	1,200	62	65	0.0	$ 10.34	$ 368.75	$ -	35.7	35.7
11A	Office Room - 205	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	1062.5	255	4	F32T8	F42ILL-R	52	0.2	None	1,063	221	34	0.0	$ 7.40	$ 1,000.00	$ 28	135.1	131.3
162A	Classroom - 204	23	4' 4-LAMP T-12	F44EL	120	2.8	SW	2250	6,210	23	F28T8	F44SSILL-R	86	2.0	None	2,250	4,451	1,760	0.8	$ 320.23	$ -	$ -	0.0	0.0
11A	2nd Floor Wiring Closet	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2250	135	1	F32T8	F42ILL-R	52	0.1	None	2,250	117	18	0.0	$ 3.28	$ 250.00	$ -	76.3	76.3
11A	Classroom - 202	12	4' 2-LAMP T-12	F42EL	60	0.7	SW	500	360	12	F32T8	F42ILL-R	52	0.6	None	500	312	48	0.1	$ 14.11	$ 3,000.00	$ -	212.6	212.6
11A	Classroom - 203	24	4' 2-LAMP T-12	F42EL	60	1.4	SW	520	749	24	F32T8	F42ILL-R	52	1.2	None	520	649	100	0.2	$ 28.80	$ 6,000.00	$ -	208.3	208.3
11A	Closet - 203A	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	520	125	4	F32T8	F42ILL-R	52	0.2	C-OCC	390	81	44	0.0	$ 8.86	$ 1,202.50	$ 35	135.8	131.8
111A	Closet - 203B	4	4' 1-LAMP T-12	F41EL	32	0.1	SW	520	67	4	F28T8	F41SSILL-R	23	0.1	None	520	48	19	0.0	$ 5.40	$ -	$ 100	0.0	-18.5
11A	Classroom - 201	33	4' 2-LAMP T-12	F42EL	60	2.0	SW	500	990	33	F32T8	F42ILL-R	52	1.7	None	500	858	132	0.3	$ 38.81	$ 8,250.00	$ -	212.6	212.6
111A	Classroom - 203C	6	4' 1-LAMP T-12	F41EL	32	0.2	SW	4380	841	6	F28T8	F41SSILL-R	23	0.1	None	4,380	604	237	0.1	$ 39.37	$ -	$ -	0.0	0.0
111A	Room - 201B	4	4' 1-LAMP T-12	F41EL	32	0.1	SW	4380	561	4	F28T8	F41SSILL-R	23	0.1	None	4,380	403	158	0.0	$ 26.24	$ -	$ -	0.0	0.0
11A	Room - 201A	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	8760	2,102	4	F32T8	F42ILL-R	52	0.2	None	8,760	1,822	280	0.0	$ 44.35	$ 1,000.00	$ -	22.5	22.5
11A	Room - 200A	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	8760	526	1	F32T8	F42ILL-R	52	0.1	None	8,760	456	70	0.0	$ 11.09	$ 250.00	$ -	22.5	22.5
11A	Room - 200B	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	128	1	F32T8	F42ILL-R	52	0.1	OCC	1,200	62	65	0.0	$ 10.34	$ 368.75	$ 45	35.7	31.3
11A	Classroom - 200	33	4' 2-LAMP T-12	F42EL	60	2.0	SW	2125	4,208	33	F32T8	F42ILL-R	52	1.7	OCC	1,200	2,059	2,148	0.3	$ 341.25	$ 8,368.75	$ 825	24.5	22.1
111A	Closet - 202A	2	4' 1-LAMP T-12	F41EL	32	0.1	SW	500	32	2	F28T8	F41SSILL-R	23	0.0	None	500	23	9	0.0	$ 2.65	$ -	$ 50	0.0	-18.9
11A	2nd Floor Women's Bathroom	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	500	120	4	F32T8	F42ILL-R	52	0.2	None	500	104	16	0.0	$ 4.70	$ 1,000.00	$ 100	212.6	191.3
11A	3rd Floor Corridor	20	4' 2-LAMP T-12	F42EL	60	1.2	SW	8760	10,512	20	F32T8	F42ILL-R	52	1.0	None	8,760	9,110	1,402	0.2	$ 221.76	$ 5,000.00	$ 500	22.5	20.3
11A	Room - 307	5	4' 2-LAMP T-12	F42EL	60	0.3	SW	500	150	5	F32T8	F42ILL-R	52	0.3	None	500	130	20	0.0	$ 5.88	$ 1,250.00	$ 125	212.6	191.3
111A	Custodial Closet	1	4' 1-LAMP T-12	F41EL	32	0.0	SW	3285	105	1	F28T8	F41SSILL-R	23	0.0	OCC	1,825	42	63	0.0	$ 10.12	$ 118.75	$ 45	11.7	7.3
204	Room - 306	1	S 96 P F 2 (MAG) 8'	F82EHE	207	0.2	SW	3285	680	1	S 96 P F 2 (MAG) 8'	F82EHE	207	0.2	OCC	1,825	378	302	0.0	$ 45.33	$ 118.75	$ 45	2.6	1.6
175A	Office Room - 305	7	4' 2-LAMP T-8 (32W)	F42ILL	32	0.2	SW	8760	1,962	7	4' 2-LAMP T-8	F42ILL	59	0.4	None	8,760	3,618	(1,656)	(0.2)	$ (261.95)	$ -	$ 175		
111A	Office Room - 305	3	4' 1-LAMP T-12	F41EL	32	0.1	SW	8760	841	3	F28T8	F41SSILL-R	23	0.1	None	8,760	604	237	0.0	$ 37.42	$ -	$ -	0.0	0.0
11A	Room - 304	12	4' 2-LAMP T-12	F42EL	60	0.7	SW	500	360	12	F32T8	F42ILL-R	52	0.6	None	500	312	48	0.1	$ 14.11	$ 3,000.00	$ 300	212.6	191.3
11A	Room - 303	33	4' 2-LAMP T-12	F42EL	60	2.0	SW	2125	4,208	33	F32T8	F42ILL-R	52	1.7	OCC	1,000	1,716	2,492	0.3	$ 392.73	$ 8,368.75	$ 825	21.3	19.2
192A	Room - 303B	1	8' 4-LAMP T-12	F84EHE	414	0.4	SW	500	207	1	8' 4-LAMP T-12	F84EHE	414	0.4	None	500	207	-	0.0	$ -	$ -	$ 25		
11A	Room - 303A	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	2000	480	4	F32T8	F42ILL-R	52	0.2	OCC	1,000	208	272	0.0	$ 43.10	$ 1,118.75	$ 100	26.0	23.6
111A	Room - 301B	7	4' 1-LAMP T-12	F41EL	32	0.2	SW	2000	448	7	F28T8	F41SSILL-R	23	0.2	None	2,000	322	126	0.1	$ 23.44	$ -	$ 175	0.0	-7.5
11A	Room - 301	33	4' 2-LAMP T-12	F42EL	60	2.0	SW	500	990	33	F32T8	F42ILL-R	52	1.7	None	500	858	132	0.3	$ 38.81	$ 8,250.00	$ 825	212.6	191.3
11A	Classroom - 302	24	4' 2-LAMP T-12	F42EL	60	1.4	SW	8760	12,614	24	F32T8	F42ILL-R	52	1.2	OCC	2,000	2,496	10,118	0.2	$ 1,531.58	$ 6,118.75	$ 620	4.0	3.6
162A	Room - 302B	12	4' 4-LAMP T-12	F44EL	120	1.4	SW	500	720	12	F28T8	F44SSILL-R	86	1.0	None	500	516	204	0.4	$ 59.98	$ -	$ 300	0.0	-5.0
227	Room - 302C	3	W60CF1	F81EL	60	0.2	SW	500	90	3	CF42W	CF42/1-L	48	0.1	None	500	72	18	0.0	$ 5.29	$ 607.50	$ 75	114.8	100.6
11A	Room - 302A	8	4' 2-LAMP T-12	F42EL	60	0.5	SW	8760	4,205	8	F32T8	F42ILL-R	52	0.4	OCC	2,000	832	3,373	0.1	$ 510.53	$ 2,118.75	$ 200	4.2	3.8
11A	Room - 300	24	4' 2-LAMP T-12	F42EL	60	1.4	SW	2000	2,880	24	F32T8	F42ILL-R	52	1.2	None	2,000	2,496	384	0.2	$ 71.42	$ 6,000.00	$ 600	84.0	75.6
11A	Room - 300A	8	4' 2-LAMP T-12	F42EL	60	0.5	SW	8760	4,205	8	F32T8	F42ILL-R	52	0.4	None	8,760	3,644	561	0.1	$ 88.70	$ 2,000.00	$ 200	22.5	20.3
11A	3rd Floor Men's Bathroom	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	2000	480	4	F32T8	F42ILL-R	52	0.2	OCC	1,000	208	272	0.0	$ 43.10	$ 1,118.75	$ 120	26.0	23.2
11A	3rd Floor Women's Bathroom	4	4' 2-LAMP T-12	F42EL	60	0.2	SW	4380	1,051	4	F32T8	F42ILL-R	52	0.2	OCC	2,000	416	635	0.0	$ 97.58	$ 1,118.75	$ 120	11.5	10.2
146	Exterior	11	High Bay MH 400	MH400/1	458	5.0	SW	4380	22,066	11	P 54 C F 4	FC20	20	0.2	C-OCC	2,000	440	21,626	4.8	$ 3,590.86	$ 202.50	$ 310	0.1	0.0
143	Exterior	2	HPS 100 POLE	HPS100/1	138	0.3	SW	4380	1,209	2	EXLED39	FXLED39/1	39	0.1	OCC	2,000	156	1,053	0.2	$ 172.19	$ 348.25	$ 70	2.0	1.6
	Total	**641**				**45.6**			**120,182**	**641**				**34.4**				**60,435**	**59,700**	**11.2**	**$9,800**	**131,400**	**8,098**		
																		Demand Savings		**11.2**	**$807**			
																		kWh Savings		**59,700**	**$8,955**			
																		Total Savings			**$9,762**		**13.5**	**12.6**

APPENDIX D

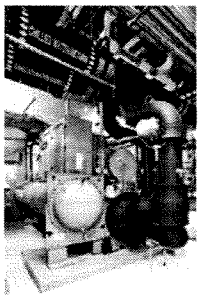
New Jersey Pay For Performance Incentive Program

Pay for Performance - Existing Buildings

Download program applications and incentive forms.

The Greater the Savings, the Greater Your Incentives

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



Eligibility

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

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

ENERGY STAR Portfolio Manager

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

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

Incentives

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

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

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

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

CONTACT US

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

Energy Efficiency Revolving Loan Fund (EE RLF)

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

Steps to Participation

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

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

New Jersey SmartStart BUILDINGS®

BPU

2012 PAY FOR PERFORMANCE PROGRAM
Existing Buildings Incentive Structure

Incentive #1: Energy Reduction Plan

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

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

Incentive #2: Installation of Recommended Measures

Minimum Performance Target: 15%

Electric Incentives

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

Gas Incentives

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

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

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

Incentive #3: Post-Construction Benchmarking Report

Minimum Performance Target: 15%

Electric Incentives

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

Gas Incentives

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

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

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

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

New Jersey Pay For Performance Incentive Program

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

Total Building Area (Square Feet)	42,400
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)	$207,340	$4,739
Existing Usage (from utility)	990,071	14,034
Proposed Savings	469,448	-460
Existing Total MMBtus	4,783	
Proposed Savings MMBtus	1,556	
% Energy Reduction	**32.5%**	
Proposed Annual Savings	$62,280	

	Min (Savings = 15%)		Increase (Savings > 15%)		Max Incentive		Achieved Incentive	
	$/kWh	$/therm	$/kWh	$/therm	$/kWh	$/therm	$/kWh	$/therm
Incentive #2	$0.09	$0.90	$0.005	$0.05	$0.11	$1.25	$0.11	$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	$4,240
Incentive #2	$51,639	$0	$51,639
Incentive #3	$51,639	$0	$51,639
Total All Incentives	**$103,279**	**$0**	**$107,519**

Total Project Cost	$360,900

		Allowable Incentive
% Incentives #1 of Utility Cost*	2.0%	$4,240
% Incentives #2 of Project Cost**	14.3%	$51,639
% Incentives #3 of Project Cost**	14.3%	$51,639
Total Eligible Incentives***	**$107,519**	
Project Cost w/ Incentives	$253,381	

Project Payback (years)	
w/o Incentives	w/ Incentives
5.8	4.1

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

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

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

APPENDIX E

Energy Savings Improvement Plan (ESIP)

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

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

Home » Commercial & Industrial » Programs

Energy Savings Improvement Plan

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

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

- Local Government
- School Districts (K-12)

The Board also adopted protocols to measure energy savings.

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

FIRST STEP – ENERGY AUDIT

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

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

ENERGY REDUCTION PLANS

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

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

Program Updates

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

Other updates posted.

APPENDIX F

Solar Photovoltaic Analysis

Camden County College
Taft Hall

Cost of Electricity	$0.131	/kWh
Electricity Usage	990,071	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*
1,199 m2
12,907 ft2

Perimeter Output*
164 m
536 ft

Available Roof Space for PV:
(Area Output - 10 ft x Perimeter) x 85%
6,411 ft2

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

8	watt/ft2	
51,291	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	990,071	(from utilities)
PV Generation	63,889	(generated using PV Watts)
% offset	6%	

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

AC Energy & Cost Savings

Cautions for Interpreting the Results

Taft Hall (Camden County College)

Station Identification

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

PV System Specifications

DC Rating:	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
Taft Hall

Building ID: 3251861
For 12-month Period Ending: April 30, 2012[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: November 08, 2012

Facility
Taft Hall
College Drive
Blackwood, NJ 08012

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1973
Gross Floor Area (ft²): 42,387

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

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	2,623,692
Natural Gas (kBtu)[4]	749,414
Total Energy (kBtu)	3,373,106

Energy Intensity[4]

Site (kBtu/ft²/yr)	80
Source (kBtu/ft²/yr)	225

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	411

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

National Median Comparison

National Median Site EUI	104
National Median Source EUI	244
% Difference from National Median Source EUI	-8%
Building Type	College/University (Campus-Level)

Stamp of Certifying Professional

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

Certifying Professional
N/A

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

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

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

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Taft Hall	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	College/University (Campus-Level)	Is this an accurate description of the space in question?		☐
Location	College Drive, Blackwood, NJ 08012	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of a hospital, k-12 school, hotel and senior care facility) nor can they be submitted as representing only a portion of a building.		☐
Building (Other)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	42,387 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	57,092.57
02/26/2012	03/25/2012	55,597.10
01/26/2012	02/25/2012	63,288.46
12/26/2011	01/25/2012	54,294.43
11/26/2011	12/25/2011	55,815.16
10/26/2011	11/25/2011	60,990.09
09/26/2011	10/25/2011	58,665.03
08/26/2011	09/25/2011	76,360.12
07/26/2011	08/25/2011	73,314.83
06/26/2011	07/25/2011	77,534.73
05/26/2011	06/25/2011	73,239.26
83431473 Consumption (kWh (thousand Watt-hours))		**706,191.78**
83431473 Consumption (kBtu (thousand Btu))		**2,409,526.35**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**2,409,526.35**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

Meter: 461792 and 555971 (therms)
Space(s): Entire Facility

Start Date	End Date	Energy Use (therms)
03/24/2012	04/23/2012	473.80
02/24/2012	03/23/2012	1,339.00
01/24/2012	02/23/2012	1,611.48
12/24/2011	01/23/2012	2,094.96
11/24/2011	12/23/2011	1,207.14
10/24/2011	11/23/2011	267.54
09/24/2011	10/23/2011	0.00
08/24/2011	09/23/2011	30.99
07/24/2011	08/23/2011	7.29
06/24/2011	07/23/2011	0.00
05/24/2011	06/23/2011	8.30

461792 and 555971 Consumption (therms)	**7,040.50**
461792 and 555971 Consumption (kBtu (thousand Btu))	**704,050.00**
Total Natural Gas Consumption (kBtu (thousand Btu))	**704,050.00**
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
Taft Hall
College Drive
Blackwood, NJ 08012

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Taft Hall	
Gross Floor Area Excluding Parking: (ft^2)	42,387
Year Built	1973
For 12-month Evaluation Period Ending Date:	April 30, 2012

Facility Space Use Summary

Building	
Space Type	Other - College/University (Campus-Level)
Gross Floor Area (ft^2)	42,387
Number of PCs °	N/A
Weekly operating hours °	N/A
Workers on Main Shift °	N/A

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 04/30/2012)	**Baseline** (Ending Date 04/30/2012)	**Rating of 75**	**Target**	**National Median**
Energy Performance Rating	N/A	N/A	75	N/A	N/A
Energy Intensity					
Site (kBtu/ft²)	80	80	0	N/A	104
Source (kBtu/ft²)	225	225	0	N/A	244
Energy Cost					
$/year	$ 91,392.16	$ 91,392.16	N/A	N/A	$ 119,436.85
$/ft²/year	$ 2.16	$ 2.16	N/A	N/A	$ 2.82
Greenhouse Gas Emissions					
$MtCO_2e$/year	411	411	0	N/A	537
$kgCO_2e/ft^2$/year	10	10	0	N/A	13

More than 50% of your building is defined as College/University (Campus-Level). This building is currently ineligible for a rating. Please note the National Median column represents the CBECS national median data for College/University (Campus-Level). This building uses 8% less energy per square foot than the CBECS national median for College/University (Campus-Level).

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