CAMDEN COUNTY COLLEGE
LASER BUILDING
ENERGY ASSESSMENT

for

NEW JERSEY
BOARD OF PUBLIC UTILITIES

CHA PROJECT NO. 24364

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REPORT DISCLAIMER

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

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

1.0 EXECUTIVE SUMMARY

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

Building Name	Address	Square Feet	Construction Date
Camden County College Laser Building	200 College Drive Building 23 Blackwood, New Jersey	10,000	Original: 1989

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 $2,900 for the recommended ECMs may be realized with a payback of 1.1 years. A summary of the costs, savings, and paybacks for the recommended ECMs follows:

Summary of Energy Conservation Measures							
Energy Conservation Measure		Approx. Costs ($)	Approx. Savings ($/year)	Payback (Years) w/o Incentive	Potential Incentive ($)*	Payback (Years) w/ Incentive	Recommended For Implementation
ECM-1	HVAC Condensing Boilers Addition	86,600	100	>20	3,000	>20	
2	Lighting Replacement Upgrades	2,500	2,300	1.1	1,000	0.6	X
3	Install Lighting Controls (Occupancy Sensors)	1,100	1,100	1.0	500	0.6	X
4	Lighting Replacements with Lighting Controls (Occupancy Sensors)	3,100	2,900	1.1	1,500	0.5	X

2.0 INTRODUCTION AND BACKGROUND

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

The Laser Building located on the Camden County College campus in Blackwood, NJ, is a 10,000 square foot single story steel and masonry structure with brick veneer. The building contains laboratories, classrooms, administrative offices and other support areas. HVAC units are located on the roof, a single boiler is in a mechanical room and an air cooled chiller is on grade behind the building. The building was constructed in 1989. Occupancy includes approximately XXX students and XX 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 1989, the Criminal Justice Building is a 10,000 square foot single story block foot single story steel and masonry structure containing laser/photonics and optics laboratories, classrooms, administrative offices, a lounge and other support areas. The main entrance has store front glass doors in metal frames that open into a lobby on the north side of the building.

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

The building is constructed of steel framing with masonry walls and brick veneer with an air space between. Insulation is incorporated into the wall assembly for an improved envelope. The majority of the interior walls are painted block or concrete walls; 3-5/8" metal studs filled with fiberglass insulation finished with gypsum board are used renovated or reconfigured areas. The flat roof system is comprised of a structural steel framing with a metal deck having rigid foam board insulation. The rooftop has a light-colored EPDM roof membrane system. Windows are minimal where used in exterior walls (<20% on walls where used), and are double pane set in metal frames with tint. The main entrance in the north façade of the building has glass block walls on either side of the doors. The building has exposed walls facing the north, east, south and west directions, with a mostly uniform one story height of approximately 14' (see photo above). The first floor areas all have concrete slab-on-grade floors.

3.2 Utility Usage

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

The campus has one main electric meter. There was no installed sub-metering for this building from the main meter, therefore the following usage and costs rates were determined from square footage of the building. From June 2011 through April 2012, the electric usage for the facility was 97,379 kWh at a cost of $12,357. Review of electricity bills during this period showed that the electricity was charged at the following rates: supply unit consumption cost of $0.119 per kWh; demand unit cost of $5.94 per kW; and blended unit cost of $0.131 per kWh. From June 2011 through April 2012, the facility had a maximum electricity demand of 34 kW. Electrical usage was generally higher in the summer months when air conditioning equipment was operational.

The facility has one natural gas meter. From July 2011 through May 2012, gas-fired equipment consumed 859 therms of natural gas. Based on the annual cost of $4,189, the blended price for natural gas was $0.80 per therm. Natural gas consumption was highest in winter months for heating.

The delivery component of the electric and natural gas bills will always be the responsibility of the utility that connects the facility to the power grid or gas line; however, the supply can be purchased from a third party; as is currently the case with electricity and natural gas. The electricity or natural gas commodity supply entity will require submission of one to three years of past energy bills. Contract terms can vary among suppliers. According to the U.S. Energy Information Administration, the average commercial unit costs of electricity and natural gas in New Jersey during the same periods as those noted above was $0.141 per kWh and $0.959 per therm. The electrical supply rate charged by ACE for the 12 month period from June 2011 through April 2012 resulted in greater cost to the school district than having Hess supply (see table below). When compared to the average state values, it is recommended that the present natural gas be maintained and the present electricity supply rate charge be monitored and checked monthly.

Main Electric Meter Supply Costs – Atlantic City Electric vs. Hess

Month	ACE Supply Costs (For Comparison)	Hess Supply Costs (Actual)
June-11	$56,524	$0.00
July-11	$59,840	$65,404.53
August-11	$56,583	$61,844.82
September-11	$71,502	$64,413.68
October-11	$54,932	$49,486.97
November-11	$57,110	$51,448.28
December-11	$52,264	$47,082.95
January-12	$50,542	$45,800.14
February-12	$58,915	$53,387.07
March-12	$51,755	$46,899.02
April-12	$53,147	$48,160.52
Total	**$623,112.69**	**$533,927.98**
Extra Savings of using Hess for Electric Supply	$89,184.71	

A list of approved electrical and natural gas energy commodity suppliers can be found in Appendix A.

3.3 HVAC Systems

The systems and equipment described below serve the Laser building. Specifics on the mechanical equipment can be found within the equipment inventory located in Appendix B.

3.3.1 Cooling Chilled Water System

One Multistack air cooled packaged chiller with digital scroll compressors and factory control panel was installed in 1989, and is located outside behind the building. The chilled water system operates from May until September, and the chiller is shut down during the fall and winter.

The chiller is piped to a primary loop pumping system with two 7.5 HP pumps that operate in lead-lag located in the first floor mechanical room. The primary pumps are constant volume with standard efficiency motors. Chilled water is provided to the fan coil units located throughout the building. Chilled water system piping and valves appear to be insulated.

3.3.2 Heating Hot Water System

The building is heated with hot water supplied by a Weil McLain cast iron sectional, gas-fired boiler with factory gas burner and controls. The boiler was installed in 1989 and is located in the first floor mechanical room. The hot water system operates from October until April, and the boiler is shut down during the summer. The boiler is piped to a primary loop pumping system with two 3.0 HP pumps that operate in lead-lag. The pumps are constant volume with standard efficiency motors. Hot water is provided to the air handling units, the makeup air unit and fan coil units throughout the building. Hot water system piping and valves appear to be insulated.

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

Rooms and spaces throughout the building are cooled and heated by 20 horizontal ceiling mounted fan coil units (FCUs). It is not clear how outside air is provided, and record design drawings were not found during the site inspection. It is assumed certain fan coil units have ducted outside air to provide ventilation to the spaces; chilled water coils provide cooling, and hot water coils provide heating. Fan coil units are controlled by individual wall mounted thermostats in each space.

3.3.4 Exhaust Systems

E Constant volume exhaust fans laser labs. Exhaust fans are also used for restrooms and custodial closets in the building.

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

3.4 Control Systems

The building contains a mixture of Johnson pneumatic and electronic standalone controls for the hot water system boilers/pumps, fan coil units and unit ventilators; each of the three RTUs serving the building is controlled by a standalone 24V programmable thermostat.

3.5 Lighting/Electrical Systems

The facility primarily utilizes fixtures with T-12 40 watt bulbs with magnetic ballasts and 60 watt older style incandescent bulbs are also used in select areas. The primary type of control for the lights is switches manually turned off at the end of the day.

The exterior lighting consists of 100 watt high pressure sodium fixtures, 200 watt high pressure sodium light fixtures, and 200 watt metal halide fixtures. All of the exterior lighting is wall mounted to the exterior building walls.

3.6 Plumbing Systems

3.6.1 Domestic Hot Water System

The mechanical room contains one 75 gallon State standard efficiency natural gas hot water heater installed in 1989. This serves the entire Laser Building. Hot water is provided to certain labs, toilets, a lounge, etc., and the majority of hot water piping appears to be insulated. Hot water demand is very low due to the size and function of the building. Domestic hot water temperature is maintained at 130°F, and chemical disinfection soap is provided at the toilet rooms.

3.6.2 Plumbing Fixtures

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

4.0 ENERGY CONSERVATION MEASURES

4.1 ECM-1 HVAC Condensing Boiler Addition

The Laser Building is heated with hot water supplied by one Weil McLain cast iron sectional gas fired boilers from 1989. The boiler is non-condensing and has an estimated efficiency of 83%.

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

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

Natural gas-fired boilers have an expected life of 25 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 2,500 therms and $2,000.

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

ECM-1 HVAC Condensing Boilers Addition

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
86,600	0	0	100	100	0	100	(1.0)	3,000	>20	>20

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

This measure is not recommended.

4.2 ECM-2 Lighting Replacement Upgrades

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

The existing exterior lighting system for this building consists of one 200 watt metal halide wall pack fixture, two 200 watt high pressure sodium fixtures and five 100 watt high pressure sodium 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 to120 watts per fixture. It is suggested to replace the existing metal halide wall pack fixtures on a one for one basis with LED. The reduction in per fixture wattage will result in a reduced total exterior lighting connected wattage, therefore resulting in electrical energy savings. However, maintenance savings were not calculated or included in the payback analysis below due to unknown labor rates and knowledge of existing required maintenance time.

Energy savings for this measure were calculated by applying the existing and proposed fixture wattages to estimated times of operation. The difference between energy requirements resulted in a total annual savings of 14,700 kWh with an electrical demand reduction of about 7 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 220,500 kWh and $33,900.

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

ECM-2 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
2,500	14,700	7	0	2,300	0	2,300	12.6	1,000	1.1	0.6

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

This measure is not recommended in lieu of ECM-5.

4.3 ECM-3 Lighting Controls Installation

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

Lighting controls have an expected life of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 121,500 kWh and $16,000.

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

ECM-3 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
1,100	8,100	0	0	1,100	0	1,100	13.5	500	1.0	0.6

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

This measure is not recommended in lieu of ECM-5.

4.4 ECM-4 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-3 and ECM-4 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 298,500 kWh and $43,200.

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

ECM-4 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
3,100	19,900	10	0	2,900	0	2,900	12.9	1,500	1.1	0.5

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

This measure is recommended.

4.5 System Improvement Opportunities

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

- 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 replacement and re-commissioning executed as a future facility improvment 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:

- Replace 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.

- 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

Incentives #2 and #3 can be combined to yield additive savings.

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 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 existing load justifies the use of 45 kW PV solar array; however. 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 – 45 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
$180,000	0.0	54,030	0	7,100	7,100	0	5,133	>25	14.4

* 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 Laser Building had a maximum electricity demand of 34 kW.

This measure is not recommended because the facility is not operating year round, and the building does not have back up/emergency generator power.

7.0 EPA PORTFOLIO MANAGER

The EPA Portfolio Manager benchmarking tool was used to assess the building's energy performance. Portfolio Manager provides a Site and Source Energy Use Intensity (EUI), as well as an Energy Star performance rating for qualifying building types. The EUIs are provided in kBtu/ft^2/year, and the performance rating represents how energy efficient a building is on a scale of 1 to 100, with 100 being the most efficient. In order for a building to receive and Energy Star label, the energy benchmark rating must be at least 75. As energy use decreases from implementation of the proposed ECMs, the Energy Star rating will increase.

The Site EUI is the amount of heat and electricity consumed by a building as reflected in utility bills. Site energy may be delivered to a facility in the form of primary energy, which is raw fuel burned to create heat or electricity (such as natural gas or oil), or as secondary energy, which is the product created from a raw fuel (such as electricity or district steam). Site EUI is a measure of a building's annual energy utilization per square foot. Site EUI is a good measure of a building's energy use and is utilized regularly for comparison of energy performance for similar building types.

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

To provide an equitable comparison for different buildings with varying proportions of primary and secondary energy consumption, the Portfolio Manager uses the convention of Source EUIs. The source energy also accounts for all losses incurred in production, storage, transmission, and delivery of energy to the site; which provides an equivalent measure for various types of buildings with different energy sources.

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

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

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

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

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

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

The user name ("[redacted]") and password ("[redacted]") for the building's EPA Portfolio Manager Account have been provided to Ed Carney for the Camden County College.

8.0 CONCLUSIONS & RECOMMENDATIONS

TBD

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

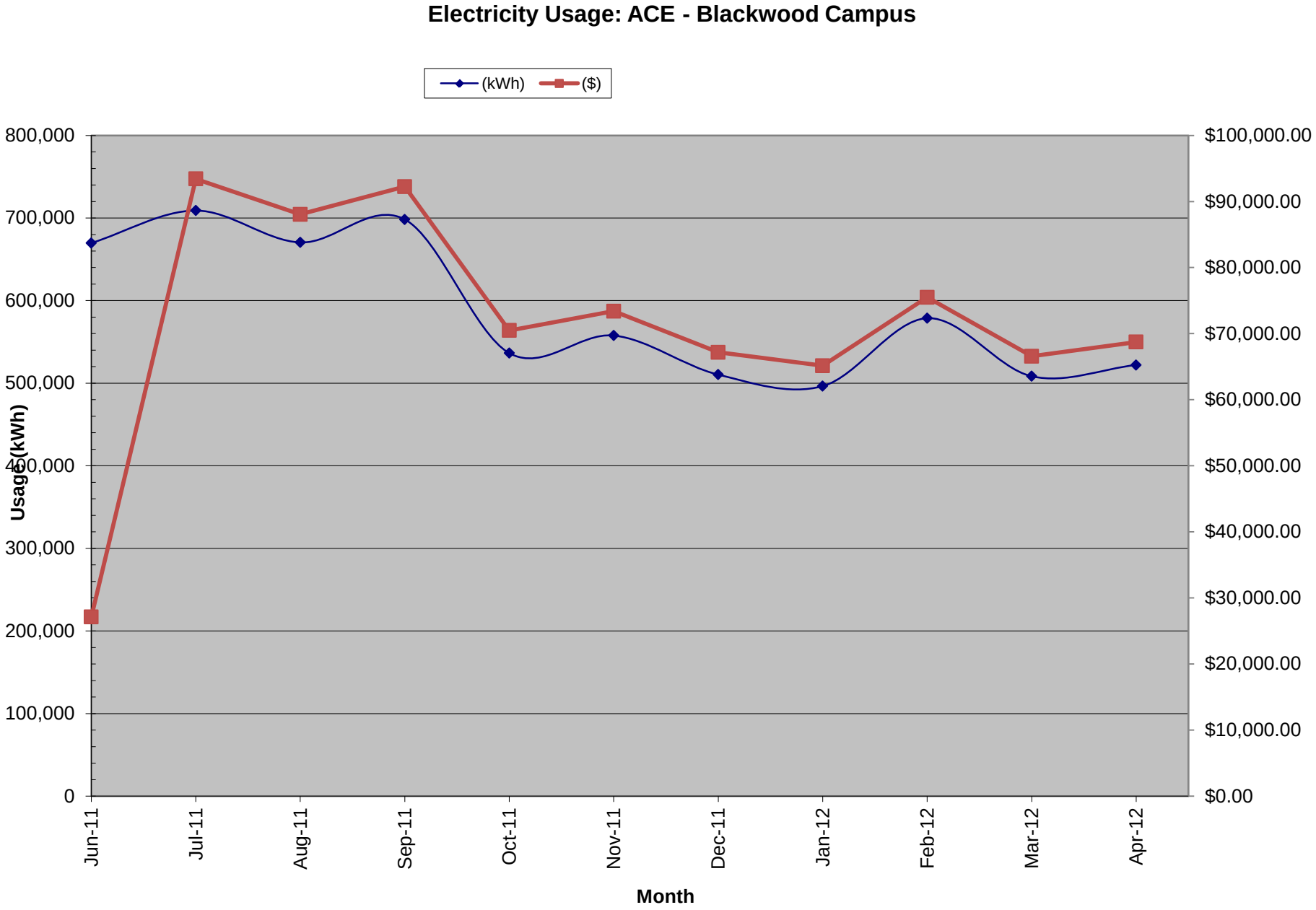
Building Name	~Electrical Consumption	Cost
Building		$ -
Taft Hall	580,947.75	$ 76,355
Truman Hall	580,947.75	$ 76,355

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
Child Care Center
Original Construction Date: 1989

Description	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size/Efficiency	Location	Areas/Equipment Served	Date Installed	Remaining Useful Life (years)	Other Info.
CH-1	1	Multistack Airstack	ASP20A-V	JC-08-40	Modular Air Cooled Chiller / Electric	365 MBH (30.4 tons) / 11.4 EER	On Grade Behind Building	Laser Building	1989	-3	Good Condition, Requires Maintenance
PP-19	1	Armstrong	U030BF Size 3x1.5x10	153018	Primary CHW Loop Pump / Electric	7.5 HP / 84% Eff. / 1750 RPM	Mechanical Room 104	Laser Building / Primary CHW System	1989	-3	Good Condition
B-1	1	Weil Mclain	PG976-WS	CP1757653	Hot Water Heating Boiler / Natural Gas	794 MBH Input / 624 MBH Output / 76% Efficiency	Mechanical Room 104	Laser Building	1989	12	Good Condition, Cast Iron Sectional
PP-13	1	Armstrong	4030BF Size 3x1.5x10	153019	Primary CHW Loop Pump / Electric	3 HP / 1730 RPM / 81.5% Eff.	Mechanical Room 104	Laser Building / Primary HW System	1989	-3	Good Condition
DWH-1	1	STATE	SBJ75155NE9F	A90113354	Domestic Hot Water Heating / Natural Gas	75 Gallon / 155,000 Btuh / 80% Eff.	Mechanical Room 104	Laser Building	1989	-11	Good Condition
FC-1 thru FC-20	20	Dunham Bush	CR4CPB CR6CPB CR8CPB CR12CPB	Various	HVAC / Chilled Water Cooling, Hot Water Heating	Various Heating and Cooling Capacities, Fractional HP fan motors	Above Ceiling of Area Served	All Areas	1989	-3	Good Condition

Energy Audit of Camden County College (Laser Building)

CHA Project No. 24364

Existing Lighting

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

$5.94 **$/kW**

		EXISTING CONDITIONS									
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Retrofit Control**	**Annual kWh**	
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	Retrofit control device	(kW/space) * (Annual Hours)	Notes
4A	Lobby	9	**2-LAMP U-TUBE T-12**	FU2SS	95	0.86	SW	2500	None	2,138	
4A	Corridor	15	**2-LAMP U-TUBE T-12**	FU2SS	95	1.43	SW	2500	None	3,563	
162A	Classroom - 102	12	**4' 4-LAMP T-12**	F44EL	120	1.44	SW	2500	None	3,600	
162A	Room - 103	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	C-OCC	510	
4A	Corridor - 112	6	**2-LAMP U-TUBE T-12**	FU2SS	95	0.57	SW	2125	C-OCC	1,211	
204	Mechanical Room	2	**S 96 P F 2 (MAG) 8'**	F82EHE	207	0.41	SW	2125	C-OCC	880	
162A	Room - 105	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2500	None	600	
162A	Room - 106	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	OCC	510	
162A	Room - 107	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	OCC	510	
71	Room - 107	1	**I 60**	I60/1	60	0.06	SW	2125	OCC	128	
162A	Room - 108	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2250	C-OCC	540	
162A	Room - 109	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2250	C-OCC	540	
162A	Room - 110	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	OCC	510	
162A	Room - 111	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	OCC	510	
162A	Room - 112	6	**4' 4-LAMP T-12**	F44EL	120	0.72	SW	2125	OCC	1,530	
71	Room - 108	1	**I 60**	I60/1	60	0.06	SW	2000	OCC	120	
71	Room - 109	1	**I 60**	I60/1	60	0.06	SW	2125	OCC	128	
71	Room - 110	1	**I 60**	I60/1	60	0.06	SW	2125	OCC	128	
71	Room - 111	1	**I 60**	I60/1	60	0.06	SW	2125	OCC	128	
204	Electrical Room	1	**S 96 P F 2 (MAG) 8'**	F82EHE	207	0.21	SW	2125	OCC	440	
162A	Room - 114	8	**4' 4-LAMP T-12**	F44EL	120	0.96	SW	2125	OCC	2,040	
162A	Room - 116	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	OCC	510	
4A	Corridor Rooms - 112 through 124	8	**2-LAMP U-TUBE T-12**	FU2SS	95	0.76	SW	2125	OCC	1,615	
162A	Room - 115	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	OCC	510	
162A	Room - 117	3	**4' 4-LAMP T-12**	F44EL	120	0.36	SW	2500	None	900	
162A	Room - 118	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	OCC	510	
162A	Room - 119	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	OCC	510	
162A	Room - 123	6	**4' 4-LAMP T-12**	F44EL	120	0.72	SW	500	None	360	
162A	Room - 124	6	**4' 4-LAMP T-12**	F44EL	120	0.72	SW	2125	OCC	1,530	
162A	Room - 122	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2500	None	600	
4A	Sitting Area	10	**2-LAMP U-TUBE T-12**	FU2SS	95	0.95	SW	2500	None	2,375	
162A	Men's Bathroom	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2500	None	600	
162A	Women's Bathroom	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	OCC	510	
71	Janitor Closet - 128	1	**I 60**	I60/1	60	0.06	SW	1063	None	64	
11A	Closet - 129	1	**4' 2-LAMP T-12**	F42EL	60	0.06	SW	2125	OCC	128	
11A	Toilet - 130	1	**4' 2-LAMP T-12**	F42EL	60	0.06	SW	1063	None	64	
162A	Room - 131	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	1063	None	255	
162A	Room - 132	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	2125	OCC	510	
162A	Room - 133	8	**4' 4-LAMP T-12**	F44EL	120	0.96	SW	500	None	480	
162A	Room - 135	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	500	None	120	
162A	Room - 136	2	**4' 4-LAMP T-12**	F44EL	120	0.24	SW	500	None	120	
4A	Corridor Rooms - 131 through 136	2	**2-LAMP U-TUBE T-12**	FU2SS	95	0.19	SW	2125	OCC	404	
143	Exterior	5	**HPS 100 POLE**	HPS100/1	138	0.69	SW	1063	None	733	
141A	Exterior	2	**HPS 200**	HPS200/1	250	0.50	SW	2125	OCC	1,063	
9A	Exterior	1	**High Bay MH 200 35 Feet High**	MH200/1	232	0.23	SW	1063	None	247	

Energy Audit of Camden County College (Laser Building)

CHA Project No. 24364

Existing Lighting

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

$5.94 **$/kW**

		EXISTING CONDITIONS									
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Retrofit Control**	**Annual kWh**	
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	Retrofit control device	(kW/space) * (Annual Hours)	Notes
	Total	**156**				**17.71**				**34,977**	

APPENDIX C

ECM Calculations

Summary of Energy Conservation Measures							
Energy Conservation Measure		**Approx. Costs ($)**	**Approx. Savings ($/year)**	**Payback (Years) w/o Incentive**	**Potential Incentive ($)***	**Payback (Years) w/ Incentive**	**Recommended For Implementation**
ECM-1	HVAC Condensing Boilers Addition	86,600	100	866.0	3,000	836.0	
ECM-2	Lighting Replacement Upgrades	2,500	2,300	1.1	1,032	0.6	X
ECM-3	Lighting Controls Installation (Occupancy Sensors)	1,100	1,100	1.0	485	0.6	X
ECM-4	Lighting Replacements with Lighting Controls (Occupancy Sensors)	3,100	2,900	1.1	1,517	0.5	X

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

ECM Summary Sheet

ECM-1 HVAC Condensing Boilers Addition

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
86,600	0	0	100	100	0	100	(1.0)	3,000	>20	>20

ECM-2 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
2,500	14,700	7	0	2,300	0	2,300	12.6	1,032	1.1	0.6

ECM-3 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
1,100	8,100	0	0	1,100	0	1,100	13.5	485	1.0	0.6

ECM-4 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
3,100	19,900	10	0	2,900	0	2,900	12.9	1,517	1.1	0.5

Camden County College Blackwood Campus- NJBPU
CHA Project #24364

Utility Costs		Yearly Usage	MTCDE	Building Area	Annual Utility Cost	
$ 0.131	$/kWh blended		0.00042021	10,000	Electric	Natural Gas
$ 0.119	$/kWh consumpt	97,379	0.00042021		$13,003	$686
$ 5.94	$/kW	34	0			
$ 0.80	$/Therm	859	0.00533471			
$ -	$/kgals	-	0			

Laser Hall

	Item	Savings						Cost	Simple Payback	MTCDE	Life Expectancy	NJ Smart Start Incentives	Direct Install Eligible (Y/N)*	Direct Install Incentives**	Max Incentives	Payback w/ Incentives***	Simple Projected Lifetime Savings						ROI
		kW	kWh	therms	cooling kWh	kgal/yr	$										kW	kWh	therms	cooling	kgal/yr	$	
ECM-1	HVAC Condensing Boilers Addition	0.0	0	100	0	0	$ 100	$ 86,600	866.0	0.5	25	$ 3,000	Y	$ 60,600	$ 3,000	836.0	0	0	2,500	0	0	$ 2,000	(1.0)
ECM-2	Lighting Replacement Upgrades	7.3	14,700	0	0	0	$ 2,300	$2,500	1.1	6.2	15	$ 1,032		$ -	$ 1,032	0.6	109	220,500	0	0	0	$ 33,900	12.6
ECM-3	Lighting Controls Installation (Occupancy Sensors)	0.0	8,100	0	0	0	$ 1,100	$1,100	1.0	3.4	15	$ 485		$ -	$ 485	0.6	0	121,500	0	0	0	$ 16,000	13.5
ECM-4	Lighting Replacements with Lighting Controls (Occupancy Sensors)	7.3	19,900	0	0	0	$ 2,900	$3,100	1.1	8.4	15	$ 1,517	Y	$ 2,200	$ 1,517	0.5	109	298,500	0	0	0	$ 43,200	12.9
	Total (Does Not Include ECM-3 & ECM-4)	**7.3**	**19,900**	**100**	**0**	**0**	**$ 3,000**	**$ 89,700**	29.9		20	$ 4,517		$ 62,800	$ 4,517	28.4	**109.0**	**298,500**	**2,500**	**0**	**0**	**$ 45,200**	(0.5)
	Total Measures with Positive ROI	**7.3**	**19,900**	**0**	**0**	**0**	**$ 2,900**	**$ 3,100**	1.1		15	$ 1,517		$ 2,200	$ 1,517	0.5	**109.0**	**298,500**	**0**	**0**	**0**	**$ 43,200**	12.9
	% of Existing	**21%**	**20%**	**12%**	**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
CHA Project #24364
Laser Hall

ECM-1: HVAC Condensing Boiler Added

ECM Description Summary

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

Existing Fuel Nat.Gas
Proposed Fuel Nat.Gas

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	$ 0.80	/ Therm	
Proposed Fuel Cost	$ 0.80	/ Therm	
Baseline Fuel Use	859	Therms	Based on historical utility data.
Existing Boiler Plant Efficiency	80%		Estimated or Measured
Baseline Boiler Load	68,711	Mbtu/yr	Baseline Fuel Use x Existing Efficiency x 100 Mbtu/Therms
Baseline Fuel Cost	$ 686		
Proposed Boiler Plant Efficiency	92%		New Condensing Boiler Efficiency
Proposed Fuel Use	747	Therms	Baseline Boiler Load / Proposed Efficiency / 100 Mbtu/Therms
Proposed Fuel Cost	$ 597		
Annual Utility Savings	**100**	**Therms**	
Annual Savings	$ 100		
Boiler Addition Project Cost	**$ 86,600**		
Simple Payback	866	Years	Negative number indicates

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

ECM-1: HVAC Condensing Boiler Added - Cost

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
1,000 MBH NG Condensing Boiler	1	EA	$ 18,000	$ 2,000		$ 19,800	$ 2,700	$ -	$ 22,500	
Flue Installation	25	LF	$ 75.0	$ 15.00		$ 2,063	$ 506	$ -	$ 2,569	
Reprogram DDC system	1	EA	$ 100.0	$ 350.00		$ 110	$ 473	$ -	$ 583	
Miscellaneous Electrical	1	LS	$ 500	$ 250		$ 550	$ 338	$ -	$ 888	
Miscellaneous HW Piping	1	LS	$ 2,000	$ 1,000		$ 2,200	$ 1,350	$ -	$ 3,550	
Boiler room/space construction	1	LS	$ 20,000	$ 10,000		$ 22,000	$ 13,500	$ -	$ 35,500	
						$ -	$ -	$ -	$ -	

$ 65,589	Subtotal
$ 6,559	10% Contingency
$ 14,430	20% Contractor O&P
$ -	0% Engineering
$ 86,600	**Total**

ECM-3 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
$5,430	**7.3**	**14,700**	**0**	**$2,450**	**0**	**$2,450**	**$1,032**	**2.2**	**1.8**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-4 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
$0	**0.0**	**8,100**	**0**	**$1,065**	**0**	**$1,065**	**$485**	**0.0**	**-0.5**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-5 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
$5,430	**7.3**	**19,900**	**0**	**$3,133**	**0**	**$3,133**	**$1,517**	**1.7**	**1.2**

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

Energy Audit of Camden County College (Laser Building)

CHA Project No. 24364

ECM-3 Lighting Replacements

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

$5.94 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**	**Number of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
4A	Lobby	9	2-LAMP U-TUBE T-12	FU2SS	95	0.9	SW	2500	2,138	9	F17T8	F22ILL	33	0.3	SW	2,500	743	1,395	0.6	$ 223.12	$ 810.00		3.6	3.6
4A	Corridor	15	2-LAMP U-TUBE T-12	FU2SS	95	1.4	SW	2500	3,563	15	F17T8	F22ILL	33	0.5	SW	2,500	1,238	2,325	0.9	$ 371.87	$ 1,350.00	$375	3.6	2.6
162A	Classroom - 102	12	4' 4-LAMP T-12	F44EL	120	1.4	SW	2500	3,600	12	F28T8	F44SSILL-R	86	1.0	SW	2,500	2,580	1,020	0.4	$ 163.14	$ -		0.0	0.0
162A	Room - 103	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	SW	2,125	366	145	0.1	$ 23.84	$ -		0.0	0.0
4A	Corridor - 112	6	2-LAMP U-TUBE T-12	FU2SS	95	0.6	SW	2125	1,211	6	F17T8	F22ILL	33	0.2	SW	2,125	421	791	0.4	$ 130.41	$ 540.00		4.1	4.1
204	Mechanical Room	2	S 96 P F 2 (MAG) 8'	F82EHE	207	0.4	SW	2125	880	2	S 96 P F 2 (MAG) 8'	F82EHE	207	0.4	SW	2,125	880	-	0.0	$ -	$ -	$50		
162A	Room - 105	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	$ 27.19	$ -	$50	0.0	-1.8
162A	Room - 106	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	SW	2,125	366	145	0.1	$ 23.84	$ -		0.0	0.0
162A	Room - 107	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	SW	2,125	366	145	0.1	$ 23.84	$ -	$50	0.0	-2.1
71	Room - 107	1	I 60	I60/1	60	0.1	SW	2125	128	1	CF 26	CFQ26/1-L	27	0.0	SW	2,125	57	70	0.0	$ 11.57	$ 36.00		3.1	3.1
162A	Room - 108	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2250	540	2	F28T8	F44SSILL-R	86	0.2	SW	2,250	387	153	0.1	$ 24.96	$ -		0.0	0.0
162A	Room - 109	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2250	540	2	F28T8	F44SSILL-R	86	0.2	SW	2,250	387	153	0.1	$ 24.96	$ -		0.0	0.0
162A	Room - 110	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	SW	2,125	366	145	0.1	$ 23.84	$ -		0.0	0.0
162A	Room - 111	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	SW	2,125	366	145	0.1	$ 23.84	$ -		0.0	0.0
162A	Room - 112	6	4' 4-LAMP T-12	F44EL	120	0.7	SW	2125	1,530	6	F28T8	F44SSILL-R	86	0.5	SW	2,125	1,097	434	0.2	$ 71.52	$ -		0.0	0.0
71	Room - 108	1	I 60	I60/1	60	0.1	SW	2000	120	1	CF 26	CFQ26/1-L	27	0.0	SW	2,000	54	66	0.0	$ 11.03	$ 36.00		3.3	3.3
71	Room - 109	1	I 60	I60/1	60	0.1	SW	2125	128	1	CF 26	CFQ26/1-L	27	0.0	SW	2,125	57	70	0.0	$ 11.57	$ 36.00		3.1	3.1
71	Room - 110	1	I 60	I60/1	60	0.1	SW	2125	128	1	CF 26	CFQ26/1-L	27	0.0	SW	2,125	57	70	0.0	$ 11.57	$ 36.00		3.1	3.1
71	Room - 111	1	I 60	I60/1	60	0.1	SW	2125	128	1	CF 26	CFQ26/1-L	27	0.0	SW	2,125	57	70	0.0	$ 11.57	$ 36.00		3.1	3.1
204	Electrical Room	1	S 96 P F 2 (MAG) 8'	F82EHE	207	0.2	SW	2125	440	1	S 96 P F 2 (MAG) 8'	F82EHE	207	0.2	SW	2,125	440	-	0.0	$ -	$ -			
162A	Room - 114	8	4' 4-LAMP T-12	F44EL	120	1.0	SW	2125	2,040	8	F28T8	F44SSILL-R	86	0.7	SW	2,125	1,462	578	0.3	$ 95.36	$ -		0.0	0.0
162A	Room - 116	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	SW	2,125	366	145	0.1	$ 23.84	$ -	$50	0.0	-2.1
4A	Corridor Rooms - 112 through 124	8	2-LAMP U-TUBE T-12	FU2SS	95	0.8	SW	2125	1,615	8	F17T8	F22ILL	33	0.3	SW	2,125	561	1,054	0.5	$ 173.89	$ 720.00		4.1	4.1
162A	Room - 115	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	SW	2,125	366	145	0.1	$ 23.84	$ -		0.0	0.0
162A	Room - 117	3	4' 4-LAMP T-12	F44EL	120	0.4	SW	2500	900	3	F28T8	F44SSILL-R	86	0.3	SW	2,500	645	255	0.1	$ 40.79	$ -		0.0	0.0
162A	Room - 118	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	SW	2,125	366	145	0.1	$ 23.84	$ -		0.0	0.0
162A	Room - 119	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	SW	2,125	366	145	0.1	$ 23.84	$ -		0.0	0.0
162A	Room - 123	6	4' 4-LAMP T-12	F44EL	120	0.7	SW	500	360	6	F28T8	F44SSILL-R	86	0.5	SW	500	258	102	0.2	$ 27.95	$ -	$150	0.0	-5.4
162A	Room - 124	6	4' 4-LAMP T-12	F44EL	120	0.7	SW	2125	1,530	6	F28T8	F44SSILL-R	86	0.5	SW	2,125	1,097	434	0.2	$ 71.52	$ -		0.0	0.0
162A	Room - 122	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	$ 27.19	$ -		0.0	0.0
4A	Sitting Area	10	2-LAMP U-TUBE T-12	FU2SS	95	1.0	SW	2500	2,375	10	F17T8	F22ILL	33	0.3	SW	2,500	825	1,550	0.6	$ 247.92	$ 900.00	$250	3.6	2.6
162A	Men's Bathroom	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	$ 27.19	$ -	$50	0.0	-1.8
162A	Women's Bathroom	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	SW	2,125	366	145	0.1	$ 23.84	$ -		0.0	0.0
71	Janitor Closet - 128	1	I 60	I60/1	60	0.1	SW	1062.5	64	1	CF 26	CFQ26/1-L	27	0.0	SW	1,063	29	35	0.0	$ 6.96	$ 36.00		5.2	5.2
11A	Closet - 129	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	128	1	F32T8	F42ILL-R	52	0.1	SW	2,125	111	17	0.0	$ 2.80	$ -		0.0	0.0
11A	Toilet - 130	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	1062.5	64	1	F32T8	F42ILL-R	52	0.1	SW	1,063	55	9	0.0	$ 1.69	$ -		0.0	0.0
162A	Room - 131	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	1062.5	255	2	F28T8	F44SSILL-R	86	0.2	SW	1,063	183	72	0.1	$ 14.34	$ -		0.0	0.0
162A	Room - 132	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	SW	2,125	366	145	0.1	$ 23.84	$ -		0.0	0.0
162A	Room - 133	8	4' 4-LAMP T-12	F44EL	120	1.0	SW	500	480	8	F28T8	F44SSILL-R	86	0.7	SW	500	344	136	0.3	$ 37.26	$ -		0.0	0.0
162A	Room - 135	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	500	120	2	F28T8	F44SSILL-R	86	0.2	SW	500	86	34	0.1	$ 9.32	$ -		0.0	0.0
162A	Room - 136	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	500	120	2	F28T8	F44SSILL-R	86	0.2	SW	500	86	34	0.1	$ 9.32	$ -		0.0	0.0
4A	Corridor Rooms - 131 through 136	2	2-LAMP U-TUBE T-12	FU2SS	95	0.2	SW	2125	404	2	F17T8	F22ILL	33	0.1	SW	2,125	140	264	0.1	$ 43.47	$ 180.00		4.1	4.1
143	Exterior	5	HPS 100 POLE	HPS100/1	138	0.7	SW	1062.5	733	5	FXLED39	FXLED39/1	39	0.2	SW	1,063	207	526	0.5	$ 104.41	$ 510.00		4.9	4.9
141A	Exterior	2	HPS 200	HPS200/1	250	0.5	SW	2125	1,063	2	FXLED78	FXLED78/1	78	0.2	SW	2,125	332	731	0.3	$ 120.60	$ 204.00		1.7	1.7
9A	Exterior	1	High Bay MH 200 35 Feet High	MH200/1	232	0.2	SW	1062.5	247	1	FXLED78	FXLED78/1	78	0.1	SW	1,063	83	164	0.2	$ 32.48	$ -	$7	0.0	-0.2
	Total	**156**				**17.7**			**34,977**	**156**			**3,309**	**10.4**			**20,267**	**14,709**	**7.3**	**$2,500**	**$5,430**	**$1,032**		
																	Demand Savings			**7.3**	**$518**			
																	kWh Savings			**14,700**	**$1,932**			
																	Total savings				**$2,450**		**2.2**	**1.8**

Energy Audit of Camden County College (Laser Building)

CHA Project No. 24364

ECM-4 Install Occupancy Sensors

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

$5.94 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**	**Number of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kW Saved) * ($/kWh)	Cost for renovations to lighting system		Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
4A	Lobby	9	2-LAMP U-TUBE T-12	FU2SS	95	0.9	SW	2500	2,137.5	9	2-LAMP U-TUBE T-12	FU2SS	95	0.9	None	2500	2,137.5	0.0	0.0	$0.00	$0.00	$0.00		
4A	Corridor	15	2-LAMP U-TUBE T-12	FU2SS	95	1.4	SW	2500	3,562.5	15	2-LAMP U-TUBE T-12	FU2SS	95	1.4	None	2500	3,562.5	0.0	0.0	$0.00	$0.00	$0.00		
162A	Classroom - 102	12	4' 4-LAMP T-12	F44EL	120	1.4	SW	2500	3,600.0	12	4' 4-LAMP T-12	F44EL	120	1.4	None	2500	3,600.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 103	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510.0	2	4' 4-LAMP T-12	F44EL	120	0.2	C-OCC	1200	288.0	222.0	0.0	$29.18	$0.00	$35.00	0.0	-0.2
4A	Corridor - 112	6	2-LAMP U-TUBE T-12	FU2SS	95	0.6	SW	2125	1,211.3	6	2-LAMP U-TUBE T-12	FU2SS	95	0.6	C-OCC	1200	684.0	527.3	0.0	$69.30				
204	Mechanical Room	2	S 96 P F 2 (MAG) 8'	F82EHE	207	0.4	SW	2125	879.8	2	S 96 P F 2 (MAG) 8'	F82EHE	207	0.4	C-OCC	1200	496.8	383.0	0.0	$50.33				
162A	Room - 105	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		
162A	Room - 106	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510.0	2	4' 4-LAMP T-12	F44EL	120	0.2	OCC	1200	288.0	222.0	0.0	$29.18	$0.00	$20.00	0.0	-0.7
162A	Room - 107	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510.0	2	4' 4-LAMP T-12	F44EL	120	0.2	OCC	1200	288.0	222.0	0.0	$29.18	$0.00	$20.00	0.0	-0.7
71	Room - 107	1	I 60	I60/1	60	0.1	SW	2125	127.5	1	I 60	I60/1	60	0.1	OCC	1200	72.0	55.5	0.0	$7.29	$0.00	$20.00	0.0	-2.7
162A	Room - 108	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2250	540.0	2	4' 4-LAMP T-12	F44EL	120	0.2	C-OCC	1000	240.0	300.0	0.0	$39.43	$0.00	$35.00	0.0	-0.9
162A	Room - 109	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2250	540.0	2	4' 4-LAMP T-12	F44EL	120	0.2	C-OCC	1000	240.0	300.0	0.0	$39.43	$0.00	$35.00	0.0	-0.9
162A	Room - 110	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510.0	2	4' 4-LAMP T-12	F44EL	120	0.2	OCC	1200	288.0	222.0	0.0	$29.18	$0.00	$20.00	0.0	-0.7
162A	Room - 111	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510.0	2	4' 4-LAMP T-12	F44EL	120	0.2	OCC	1200	288.0	222.0	0.0	$29.18	$0.00	$20.00	0.0	-0.7
162A	Room - 112	6	4' 4-LAMP T-12	F44EL	120	0.7	SW	2125	1,530.0	6	4' 4-LAMP T-12	F44EL	120	0.7	OCC	1200	864.0	666.0	0.0	$87.53	$0.00	$20.00	0.0	-0.2
71	Room - 108	1	I 60	I60/1	60	0.1	SW	2000	120.0	1	I 60	I60/1	60	0.1	OCC	1000	60.0	60.0	0.0	$7.89	$0.00	$0.00	0.0	0.0
71	Room - 109	1	I 60	I60/1	60	0.1	SW	2125	127.5	1	I 60	I60/1	60	0.1	OCC	1200	72.0	55.5	0.0	$7.29	$0.00	$20.00	0.0	-2.7
71	Room - 110	1	I 60	I60/1	60	0.1	SW	2125	127.5	1	I 60	I60/1	60	0.1	OCC	1200	72.0	55.5	0.0	$7.29	$0.00	$20.00	0.0	-2.7
71	Room - 111	1	I 60	I60/1	60	0.1	SW	2125	127.5	1	I 60	I60/1	60	0.1	OCC	1200	72.0	55.5	0.0	$7.29	$0.00	$20.00	0.0	-2.7
204	Electrical Room	1	S 96 P F 2 (MAG) 8'	F82EHE	207	0.2	SW	2125	439.9	1	S 96 P F 2 (MAG) 8'	F82EHE	207	0.2	OCC	1200	248.4	191.5	0.0	$25.17	$0.00	$20.00	0.0	-0.8
162A	Room - 114	8	4' 4-LAMP T-12	F44EL	120	1.0	SW	2125	2,040.0	8	4' 4-LAMP T-12	F44EL	120	1.0	OCC	1200	1,152.0	888.0	0.0	$116.71	$0.00	$20.00	0.0	-0.1
162A	Room - 116	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510.0	2	4' 4-LAMP T-12	F44EL	120	0.2	OCC	1200	288.0	222.0	0.0	$29.18				
4A	Corridor Rooms - 112 through 124	8	2-LAMP U-TUBE T-12	FU2SS	95	0.8	SW	2125	1,615.0	8	2-LAMP U-TUBE T-12	FU2SS	95	0.8	OCC	1200	912.0	703.0	0.0	$92.40	$0.00	$20.00	0.0	-0.2
162A	Room - 115	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510.0	2	4' 4-LAMP T-12	F44EL	120	0.2	OCC	1200	288.0	222.0	0.0	$29.18	$0.00	$20.00	0.0	-0.7
162A	Room - 117	3	4' 4-LAMP T-12	F44EL	120	0.4	SW	2500	900.0	3	4' 4-LAMP T-12	F44EL	120	0.4	None	2500	900.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 118	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510.0	2	4' 4-LAMP T-12	F44EL	120	0.2	OCC	1200	288.0	222.0	0.0	$29.18	$0.00	$20.00	0.0	-0.7
162A	Room - 119	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510.0	2	4' 4-LAMP T-12	F44EL	120	0.2	OCC	1000	240.0	270.0	0.0	$35.49	$0.00	$20.00	0.0	-0.6
162A	Room - 123	6	4' 4-LAMP T-12	F44EL	120	0.7	SW	500	360.0	6	4' 4-LAMP T-12	F44EL	120	0.7	None	500	360.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 124	6	4' 4-LAMP T-12	F44EL	120	0.7	SW	2125	1,530.0	6	4' 4-LAMP T-12	F44EL	120	0.7	OCC	1200	864.0	666.0	0.0	$87.53	$0.00	$20.00	0.0	-0.2
162A	Room - 122	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		
4A	Sitting Area	10	2-LAMP U-TUBE T-12	FU2SS	95	1.0	SW	2500	2,375.0	10	2-LAMP U-TUBE T-12	FU2SS	95	1.0	None	2500	2,375.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Men's Bathroom	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		
162A	Women's Bathroom	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510.0	2	4' 4-LAMP T-12	F44EL	120	0.2	OCC	1200	288.0	222.0	0.0	$29.18	$0.00	$0.00	0.0	0.0
71	Janitor Closet - 128	1	I 60	I60/1	60	0.1	SW	1062.5	63.8	1	I 60	I60/1	60	0.1	None	1062.5	63.8	0.0	0.0	$0.00	$0.00	$0.00		
11A	Closet - 129	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	127.5	1	4' 2-LAMP T-12	F42EL	60	0.1	OCC	1200	72.0	55.5	0.0	$7.29	$0.00	$20.00	0.0	-2.7
11A	Toilet - 130	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	1062.5	63.8	1	4' 2-LAMP T-12	F42EL	60	0.1	None	1062.5	63.8	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 131	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	1062.5	255.0	2	4' 4-LAMP T-12	F44EL	120	0.2	None	1062.5	255.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 132	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510.0	2	4' 4-LAMP T-12	F44EL	120	0.2	OCC	1200	288.0	222.0	0.0	$29.18	$0.00	$20.00	0.0	-0.7
162A	Room - 133	8	4' 4-LAMP T-12	F44EL	120	1.0	SW	500	480.0	8	4' 4-LAMP T-12	F44EL	120	1.0	None	500	480.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 135	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	500	120.0	2	4' 4-LAMP T-12	F44EL	120	0.2	None	500	120.0	0.0	0.0	$0.00	$0.00	$0.00		
162A	Room - 136	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	500	120.0	2	4' 4-LAMP T-12	F44EL	120	0.2	None	500	120.0	0.0	0.0	$0.00	$0.00	$0.00		
4A	Corridor Rooms - 131 through 136	2	2-LAMP U-TUBE T-12	FU2SS	95	0.2	SW	2125	403.8	2	2-LAMP U-TUBE T-12	FU2SS	95	0.2	OCC	1200	228.0	175.8	0.0	$23.10	$0.00	$20.00	0.0	-0.9
143	Exterior	5	HPS 100 POLE	HPS100/1	138	0.7	SW	1062.5	733.1	5	HPS 100 POLE	HPS100/1	138	0.7	None	1062.5	733.1	0.0	0.0	$0.00	$0.00	$0.00		
141A	Exterior	2	HPS 200	HPS200/1	250	0.5	SW	2125	1,062.5	2	HPS 200	HPS200/1	250	0.5	OCC	1200	600.0	462.5	0.0	$60.79	$0.00	$0.00	0.0	0.0
9A	Exterior	1	High Bay MH 200 35 Feet High	MH200/1	232	0.2	SW	1062.5	246.5	1	High Bay MH 200 35 Feet High	MH200/1	232	0.2	None	1062.5	246.5	0.0	0.0	$0.00	$0.00	$0.00		
	Total	**156**				**17.7**			**34,977**	**156**				**18**				**26,886**	**8,100**	**0**	**$1,100**	**$0**	**485**		
																		Demand Savings			**0.0**	**$0**			
																		kWh Savings			**8,100**	**$1,065**			
																		Total Savings				**$1,065**		**0.0**	**-0.5**

Energy Audit of Camden County College (Laser Building)

CHA Project No. 24364

ECM-5 Lighting Replacements with Occupancy Sensors

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

$5.94 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**	**Number of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
4A	Lobby	9	2-LAMP U-TUBE T-12	FU2SS	95	0.9	SW	2500	2,138	9	F17T8	F22ILL	33	0.3	None	2,500	743	1,395	0.6	$ 223.12	$ 810.00	$ -	3.6	3.6
4A	Corridor	15	2-LAMP U-TUBE T-12	FU2SS	95	1.4	SW	2500	3,563	15	F17T8	F22ILL	33	0.5	None	2,500	1,238	2,325	0.9	$ 371.87	$ 1,350.00	$ 375	3.6	2.6
162A	Classroom - 102	12	4' 4-LAMP T-12	F44EL	120	1.4	SW	2500	3,600	12	F28T8	F44SSILL-R	86	1.0	None	2,500	2,580	1,020	0.4	$ 163.14	$ -	$ -	0.0	0.0
162A	Room - 103	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	C-OCC	1,200	206	304	0.1	$ 44.75	$ -	$ 35	0.0	-0.8
4A	Corridor - 112	6	2-LAMP U-TUBE T-12	FU2SS	95	0.6	SW	2125	1,211	6	F17T8	F22ILL	33	0.2	C-OCC	1,200	238	974	0.4	$ 154.49	$ 540.00	$ -	3.5	3.5
204	Mechanical Room	2	S 96 P F 2 (MAG) 8'	F82EHE	207	0.4	SW	2125	880	2	S 96 P F 2 (MAG) 8'	F82EHE	207	0.4	C-OCC	1,200	497	383	0.0	$ 50.33	$ -	$ 50	0.0	-1.0
162A	Room - 105	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	$ 27.19	$ -	$ 50	0.0	-1.8
162A	Room - 106	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	OCC	1,200	206	304	0.1	$ 44.75	$ -	$ 20	0.0	-0.4
162A	Room - 107	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	OCC	1,200	206	304	0.1	$ 44.75	$ -	$ 70	0.0	-1.6
71	Room - 107	1	I 60	I60/1	60	0.1	SW	2125	128	1	CF 26	CFQ26/1-L	27	0.0	OCC	1,200	32	95	0.0	$ 14.85	$ 36.00	$ 20	2.4	1.1
162A	Room - 108	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2250	540	2	F28T8	F44SSILL-R	86	0.2	C-OCC	1,000	172	368	0.1	$ 53.21	$ -	$ 35	0.0	-0.7
162A	Room - 109	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2250	540	2	F28T8	F44SSILL-R	86	0.2	C-OCC	1,000	172	368	0.1	$ 53.21	$ -	$ 35	0.0	-0.7
162A	Room - 110	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	OCC	1,200	206	304	0.1	$ 44.75	$ -	$ 20	0.0	-0.4
162A	Room - 111	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	OCC	1,200	206	304	0.1	$ 44.75	$ -	$ 20	0.0	-0.4
162A	Room - 112	6	4' 4-LAMP T-12	F44EL	120	0.7	SW	2125	1,530	6	F28T8	F44SSILL-R	86	0.5	OCC	1,200	619	911	0.2	$ 134.25	$ -	$ 20	0.0	-0.1
71	Room - 108	1	I 60	I60/1	60	0.1	SW	2000	120	1	CF 26	CFQ26/1-L	27	0.0	OCC	1,000	27	93	0.0	$ 14.58	$ 36.00	$ -	2.5	2.5
71	Room - 109	1	I 60	I60/1	60	0.1	SW	2125	128	1	CF 26	CFQ26/1-L	27	0.0	OCC	1,200	32	95	0.0	$ 14.85	$ 36.00	$ 20	2.4	1.1
71	Room - 110	1	I 60	I60/1	60	0.1	SW	2125	128	1	CF 26	CFQ26/1-L	27	0.0	OCC	1,200	32	95	0.0	$ 14.85	$ 36.00	$ 20	2.4	1.1
71	Room - 111	1	I 60	I60/1	60	0.1	SW	2125	128	1	CF 26	CFQ26/1-L	27	0.0	OCC	1,200	32	95	0.0	$ 14.85	$ 36.00	$ 20	2.4	1.1
204	Electrical Room	1	S 96 P F 2 (MAG) 8'	F82EHE	207	0.2	SW	2125	440	1	S 96 P F 2 (MAG) 8'	F82EHE	207	0.2	OCC	1,200	248	191	0.0	$ 25.17	$ -	$ 20	0.0	-0.8
162A	Room - 114	8	4' 4-LAMP T-12	F44EL	120	1.0	SW	2125	2,040	8	F28T8	F44SSILL-R	86	0.7	OCC	1,200	826	1,214	0.3	$ 179.00	$ -	$ 20	0.0	-0.1
162A	Room - 116	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	OCC	1,200	206	304	0.1	$ 44.75	$ -	$ 50	0.0	-1.1
4A	Corridor Rooms - 112 through 124	8	2-LAMP U-TUBE T-12	FU2SS	95	0.8	SW	2125	1,615	8	F17T8	F22ILL	33	0.3	OCC	1,200	317	1,298	0.5	$ 205.98	$ 720.00	$ 20	3.5	3.4
162A	Room - 115	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	OCC	1,200	206	304	0.1	$ 44.75	$ -	$ 20	0.0	-0.4
162A	Room - 117	3	4' 4-LAMP T-12	F44EL	120	0.4	SW	2500	900	3	F28T8	F44SSILL-R	86	0.3	None	2,500	645	255	0.1	$ 40.79	$ -	$ -	0.0	0.0
162A	Room - 118	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	OCC	1,200	206	304	0.1	$ 44.75	$ -	$ 20	0.0	-0.4
162A	Room - 119	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	OCC	1,000	172	338	0.1	$ 49.27	$ -	$ 20	0.0	-0.4
162A	Room - 123	6	4' 4-LAMP T-12	F44EL	120	0.7	SW	500	360	6	F28T8	F44SSILL-R	86	0.5	None	500	258	102	0.2	$ 27.95	$ -	$ 150	0.0	-5.4
162A	Room - 124	6	4' 4-LAMP T-12	F44EL	120	0.7	SW	2125	1,530	6	F28T8	F44SSILL-R	86	0.5	OCC	1,200	619	911	0.2	$ 134.25	$ -	$ 20	0.0	-0.1
162A	Room - 122	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	$ 27.19	$ -	$ -	0.0	0.0
4A	Sitting Area	10	2-LAMP U-TUBE T-12	FU2SS	95	1.0	SW	2500	2,375	10	F17T8	F22ILL	33	0.3	None	2,500	825	1,550	0.6	$ 247.92	$ 900.00	$ 250	3.6	2.6
162A	Men's Bathroom	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	$ 27.19	$ -	$ 50	0.0	-1.8
162A	Women's Bathroom	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	OCC	1,200	206	304	0.1	$ 44.75	$ -	$ -	0.0	0.0
71	Janitor Closet - 128	1	I 60	I60/1	60	0.1	SW	1062.5	64	1	CF 26	CFQ26/1-L	27	0.0	None	1,063	29	35	0.0	$ 6.96	$ 36.00	$ -	5.2	5.2
11A	Closet - 129	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	2125	128	1	F32T8	F42ILL-R	52	0.1	OCC	1,200	62	65	0.0	$ 9.13	$ -	$ -	0.0	-2.2
11A	Toilet - 130	1	4' 2-LAMP T-12	F42EL	60	0.1	SW	1062.5	64	1	F32T8	F42ILL-R	52	0.1	None	1,063	55	9	0.0	$ 1.69	$ -	$ -	0.0	0.0
162A	Room - 131	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	1062.5	255	2	F28T8	F44SSILL-R	86	0.2	None	1,063	183	72	0.1	$ 14.34	$ -	$ -	0.0	0.0
162A	Room - 132	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	2125	510	2	F28T8	F44SSILL-R	86	0.2	OCC	1,200	206	304	0.1	$ 44.75	$ -	$ 20	0.0	-0.4
162A	Room - 133	8	4' 4-LAMP T-12	F44EL	120	1.0	SW	500	480	8	F28T8	F44SSILL-R	86	0.7	None	500	344	136	0.3	$ 37.26	$ -	$ -	0.0	0.0
162A	Room - 135	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	500	120	2	F28T8	F44SSILL-R	86	0.2	None	500	86	34	0.1	$ 9.32	$ -	$ -	0.0	0.0
162A	Room - 136	2	4' 4-LAMP T-12	F44EL	120	0.2	SW	500	120	2	F28T8	F44SSILL-R	86	0.2	None	500	86	34	0.1	$ 9.32	$ -	$ -	0.0	0.0
4A	Corridor Rooms - 131 through 136	2	2-LAMP U-TUBE T-12	FU2SS	95	0.2	SW	2125	404	2	F17T8	F22ILL	33	0.1	OCC	1,200	79	325	0.1	$ 51.50	$ 180.00	$ 20	3.5	3.1
143	Exterior	5	HPS 100 POLE	HPS100/1	138	0.7	SW	1062.5	733	5	FXLED39	FXLED39/1	39	0.2	None	1,063	207	526	0.5	$ 104.41	$ 510.00	$ -	4.9	4.9
141A	Exterior	2	HPS 200	HPS200/1	250	0.5	SW	2125	1,063	2	FXLED78	FXLED78/1	78	0.2	OCC	1,200	187	875	0.3	$ 139.56	$ 204.00	$ -	1.5	1.5
9A	Exterior	1	High Bay MH 200 35 Feet High	MH200/1	232	0.2	SW	1062.5	247	1	FXLED78	FXLED78/1	78	0.1	None	1,063	83	164	0.2	$ 32.48	$ -	$ 7	0.0	-0.2
	Total	**156**				**17.7**			**34,977**	**156**				**10.4**			**15,080**		**7.3**	**$3,100**	**5,430**	**1,517**		
																		Demand Savings		**7.3**	**$518**			
																		kWh Savings		**19,900**	**$2,615**			
																		Total Savings			**$3,133**		**1.7**	**1.2**

APPENDIX D

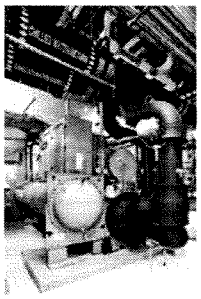
New Jersey Pay For Performance Incentive Program

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
Laser 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)	10,000
Is this audit funded by NJ BPU (Y/N)	Yes

Board of Public Utilites (BPU)

Incentive #1		
Audit is funded by NJ BPU	$0.10	$/sqft

	Annual Utilities	
	kWh	Therms
Existing Cost (from utility)	$13,003	$686
Existing Usage (from utility)	97,379	859
Proposed Savings	19,900	0
Existing Total MMBtus	418	
Proposed Savings MMBtus	68	
% Energy Reduction	**16.2%**	
Proposed Annual Savings	$2,900	

	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	$0.10	$0.96
Incentive #3	$0.09	$0.90	$0.005	$0.05	$0.11	$1.25	$0.10	$0.96

	Incentives $		
	Elec	Gas	Total
Incentive #1	$0	$0	$1,000
Incentive #2	$1,914	$0	$1,914
Incentive #3	$1,914	$0	$1,914
Total All Incentives	**$3,829**	**$0**	**$4,829**

Total Project Cost	$3,100

		Allowable Incentive
% Incentives #1 of Utility Cost*	7.3%	$1,000
% Incentives #2 of Project Cost**	61.8%	$930
% Incentives #3 of Project Cost**	61.8%	$930
Total Eligible Incentives***	**$2,860**	
Project Cost w/ Incentives	$240	

Project Payback (years)	
w/o Incentives	w/ Incentives
1.1	0.1

* 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
Laser Building

Cost of Electricity	$0.131	/kWh
Electricity Usage	120,655	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
$120,000	**30.0**	**38,333**	**0**	**$5,022**	**0**	**$5,022**	**$0**	**$3,067**	**23.9**	**14.8**

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

Area Output*
928 m2
9,991 ft2

Perimeter Output*
144 m
474 ft

Available Roof Space for PV:
(Area Output - 10 ft x Perimeter) x 85%
4,465 ft2

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

8	watt/ft2	
35,724	DC watts	
30	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
38,333 annual kWh calculated in PV Watts program

% Offset Calc

Usage	120,655	(from utilities)
PV Generation	38,333	(generated using PV Watts)
% offset	32%	

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

AC Energy & Cost Savings

Cautions for Interpreting the Results

Laser Building (Camden County College)

Station Identification

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

PV System Specifications

DC Rating:	30.0 kW
DC to AC Derate Factor:	0.830
AC Rating:	24.9 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	2102	275.36
2	3.50	2475	324.23
3	4.81	3627	475.14
4	5.27	3750	491.25
5	5.81	4163	545.35
6	6.13	4116	539.20
7	5.76	3959	518.63
8	5.63	3855	505.01
9	5.03	3408	446.45
10	4.04	2934	384.35
11	2.90	2092	274.05
12	2.46	1852	242.61
Year	4.51	38333	5021.62

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
Laser Institute of Technology

Building ID: 3251854
For 12-month Period Ending: April 30, 2012[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: November 08, 2012

Facility
Laser Institute of Technology
College Drive
Blackwood, NJ 08012

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1989
Gross Floor Area (ft²): 9,991

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

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	618,428
Natural Gas - (kBtu)[4]	0
Total Energy (kBtu)	618,428

Energy Intensity[4]

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

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	88

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

National Median Comparison

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

Stamp of Certifying Professional

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

Certifying Professional
N/A

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

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

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

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Laser Institute of Technology	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	College/University (Campus-Level)	Is this an accurate description of the space in question?		☐
Location	College Drive, Blackwood, NJ 08012	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of a hospital, k-12 school, hotel and senior care facility) nor can they be submitted as representing only a portion of a building.		☐
Building (Other)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	9,991 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	13,457.24
02/26/2012	03/25/2012	13,104.74
01/26/2012	02/25/2012	14,917.66
12/26/2011	01/25/2012	12,797.69
11/26/2011	12/25/2011	13,156.14
10/26/2011	11/25/2011	14,375.92
09/26/2011	10/25/2011	13,827.88
08/26/2011	09/25/2011	17,998.77
07/26/2011	08/25/2011	17,280.97
06/26/2011	07/25/2011	18,275.64
05/26/2011	06/25/2011	17,263.16
83431473 Consumption (kWh (thousand Watt-hours))		**166,455.81**
83431473 Consumption (kBtu (thousand Btu))		**567,947.22**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**567,947.22**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

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

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

Certifying Professional

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

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
Laser Institute of Technology
College Drive
Blackwood, NJ 08012

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Laser Institute of Technology	
Gross Floor Area Excluding Parking: (ft^2)	9,991
Year Built	1989
For 12-month Evaluation Period Ending Date:	April 30, 2012

Facility Space Use Summary

Building	
Space Type	Other - College/University (Campus-Level)
Gross Floor Area (ft^2)	9,991
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)	62	62	0	N/A	104
Source (kBtu/ft²)	207	207	0	N/A	244
Energy Cost					
$/year	$ 20,419.68	$ 20,419.68	N/A	N/A	$ 34,307.70
$/ft²/year	$ 2.04	$ 2.04	N/A	N/A	$ 3.43
Greenhouse Gas Emissions					
$MtCO_2e$/year	88	88	0	N/A	148
$kgCO_2e/ft^2$/year	9	9	0	N/A	15

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

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