LOCAL GOVERNMENT ENERGY AUDIT PROGRAM: ENERGY AUDIT REPORT

PREPARED FOR:

BURLINGTON COUNTY DETENTION CENTER
54 GRANT STREET
MOUNT HOLLY, NJ 08060
ATTN: MS. MARY PAT ROBBIE
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DEPT. OF RESOURCE CONSERVATION

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I. EXECUTIVE SUMMARY

This report presents the findings of the energy audit conducted for:

Burlington County
Detention Center
49 Rancocas Road
Mount Holly, NJ 08060

Municipal Contact Person: Mary Pat Robbie
Facility Contact Person: Ms. Karen Smith

This audit is performed in connection with the New Jersey Clean Energy - Local Government Energy Audit Program. The energy audit is conducted to promote the mission of the office of Clean Energy, which is to use innovation and technology to solve energy and environmental problems in a way that improves the State's economy. This can be achieved through the wiser and more efficient use of energy.

The annual energy costs at this facility are as follows:

Electricity	$ 309,832
Natural Gas	$ 85,366
Total	$ 394,748

The potential annual energy cost savings for each energy conservation measure (ECM) and renewable energy measure (REM) are shown below in Table 1. Be aware that the ECM's and REM's are not additive because of the interrelation of some of the measures. This audit is consistent with an ASHRAE level 2 audit. The cost and savings for each measure is ± 20%. The evaluations are based on engineering estimations and industry standard calculation methods. More detailed analyses would require engineering simulation models, hard equipment specifications, and contractor bid pricing.

Table 1
Financial Summary Table

ENERGY CONSERVATION MEASURES (ECM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST[A]**	**ANNUAL SAVINGS[B]**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
ECM #1	Lighting Upgrade	$3,020	$1,942	1.6	864.6%
ECM #2	High Efficiency Boiler Upgrade	$182,500	$7,239	25.2	19.0%
ECM #3	Premium Efficient Motors	$7,532	$398	18.9	-4.9%
ECM #4	Dryers	$8,400	$854	9.8	52.5%
ECM #5	Refrigerator Freezers	$20,359	$6,619	3.1	387.7%
ECM #6	MELINK	$40,000	$2,695	14.8	1.1%
ECM #7	Air Conditioning Unit Upgrade	$16,380	$829	19.8	-24.1%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST**	**ANNUAL SAVINGS**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
REM #1	530.84 KW PV Canopy System	$4,777,560	$321,836	14.8	68.4%

Notes: A. Cost takes into consideration applicable NJ Smart StartTM incentives.
B. Savings takes into consideration applicable maintenance savings.

The estimated demand and energy savings for each ECM and REM is shown below in Table 2. The descriptions in this table correspond to the ECM's and REM's listed in Table 1.

Table 2
Estimated Energy Savings Summary Table

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
ECM #1	Lighting Upgrade	1.8	16048.0	0.0
ECM #2	High Efficiency Boiler Upgrade	0.0	0.0	8134.0
ECM #3	Premium Efficient Motors	0.7	3286.0	0.0
ECM #4	Dryers	0.0	0.0	960.0
ECM #5	Refrigerator Freezers	0.0	330955.0	0.0
ECM #6	MELINK	0.0	11275.0	1495.0
ECM #7	Air Conditioning Unit Upgrade	4.6	6848.0	0.0
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
REM #1	530.84 KW PV Canopy System	530.8	683303.0	0.0

Concord Engineering Group (CEG) recommends proceeding with the implementation of all ECM's that provide a calculated simple payback at or under ten (10) years. The following Energy Conservation Measures are recommended for the facility:

- **ECM #1:** Lighting Upgrade
- **ECM #4:** High-Efficiency Gas-Fired Commercial Laundry Dryers
- **ECM #5:** Evaporator Fan Controls on Walk-In Boxes

In addition to the ECMs, there are maintenance and operational measures that can provide significant energy savings and provide immediate benefit. The ECMs listed above represent investments that can be made to the facility which are justified by the savings seen overtime. However, the maintenance items and small operational improvements below are typically achievable with on site staff or maintenance contractors and in turn have the potential to provide substantial operational savings compared to the costs associated. The following are recommendations which should be considered a priority in achieving an energy efficient building:

1. Chemically clean the condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%.
2. Maintain all weather stripping on entrance doors.
3. Clean all light fixtures to maximize light output.
4. Provide more frequent air filter changes to decrease overall system power usage and maintain better IAQ.

Renewable Energy Measures (REMs) were also reviewed for implementation at the Burlington County Detention Center. CEG utilized a ground mounted parking canopy array to house a substantial PV system. The recommended 530.84 kW PV system will produce approximately 683,303 kWh of electricity annually and will reduce the Detention Center's electrical consumption from the grid by 26.6%. The system's calculated simple payback of 14.84 years is past the standard 10 year simple payback threshold; however, with alternative funding this payback could be lessened. CEG recommends the Owner review all funding options before deciding to not implement this renewable energy measure.

In addition to the above recommendations, based on the review of the facility's energy bills and discussions with the County, the energy audit team recommends Retro-Commissioning of this facility to meet the following objectives:

- Bring existing HVAC equipment to its proper operational state including air and water distribution systems
- Reduce energy use and energy costs
- Improve indoor air quality
- Verify the installation and performance of identified system upgrades
- Address overall building energy use and demand and identify areas of highest energy use and demand

- Identify the location of the most comfort problems or trouble spots in the building
- Review current O&M practices

Through the implementation of a Retro-Commissioning Plan, the County will be able to continue with their vision of reducing energy usage and operating efficient facilities.

Overall, the Burlington County Detention Center appears to be operating at a low efficiency level compared to other similar facilities in the region. With the implementation of the above recommended measures the Burlington County will realize further energy savings at the Detention Center.

II. INTRODUCTION

This comprehensive energy audit covers the 117,368 square foot detention facility that includes the cell blocks, main control room, gym, administration offices, full-cooking kitchen with walk-in refrigerator and freezers, laundry room, medical suite, Sallyport, mechanical rooms, etc.

Electrical and natural gas utility information is collected and analyzed for one full year's energy use of the building. The utility information allows for analysis of the building's operational characteristics; calculate energy benchmarks for comparison to industry averages, estimated savings potential, and baseline usage/cost to monitor the effectiveness of implemented measures. A computer spreadsheet is used to calculate benchmarks and to graph utility information (see the utility profiles below).

The Energy Use Index (EUI) is established for the building. Energy Use Index (EUI) is expressed in British Thermal Units/square foot/year (BTU/ft^2/yr), which is used to compare energy consumption to similar building types or to track consumption from year to year in the same building. The EUI is calculated by converting the annual consumption of all energy sources to BTU's and dividing by the area (gross square footage) of the building. Blueprints (where available) are utilized to verify the gross area of the facility. The EUI is a good indicator of the relative potential for energy savings. A low EUI indicates less potential for energy savings, while a high EUI indicates poor building performance therefore a high potential for energy savings.

Existing building architectural and engineering drawings (where available) are utilized for additional background information. The building envelope, lighting systems, HVAC equipment, and controls information gathered from building drawings allow for a more accurate and detailed review of the building. The information is compared to the energy usage profiles developed from utility data. Through the review of the architectural and engineering drawings a building profile can be defined that documents building age, type, usage, major energy consuming equipment or systems, etc.

The preliminary audit information is gathered in preparation for the site survey. The site survey provides critical information in deciphering where energy is spent and opportunities exist within a facility. The entire site is surveyed to inventory the following to gain an understanding of how each facility operates:

- Building envelope (roof, windows, etc.)
- Heating, ventilation, and air conditioning equipment (HVAC)
- Lighting systems and controls
- Facility-specific equipment

The building site visit is performed to survey all major building components and systems. The site visit includes detailed inspection of energy consuming components. Summary of building occupancy schedules, operating and maintenance practices, and energy management programs provided by the building manager are collected along with the system and components to determine a more accurate impact on energy consumption.

III. METHOD OF ANALYSIS

Post site visit work includes evaluation of the information gathered, researching possible conservation opportunities, organizing the audit into a comprehensive report, and making recommendations on HVAC, lighting and building envelope improvements. Data collected is processed using energy engineering calculations to anticipate energy usage for each of the proposed energy conservation measures (ECMs). The actual building's energy usage is entered directly from the utility bills provided by the owner. The anticipated energy usage is compared to the historical data to determine energy savings for the proposed ECMs.

It is pertinent to note, that the savings noted in this report are not additive. The savings for each recommendation is calculated as standalone energy conservation measures. Implementation of more than one ECM may in some cases affect the savings of each ECM. The savings may in some cases be relatively higher if an individual ECM is implemented in lieu of multiple recommended ECMs. For example implementing reduced operating schedules for inefficient lighting will result in a greater relative savings. Implementing reduced operating schedules for newly installed efficient lighting will result in a lower relative savings, because there is less energy to be saved. If multiple ECM's are recommended to be implemented, the combined savings is calculated and identified appropriately.

ECMs are determined by identifying the building's unique properties and deciphering the most beneficial energy saving measures available that meet the specific needs of the facility. The building construction type, function, operational schedule, existing conditions, and foreseen future plans are critical in the evaluation and final recommendations. Energy savings are calculated base on industry standard methods and engineering estimations. Energy consumption is calculated based on manufacturer's cataloged information when new equipment is proposed.

Cost savings are calculated based on the actual historical energy costs for the facility. Installation costs include labor and equipment costs to estimate the full up-front investment required to implement a change. Costs are derived from Means Cost Data, industry publications, and local contractors and equipment suppliers. The NJ Smart Start Building® program incentives savings (where applicable) are included for the appropriate ECM's and subtracted from the installed cost. Maintenance savings are calculated where applicable and added to the energy savings for each ECM. The life-time for each ECM is estimated based on the typical life of the equipment being replaced or altered. The costs and savings are applied and a simple payback, simple lifetime savings, and simple return on investment are calculated. See below for calculation methods:

ECM Calculation Equations:

$$Simple\ Payback = \left(\frac{Net\ Cost}{Yearly\ Savings} \right)$$

$$Simple\ Lifetime\ Savings = \left(Yearly\ Savings \times ECM\ Lifetime \right)$$

$$Simple\ Lifetime\ ROI = \frac{(Simple\ Lifetime\ Savings - Net\ Cost)}{Net\ Cost}$$

$$Lifetime\ Ma\,\mathrm{int}\,enance\ Savings = \left(Yearly\ Ma\,\mathrm{int}\,enance\ Savings \times ECM\ Lifetime \right)$$

$$Internal\ Rate\ of\ \mathrm{Re}\,turn = \sum_{n=0}^{N} \left(\frac{Cash\ Flow\ of\ Period}{(1 + IRR)^n} \right)$$

$$Net\ \mathrm{Pr}\,esent\ Value = \sum_{n=0}^{N} \left(\frac{Cash\ Flow\ of\ Period}{(1 + DR)^n} \right)$$

Net Present Value calculations based on Interest Rate of 3%.

IV. HISTORIC ENERGY CONSUMPTION/COST

A. Energy Usage / Tariffs

The energy usage for the facility has been tabulated and plotted in graph form as depicted within this section. Each energy source has been identified and monthly consumption and cost noted per the information provided by the Owner.

Public Service Electric and Gas Company (PSE&G) transports electricity to the facility under the Large Power and Lighting Service (LPLS) Electric Rate. Hess Electric is the third party provider for the generation portion of the electric bill as of August, 2010. This building shares an electric account with the County Offices/Court Facility building. The usage was pro-rated based on hours of operation and square footage.

Currently, Burlington County is taking advantage of the New Jersey Energy Choice program and is utilizing Great Eastern Energy as their natural gas supplier. PSE&G still provides the transportation service to the facility under their Large Volume Gas (LVG) – Transport Service rate. This building has its own gas account and the usage data is listed below.

Description	Average
Electricity	12.1¢ / kWh
Natural Gas	$0.89 / Therm**

**Due to the Large Volume Gas (LVG) Rate Tariff, the Detention Center natural gas costs are substantially less than those of similar facilities and less than the Offices/Court Facility at this complex.

Table 3
Electricity Billing Data

ELECTRIC USAGE SUMMARY

Utility Provider: PSE&G
Rate: LPLP
Meter No: 578003268
Customer ID No: 4200807718
Third Party Utility
TPS Meter / Acct No:

MONTH OF USE	CONSUMPTION KWH	DEMAND	TOTAL BILL
Aug-09	825,431	1649.3	$91,249
Sep-09	823,508	1622.4	$96,258
Oct-09	652,628	1300.0	$65,150
Nov-09	529,677	1169.3	$58,243
Dec-09	511,263	1200.0	$56,241
Jan-10	568,190	988.8	$75,495
Feb-10	501,589	986.9	$63,659
Mar-10	515,831	973.4	$62,534
Apr-10	573,181	1392.0	$62,484
May-10	597,832	1441.9	$66,341
Jun-10	730,190	1626.2	$100,889
Jul-10	850,637	1547.5	$130,952
Totals	**7,679,957**	**1649.3 Max**	**$929,495**

AVERAGE DEMAND 1324.8 KW average

AVERAGE RATE $0.121 $/kWh

Figure 1
Electricity Usage Profile

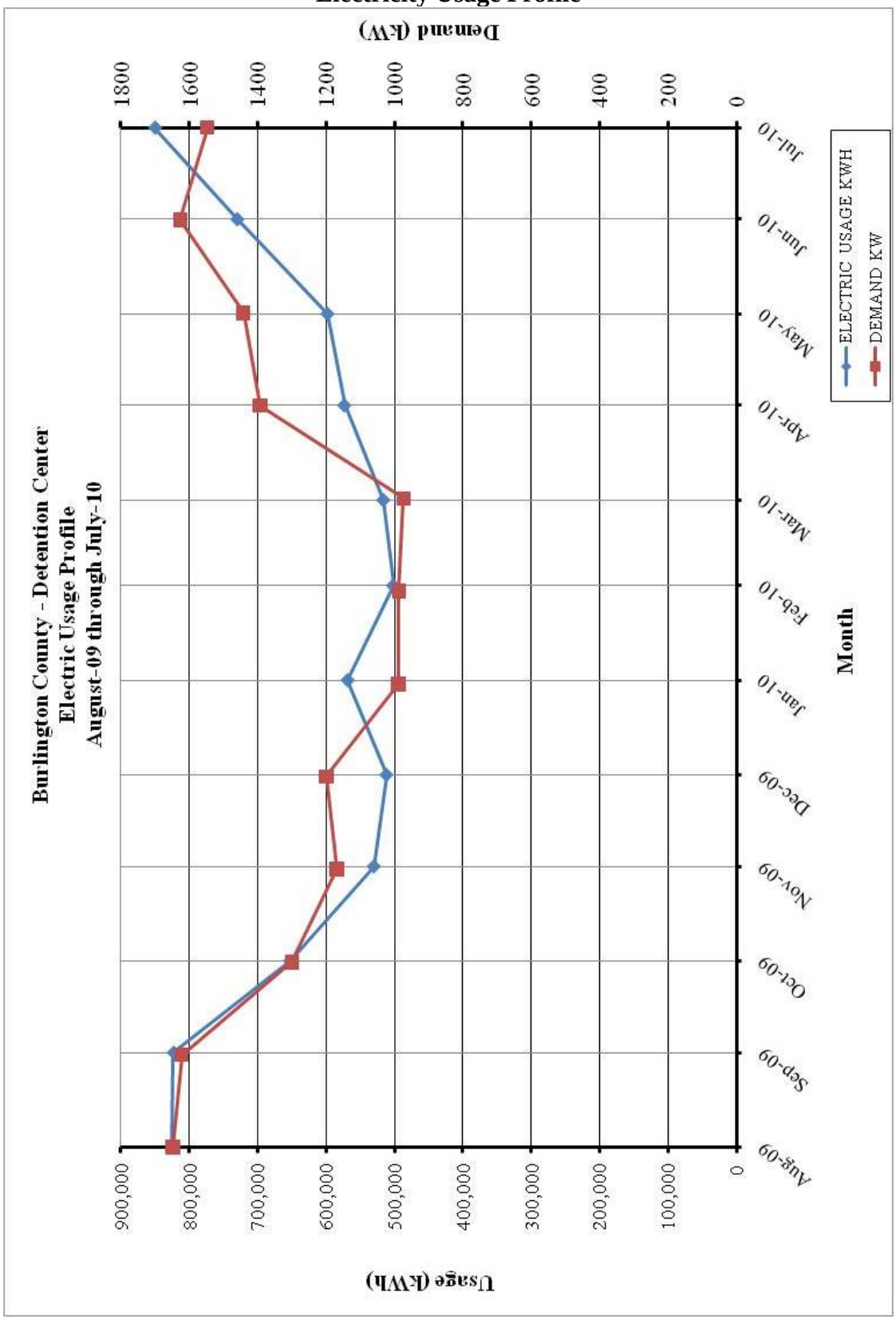
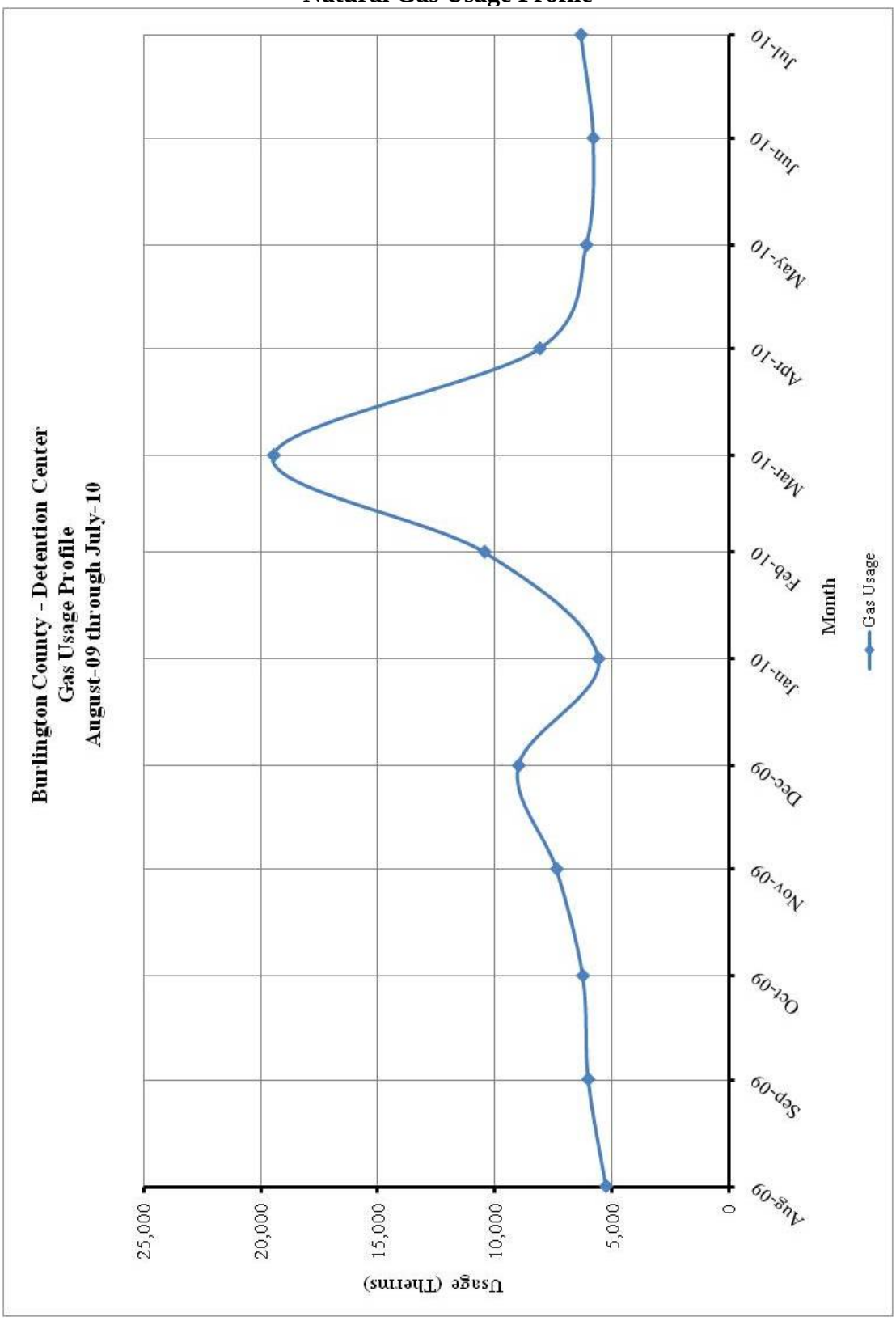


Table 4
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider:	PSE&G	
Rate:	LVG	
Meter No:	1866156	
Point of Delivery ID:	PG000009918865815367	
Third Party Utility Provider:		
TPS Meter No:		
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Aug-09	5,233.69	$3,749.16
Sep-09	5,999.39	$3,939.77
Oct-09	6,229.75	$4,045.16
Nov-09	7,351.01	$6,952.83
Dec-09	8,983.58	$8,793.91
Jan-10	5,557.86	$6,248.46
Feb-10	10,440.90	$11,436.37
Mar-10	19,464.46	$19,468.00
Apr-10	8,073.01	$6,441.09
May-10	6,076.93	$4,620.23
Jun-10	5,785.12	$4,558.86
Jul-10	6,312.12	$5,112.54
TOTALS	**95,507.82**	**$85,366.38**
AVERAGE RATE:	**$0.89**	**$/THERM**

Figure 2
Natural Gas Usage Profile



B. Energy Use Index (EUI)

Energy Use Index (EUI) is a measure of a building's annual energy utilization per square foot of building. This calculation is completed by converting all utility usage consumed by a building for one year, to British Thermal Units (BTU) and dividing this number by the building square footage. EUI is a good measure of a building's energy use and is utilized regularly for comparison of energy performance for similar building types. The Oak Ridge National Laboratory (ORNL) Buildings Technology Center under a contract with the U.S. Department of Energy maintains a Benchmarking Building Energy Performance Program. The ORNL website determines how a building's energy use compares with similar facilities throughout the U.S. and in a specific region or state.

Source use differs from site usage when comparing a building's energy consumption with the national average. Site energy use is the energy consumed by the building at the building site only. Source energy use includes the site energy use as well as all of the losses to create and distribute the energy to the building. Source energy represents the total amount of raw fuel that is required to operate the building. It incorporates all transmission, delivery, and production losses, which allows for a complete assessment of energy efficiency in a building. The type of utility purchased has a substantial impact on the source energy use of a building. The EPA has determined that source energy is the most comparable unit for evaluation purposes and overall global impact. Both the site and source EUI ratings for the building are provided to understand and compare the differences in energy use.

The site and source EUI for this facility is calculated as follows:

$$Building\ Site\ EUI = \frac{(Electric\ Usage\ in\ kBtu + Gas\ Usage\ in\ kBtu)}{Building\ Square\ Footage}$$

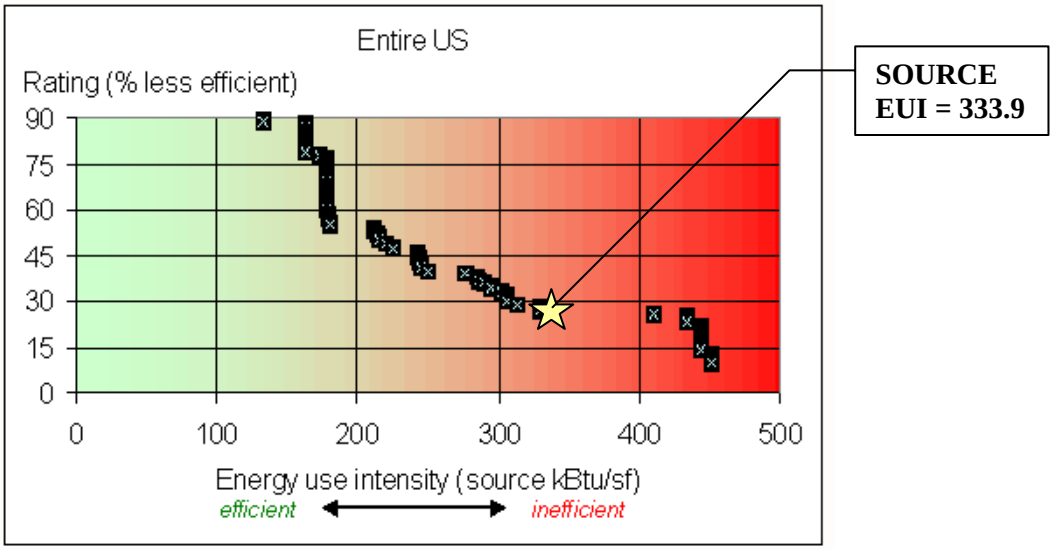
$$Building\ Source\ EUI = \frac{(Electric\ Usage\ in\ kBtu\ X\ SS\ Ratio + Gas\ Usage\ in\ kBtu\ X\ SS\ Ratio)}{Building\ Square\ Footage}$$

Table 5
Facility Energy Use Index (EUI) Calculation

ENERGY USE INTENSITY CALCULATION						
ENERGY TYPE	**BUILDING USE**			**SITE ENERGY**	**SITE-SOURCE RATIO**	**SOURCE ENERGY**
	kWh	**Therms**	**Gallons**	**kBtu**		**kBtu**
ELECTRIC	2,559,985.7			8,739,791	3.340	29,190,902
NATURAL GAS		95,507.8		9,550,782	1.047	9,999,669
FUEL OIL			0.0	0	1.010	0
PROPANE			0.0	0	1.010	0
TOTAL				18,290,573		39,190,571
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.						
BUILDING AREA			117,368	SQUARE FEET		
BUILDING SITE EUI			*155.84*	kBtu/SF/YR		
BUILDING SOURCE EUI			*333.91*	kBtu/SF/YR		

Figure 3 below depicts a national EUI grading for the source use of *Public Order and Safety Buildings*.

Figure 3
Source Energy Use Intensity Distributions: Public Order Buildings



C. EPA Energy Benchmarking System

The United States Environmental Protection Agency (EPA) in an effort to promote energy management has created a system for benchmarking energy use amongst various end users. The benchmarking tool utilized for this analysis is entitled Portfolio Manager. The Portfolio Manager tool allows tracking and assessment of energy consumption via the template forms located on the ENERGY STAR website (www.energystar.gov). The importance of benchmarking for local government municipalities is becoming more important as utility costs continue to increase and emphasis is being placed on carbon reduction, greenhouse gas emissions and other environmental impacts.

Based on information gathered from the ENERGY STAR website, Government agencies spend more than $10 billion a year on energy to provide public services and meet constituent needs. Furthermore, energy use in commercial buildings and industrial facilities is responsible for more than 50 percent of U.S. carbon dioxide emissions. It is vital that local government municipalities assess facility energy usage, benchmark energy usage utilizing Portfolio Manager, set priorities and goals to lessen energy usage and move forward with priorities and goals.

In accordance with the Local Government Energy Audit Program, CEG has created an ENERGY STAR account for the municipality to access and monitoring the facility's yearly energy usage as it compares to facilities of similar type. The login page for the account can be accessed at the following web address; the username and password are also listed below:

https://www.energystar.gov/istar/pmpam/index.cfm?fuseaction=login.login

User Name: burlingtoncounty
Password: lgeaceg2010

Security Question: What city were you born in?
Security Answer: "burlington"

The utility bills and other information gathered during the energy audit process are entered into the Portfolio Manager. The following is a summary of the results for the facility:

Table 6
ENERGY STAR Performance Rating

ENERGY STAR PERFORMANCE RATING		
FACILITY DESCRIPTION	**ENERGY PERFORMANCE RATING**	**NATIONAL AVERAGE**
Burlington County Detention Center	N/A	N/A

An Energy Performance Rating cannot be established for the Campus or individual buildings. The Energy Star program does not have enough bin data available to calculate a campus wide

Energy Performance Rating at this time. Also, individual building ratings cannot be established due to the design of the Campus wide electric and gas distribution system. One year of utility data must be entered for each building or facility, since reliable building energy meters do not exist, this approach cannot be taken.

V. FACILITY DESCRIPTION

This 117,368 SF Detention Center includes a basement and three floors facility comprised of 169 cells, main control room, gym, administration offices, full-cooking kitchen with walk-in refrigerator and freezers, laundry room, medical suite, Sallyport, and mechanical/electrical rooms. The original building was completed in 1988 with HVAC upgrades in 2004 and the sallyport and additional office space constructed in 2005. There are approximately 620 employees including inmates in this facility that operates 168 hours per week.

Exterior walls are brick/block construction with minimum insulation typical of the time period. The amount of insulation within the wall is unknown. The windows throughout the facility are in good condition and appear to be maintained. Typical windows throughout the facility are double pane, ¼" clear glass, insulated with vinyl frames. Blinds are utilized through the facility per occupant comfort. The blinds are valuable because they help to reduce heat loss in the winter and reduce solar heat in the summer. The cell block roof is standing seam metal roof system. The balance of the roof along with the 2005 addition is constructed of a built-up roof with EPDM rubber roofing where most of the rooftop HVAC equipment is located. The amount of insulation below the New Addition roofing is approximately 3-inch.

HVAC Systems

The original 1988 facility is heated and cooled by a Water Source Heat Pump (WSHP) system that consists of a number of WSHP units, a closed circuit cooling tower, boilers, water-circulating loop and associated water-circulating pumps. The WSHP units vary in size from ½ to 5 ton and larger units (6 ton to 10 to) are rooftop types. The boilers which also provide heating hot water to various terminal units are 1988 Weil-McLain, gas-fired, Model BGL 788-WS units with input of 2,049 MBH each and an output of 1,632 MBH. It is estimated that with the present age and condition of the boilers, the thermal efficiency is estimated to be 75%. The closed circuit cooling tower is a 2004 Evapco Model ATW-102-3J with a 15 HP fan and a 7.5 HP spray pump with a rated capacity of 550 GPM. The hot water is delivered at 200°F directly to various convectors, unit heater units, cabinet unit heaters, etc. by two (2) 3 HP pumps. The WSHP loop pumps are two (2) 15 HP units.

Ventilation air for the cells is provided by three (3) Semco Model FV5000V rooftop units with energy recovery wheels. It is assumed that these energy recovery wheels can cool and dehumidify the outdoor air as much as possible during cooling. The ventilation air is supplied at a neutral temperature through ductwork to the WSHP units. The circulating loop temperature is maintained between 60°F and 90°F. When more zones require heat than those needing cooling, the loop temperature drops (approaching 60°F), and the boiler is activated to make up the heat deficit. When more zones need cooling than those requiring heat, the loop temperature rises (approaching 90°F), and the cooling tower is activated to reject unwanted heat.

The 2004 renovation replaced the closed circuit cooling tower, and added the three (3) Heat Recovery Units for the cell tower along with some new WSHPs manufactured by Climate Master. Also included was a new exhaust fan and HEPA filter housing for the medical suite.

Humidity control is typically not a problem at full load (hottest, most humid days of the summer) as the WSHP unit coil is at its coldest temperature and moisture is being removed from the space. The biggest problem occurs at part-load. If the WSHP has one stage of cooling and is cycled on/off to control room temperature, the room relative humidity rises during the off cycle. During the site inspection, the building operators stated that the "cooling system provides inadequate cooling and both the inmates & guards complain of high temperatures." In addition, the HVAC mechanic stated that some of the WSHP units trip out on high temperature and/or high pressure and have to be reset manually.

CEG strongly recommends that Burlington County perform an HVAC Evaluation and undertake Retro-Commissioning of the entire WSHP system to ascertain whether it is a design and/or an operational issue. During the site inspection, several of the WSHP units were not functioning. In addition, while on the roof, the cooling tower fan was operating on/off in incomplete cycles. Ensuring that all the HVAC equipment and controls are operating at peak efficiency and per the facility requirements needs further analysis of the building operations. This effort can significantly reduce thermal and electrical loads for the original Detention Center building.

The 2005 Addition is heated by two (2) Lochinvar Model EBN150 modular, condensing boilers with an input of 150 MBH, output of 126 MBH for an efficiency of 84%. Two primary hot water pumps circulate the water through the boilers and a secondary pump delivers the hot water to VAV terminal units with hot water coils, unit heaters, ceiling cabinet heaters, etc. throughout the offices and sallyport. The offices are additionally heated and cooled by a Lennox 15-Ton DX cooling and gas-fired heating rooftop unit with an input of 169 MBH, 135 MBH output and an efficiency of 80%. The DX cooling is rated at 185.6 MBH and the 5 HP supply air fan delivers 4,500 CFM at 2" of external static pressure.

Exhaust System

Air is exhausted from the toilet rooms, mechanical/electrical rooms, storage rooms, vehicular sallyport, etc. through the roof exhausters. These exhaust fans are operated based on the facility occupancy schedule. Six exhaust fans operate for smoke control only.

HVAC System Controls

The HVAC systems within the original 1988 facility are controlled via a Honeywell pneumatic controls system that includes the following:

- Summer/Winter switch
- Hot Water Temperature Adjustment for:
  - Indoor Exercise Room
  - Inmate Dining Room

The system includes a Honeywell Series 200 controller for the jail tower control. Since the jail tower operates 24/7, there is no nighttime temperature setback.

The 2004 renovation replaced the water source heat pumps which included electronic controls.

The 2005 Addition is controlled by individual thermostats and a rooftop unit controller for the Lennox unit.

Domestic Hot Water

Domestic Hot Water (DHW) for the original building consists of two (2) A. O. Smith Model BTP200-600,000 units with 200-gallon capacity each with an input of 600,000 BTUH and a recovery of 582 gallons/hour. These two units provide hot water for the showers, guard locker rooms, and restrooms. During the site inspection, noticeable rusting and leaking of the storage tanks was observed. The kitchen hot water is provided by an A. O. Smith Model BTR400A hot water heater with 100 gallons of storage capacity, 399,000 BTUH input and 378 gallons/hour recovery.

DHW for the 2005 Addition is provided by a gas-fired hot water heater by Bradford White which has an input of 65 MBH, a recovery of 43 gallons/hour and a 65-gallon storage capacity.

Kitchen

The kitchen is heated and ventilated by a Trane gas-fired make-up air unit with 100% outside air, a capacity of 4,000 CFM, hot water coil along with two (2) kitchen hood exhausters for the two (2) kitchen hoods. These two hood exhaust fans are rated at 3,750 CFM (2 HP) and 1,500 CFM (1 HP) and are upblast roof type fans. There are also two (2) Bally walk-in boxes with air-cooled condensers on the roof.

Laundry Room

The laundry equipment consists of two (2) gas-fired American Dryer Corporation units along with two (2) 2008 Milnor Model 30022T5E 9 CF and 10 CF washers.

Lighting

Typical lighting throughout the detention facility is fluorescent tube lay-in fixtures with T-8 lights and electronic ballasts. In addition the lobby, gym and corridors contain some metal halide fixtures.

VI. MAJOR EQUIPMENT LIST

The equipment list contains major energy consuming equipment that through implementation of energy conservation measures could yield substantial energy savings. The list shows the major equipment in the facility and all pertinent information utilized in energy savings calculations. An approximate age was assigned to the equipment in some cases if a manufactures date was not shown on the equipment's nameplate. The ASHRAE service life for the equipment along with the remaining useful life is also shown in the Appendix.

Refer to the **Major Equipment List Appendix** for this facility.

VII. ENERGY CONSERVATION MEASURES

ECM #1: Lighting Upgrade

Description:

The lobby, corridor and gym areas contain metal halide fixtures which can be retrofitted with new ballasts and compact fluorescents (CFL's) in order to save energy.

Compact fluorescent lamps (CFL's) were created to be direct replacements for the standard incandescent lamps which are common to table lamps, spot lights, hi-hats, bathroom vanity lighting, etc. The light output of the CFL has been designed to resemble the incandescent lamp. The color rendering index (CRI) of the CFL is much higher than standard fluorescent lighting, and therefore provides a much "truer" light. The CFL is available in a myriad of shapes and sizes depending on the specific application.

This ECM shall replace all metal halide fixtures with new ballasts and compact fluorescent equivalents.

Energy Savings Calculations:

Refer to the **Investment Grade Lighting Audit Appendix** for detailed energy savings calculations for retrofit of metal halide lamps to compact fluorescents with new electronic ballasts.

Currently there are no NJ Smart Start® Program Incentives available for the replacement of metal halide fixtures and ballasts with compact fluorescents.

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$3,020
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$3,020
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,942
Total Yearly Savings ($/Yr):	$1,942
Estimated ECM Lifetime (Yr):	15
Simple Payback	1.6
Simple Lifetime ROI	864.6%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$29,130
Internal Rate of Return (IRR)	64%
Net Present Value (NPV)	$20,163.47

ECM #2: Condensing Boiler Installation

Description:

The existing boilers are used as the primary source of heat for the building. The existing boilers are over half of its life expectancy of a typical boiler. Even for boilers that are close to the end of its life it is difficult to predict the point at which the boiler becomes inoperable. With the increased efficiency of new condensing boilers, the savings through a replacement can be substantial.

New condensing boilers could substantially improve the operating efficiency of the heating system of the building. Condensing boiler's peak efficiency is up to 99% depending on return water temperature. Due to the operating conditions of the building, the annual average operating efficiency of the proposed condensing boiler is expected to be 90%. The existing boiler's efficiency is approximately 75%, which makes the condensing boilers an 15% increase in efficiency. This ECM is based on variable supply water temperature adjusted based on outdoor temperature.

This ECM includes installation of two condensing gas fired boilers to replace the existing boilers. The basis for this ECM is two Aerco BMK 2.0 condensing boilers. The boiler installation is based on a one-for-one replacement based on capacity of the existing boilers.

Energy Savings Calculations:

Baseline Hot Water Gas Use: 5,832.58 Therms (Ave from June & September Gas Use)

Existing Heating Natural Gas: 95,507.82 Therms – (5,832.58 Therms X 10 Months)
37,182 Therms (Sept through June Use - Baseline)

$$Bldg\ Heat\ \mathrm{Re}quired = Existing\ Nat\ Gas\ (Therms) \times Heating\ Eff.(\%) \times Fuel\ HeatValue\left(\frac{BTU}{Therm}\right)$$

$$\mathrm{Pr}oposed\ Heating\ Gas\ Usage = \frac{Bldg\ Heat\ \mathrm{Re}quired\ (BTU)}{Heating\ Eff.(\%) \times Fuel\ Heat\ Value\left(\frac{BTU}{Therm}\right)}$$

$$Energy\ Cost = Heating\ Gas\ Usage(Therms) \times Ave\ Fuel\ Cost\left(\frac{\$}{Therm}\right)$$

CONDENSING BOILER CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Existing Cast Iron Boilers	New Condensing Boilers	
Existing Nat Gas (Therms)	37,182	N/A	
Boiler Efficiency (%)	75%	96%	21%
Nat Gas Heat Value (BTU/Therm)	100,000	100,000	
Equivalent Building Heat Usage (kBTUs)	2,788,650	2,788,650	
Gas Cost ($/Therm)	0.89	0.89	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Natural Gas Usage (Therms)	37,182	29,048	8,134
Energy Cost ($)	$33,092	$25,853	$7,239
COMMENTS:			

Installation cost of the two new Aerco BMK 2.0 condensing boilers, demolition, flue piping, boiler water piping modifications, gas piping modifications, electric, etc. is estimated to be $186,500.

From the **NJ Smart Start Appendix**, the installation of new condensing boilers warrants the following incentive: $1.00 per MBH for boilers between 1,500 MBH and 4,000 MBH.

$$\text{Smart Start®}\ Incentive = (Boiler\ MBH \times \$1.00) = (4{,}000 \times \$1.00) = \$4{,}000$$

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$186,500
NJ Smart Start Equipment Incentive ($):	$4,000
Net Installation Cost ($):	$182,500
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$7,239
Total Yearly Savings ($/Yr):	$7,239
Estimated ECM Lifetime (Yr):	30
Simple Payback	25.2
Simple Lifetime ROI	19.0%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$217,170
Internal Rate of Return (IRR)	1%
Net Present Value (NPV)	($40,612.41)

ECM #3: NEMA Premium Efficiency Motor Replacement

Description:

Replacing old system pump motors with new efficient motors is a simple change that can provide substantial savings. The majority of the pump motors at the Detention Center are fractional horse power motors; however the main heating loop has two (2) 3 HP motors and the heat pump loop has two (2) 15 HP motors. The improved efficiency of the NEMA premium efficient motors is primarily due to better designs with use of better materials to reduce losses. Because many motors operate continuously, even small increases in efficiency can yield substantial energy and dollar savings.

This ECM includes replacing two (2) 3 HP and two (2) 15 HP pump motors with NEMA Premium® Efficient Motors. NEMA Premium® is the most efficient motor designation in the marketplace today.

Energy Savings Calculations:

Hours of Operation = 4760 Hours/ Year (Based on 24/7 operating season)
Motor Load Factor = 75%
Cost Of Electricity = $ .121/kWh

$$EnergyUsage = \frac{HP \times 0.746 \left(\frac{KW}{HP}\right) \times Operating\ Hrs \times Load\ Factor.}{Efficiency\ (\%)}$$

$$Energy\ Cost = Energy\ Use \times Elec\ Cost \left(\frac{\$}{kWh}\right)$$

NEMA PREMIUM MOTOR REPLACEMENT CALC						
Motor HP	**Existing Efficiency**	**NEMA Premium Efficiency**	**Hour of Operation**	**kW Savings**	**kWh Savings**	**Cost Savings**
3	86.5%	89.5%	4760	0.07	310	$37
3	86.5%	89.5%	4760	0.07	310	$37
15	90.2%	93.0%	4760	0.28	1,333	$161
15	90.2%	93.0%	4760	0.28	1,333	$161
Total:				**0.7**	**3,286**	**$398**

SmartStart Building® incentive for 3 hp NEMA motor = $60/motor.
SmartStart Building® incentive for 15 hp NEMA motor = $104/motor.

The following table outlines the motor replacements for this facility:

MOTOR REPLACEMENT SAVINGS							
Motor HP	**Qty**	**Encl. Type**	**Installed Cost**	**Smart Start Incentive**	**Total Cost**	**Total Savings**	**Simple Payback**
3	1	TEFC	$1,317	$60	$1,257	$37.46	33.6
3	1	TEFC	$1,317	$60	$1,257	$37.46	33.6
15	1	ODP	$2,613	$104	$2,509	$161.34	15.6
15	1	ODP	$2,613	$104	$2,509	$161.34	15.6
Total:					**$7,532**	**$398**	**18.9**

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$7,860
NJ Smart Start Equipment Incentive ($):	$328
Net Installation Cost ($):	$7,532
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$398
Total Yearly Savings ($/Yr):	$398
Estimated ECM Lifetime (Yr):	18
Simple Payback	18.9
Simple Lifetime ROI	-4.9%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$7,164
Internal Rate of Return (IRR)	-1%
Net Present Value (NPV)	($2,058.10)

ECM #4: High-Efficiency Gas-Fired Commercial Laundry Dryers

Description:

The existing laundry room has two (2) older vintage gas-fired commercial sized dryers by American Dryer Corporation. These gas-fired dryers are less efficient than the modern units which minimize drying time with airflow patterns, useable cylinder space, and improved burner/controls. This ECM would replace the two (2) existing gas-fired dryers with more efficient units.

Energy Savings Calculations:

According to several manufacturers of high-efficiency, gas-fired, commercial dryers, the average efficiency improvement is estimated to be 5% of existing gas usage. The existing two (2) units use approximately 4.8 Therms per hr x 4,000 hrs/yr = 19,200 Therms x $0.89/Therm = $17,088/year in natural gas costs.

Estimated energy cost savings = 5% x $17,088/year = $854/year

The cost of removing the two existing units, disconnect/re-connect the gas lines, and install/commission the new units is $8,400.

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$8,400
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$8,400
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$854
Total Yearly Savings ($/Yr):	$854
Estimated ECM Lifetime (Yr):	15
Simple Payback	9.8
Simple Lifetime ROI	52.5%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$12,810
Internal Rate of Return (IRR)	6%
Net Present Value (NPV)	$1,795.00

ECM #5: Evaporator Fan Controls on Walk-in Boxes

Description:

The refrigerated walk-in cooler/freezers in the kitchen have a bank of three (3) evaporator fans that circulate the cold air over and under the food. These banks of evaporator fans (typically 1/3 HP motors) run continuously and give off heat that must be removed by the refrigeration.

This measure would install an evaporator fan controller for each bank of fans that features two-speed operation of the evaporator fans – high speed during cooling, and low speed when not cooling. The estimated energy savings assumes that the cooler is not opened for 10 hours of each day for 365 days per year.

Energy Savings Calculations:

See Walk-in Refrigerator Appendix for the detailed energy and installation calculations for this energy conservation measure.

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$20,359
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$20,359
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$6,619
Total Yearly Savings ($/Yr):	$6,619
Estimated ECM Lifetime (Yr):	15
Simple Payback	3.1
Simple Lifetime ROI	387.7%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$99,285
Internal Rate of Return (IRR)	32%
Net Present Value (NPV)	$58,658.19

ECM #6: Commercial Kitchen Exhaust Hood Controls

Description:

The kitchen in this facility is equipped with a (16' x 5') and a (20' x 6') commercial kitchen exhaust hood providing exhaust for the cooking equipment. The total kitchen exhaust from the hoods is approximately 5,250 CFM powered by exhaust fans located on the roof. The make-up air unit provides conditioned air to replace all the air exhausted through the exhaust hood with an estimated 1 HP supply fan power. This system operates based on manual switches located in the kitchen. The installation of kitchen exhaust controls would significantly reduce the total kitchen exhaust and make-up air quantity. The conditioned make up air and exhausted air savings are achieved by monitoring the exhaust hoods and exhaust based on the actual use of the kitchen equipment. Temperature sensors and optical lasers monitor the heat and smoke production at each exhaust hood to reduce the exhaust and make-up airflow based on the need of the kitchen equipment.

This ECM includes installation of kitchen exhaust controls for the kitchen exhaust hood and VFD's for the constant volume supply and exhaust fans. The hood will be retrofitted with temperature and laser sensors to monitor the activity of each of all equipment installed below the hoods. The work involves installing a Melink Kitchen Hood Variable Air Volume Controller; variable frequency drives on the kitchen hood exhaust fan; and turn off all the kitchen hood exhaust systems when the kitchen is closed. When the cooking appliances are turned on, the hood exhaust fan speed will increase based on the hood exhaust temperature. During heavy cooking, the kitchen hood exhaust fan increases to 100% speed until the smoke/vapor is removed. Energy savings are also realized when the kitchen equipment is operating at less than full load due to minimal cooking operations. During these times the fan speed decreases, removing only the necessary amount of air, saving exhaust fan energy and make up air conditioning energy.

Energy Calculations Summary:

Detailed calculations for the proposed kitchen hood control system can be found in the **Kitchen Exhaust Calculations Appendix.** It is pertinent to note that the calculation assumes the exhaust fans and make-up air unit are manually turned off for approximately 12 hours per day.

Installed cost of the kitchen hood control system is $40,000. The calculated energy savings equals approximately $2,695 per year.

A summary of energy savings can be seen in the table below:

KITCHEN EXHAUST CONTROLS CALCULATION			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Manually Controlled Kitchen Exhaust	MELINK Kitchen Exhaust Controls	-
Fan Power Usage (kWh)	13,034	4,406	8,629
Gas Usage (Therms)	4,272	2,777	1,495
Cooling Energy (kWh)	7,560	4,914	2,646
Average Gas Cost ($/Therm)	0.89	0.89	-
Electric Cost ($/KWH)	0.121	0.121	-
SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Gas Energy Cost ($)	$3,802	$2,471	$1,331
Electric Energy Cost ($)	$2,492	$1,128	$1,364
Total Energy Cost ($)	$6,294	$3,599	$2,695
COMMENTS:	*ECM is based on calculations using spreadsheets privded by MELINK Intelli-hood controls manufacturer.		

Energy Savings Summary:

ECM #6 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$40,000
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$40,000
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$2,695
Total Yearly Savings ($/Yr):	$2,695
Estimated ECM Lifetime (Yr):	15
Simple Payback	14.8
Simple Lifetime ROI	1.1%
Simple Lifetime Maintenance Savings	0
Simple Lifetime Savings	$40,425
Internal Rate of Return (IRR)	0%
Net Present Value (NPV)	($7,827.26)

ECM #7: Air Conditioning Unit Upgrades

Description:

Various spaces in Detention Center are conditioned with older split AC systems made by Trane. These units are older and inefficient units compared to today's split systems. New split air conditioner condensers provide higher full load and part load efficiencies due to advances in inverter motor technologies and refrigerants. This ECM includes one-to-one replacement of the older air conditioning units with new higher efficiency systems. A summary of this ECM can be found in the table below:

IMPLEMENTATION SUMMARY			
ECM INPUTS	**NUMBER OF UNITS**	**TOTAL CAPACITY, TONS**	**REPLACE UNIT WITH**
Trane BTA060	2	10	New Condensing Unit
Total	**2**	**10.00**	

The basis for the energy calculations for each air conditioning unit is summarized in the table below. The replacement units utilize high efficiency R410a refrigerant. Therefore, the retrofit includes replacement of the refrigerant coil in the air handling units.

IMPLEMENTATION SUMMARY			
ECM INPUTS	**TOTAL CAPACITY, TONS**	**REPLACE UNIT WITH**	**BASIS**
Trane BTA060	10	New Condensing Unit	RHEEM PRESTIGE RASL-060
Total	**10.00**		

Energy Savings Calculations:

Cooling Energy Savings:

Energy consumption of each air conditioner at cooling mode is calculated based on applicable energy efficiency measure with the equations below.

$$\text{Energy Savings, kWh} = \text{Cooling Capacity}, \frac{\text{BTU}}{\text{Hr}} \times \left(\frac{1}{\text{EER}_{\text{Old}}} - \frac{1}{\text{EER}_{\text{New}}}\right) \times \frac{\text{Full Load Hours}}{1000 \frac{\text{W}}{\text{kWh}}}$$

$$\text{Demand Savings, kW} = \frac{\text{Energy Savings (kWh)}}{\text{Hours of Cooling}}$$

$$\text{Cooling Cost Savings} = \text{Energy Savings, kWh} \times \text{Cost of Electricity}, \left(\frac{\$}{\text{kWh}}\right)$$

ENERGY SAVINGS CALCULATIONS							
ECM INPUTS	COOLING CAPACITY, BTU/Hr	ANNUAL COOLING HOURS	EXISTING UNIT EFFICIENCY	NEW UNIT EFFICIENCY	# OF UNITS	ENERGY SAVINGS kWh	DEMAND SAVINGS kW
Trane BTA060	60,000	1,500	8 EER	11.5 EER	2	6,848	4.6
Total					2	6,848	4.6

Project Cost, Incentives and Maintenance Savings

From the NJ Smart Start® Program appendix, the replacement of split AC units falls under the category "Unitary HVAC Split System" and warrants an incentive based on efficiency (SEER, EER) of each type of system. The program incentives are calculated as follows:

$$\text{SmartStart® Incentive} = (\text{Cooling Tons} \times \$/\text{Ton Incentive})$$

REBATE SUMMARY				
UNIT DESCRIPTION	UNIT EFFICIENCY	REBATE $/TON	PROPOSED CAPACITY TONS	TOTAL REBATE $
5.4 tons or less Unitary AC and Split System	≥14 SEER	$92	10.00	$920
TOTAL			**10**	**$920**

Summary of cost, savings and payback for this ECM is below.

COST & SAVINGS SUMMARY							
ECM INPUTS	INSTALLED COST	# OF UNITS	TOTAL COST	REBATES	NET COST	ENERGY SAVING	PAY BACK YEARS
Trane BTA060	$8,650	2	$17,300	$920	$16,380	$829	19.8
Total		2	$17,300	$920	$16,380	$829	19.8

Total cost of units includes replacement of the cooling coils in the air handling unit. There is no significant maintenance savings due to implementation of this ECM.

Energy Savings Summary:

ECM #7 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$17,300
NJ Smart Start Equipment Incentive ($):	$920
Net Installation Cost ($):	$16,380
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$829
Total Yearly Savings ($/Yr):	$829
Estimated ECM Lifetime (Yr):	15
Simple Payback	19.8
Simple Lifetime ROI	-24.1%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$12,435
Internal Rate of Return (IRR)	-3%
Net Present Value (NPV)	($6,483.45)

VIII. RENEWABLE/DISTRIBUTED ENERGY MEASURES

Globally, renewable energy has become a priority affecting international and domestic energy policy. The State of New Jersey has taken a proactive approach, and has recently adopted in its Energy Master Plan a goal of 30% renewable energy by 2020. To help reach this goal New Jersey created the Office of Clean Energy under the direction of the Board of Public Utilities and instituted a Renewable Energy Incentive Program to provide additional funding to private and public entities for installing qualified renewable technologies. A renewable energy source can greatly reduce a building's operating expenses while producing clean environmentally friendly energy. CEG has assessed the feasibility of installing renewable energy measures (REM) for the Burlington County Detention Center utilizing renewable technologies and concluded that there is potential for solar energy generation. The solar photovoltaic system calculation summary will be concluded as **REM#1** within this report.

Solar Generation

Solar energy produces clean energy and reduces a building's carbon footprint. This is accomplished via photovoltaic panels which are placed on constructed parking lot canopy systems in the parking lot of the Detention Center. Parking lots can also be utilized for the installation of a solar array. A truss system can be installed that is high enough to park vehicles under the array and no parking lot area is lost.

The state of NJ has instituted a program in which one Solar Renewable Energy Certificate (SREC) is given to the Owner for every 1000 kWh of generation. SREC's can be sold anytime on the market at their current market value. The value of the credit varies upon the current need of the power companies. The average value per credit is around $350, this value was used in our financial calculations. This equates to $0.35 per kWh generated.

CEG has reviewed the existing roof area and site of Burlington Township Middle School at Springside for the purposes of determining a potential for a photovoltaic system. CEG believes a ground mounted parking lot canopy system is best suited for this site. An area of 37,700 S.F. can be utilized for a PV system as depicted in the **Renewable / Distributed Energy Measures Calculation Appendix**. Using this square footage it was determined that a system size of 321.54 kilowatts could be installed. A system of this size has an estimated kilowatt hour production of 683,303 KWh annually, reducing the overall utility bill by approximately 26.6% percent. A detailed financial analysis can be found in the **Renewable / Distributed Energy Measures Calculation Appendix**. This analysis illustrates the payback of the system over a 25 year period. The eventual degradation of the solar panels and the price of accumulated SREC's are factored into the payback.

The proposed photovoltaic array layout is designed based on the specifications for the Sun Power SPR-230 panel. This panel has a "DC" rated full load output of 230 watts, and has a total panel conversion efficiency of 18%. Although panels rated at higher wattages are available through Sun Power and other various manufacturers, in general most manufacturers who produce commercially available solar panels produce a similar panel in the 200 to 250 watt range. This

provides more manufacturer options to the public entity if they wish to pursue the proposed solar recommendation without losing significant system capacity.

The array system capacity was sized on available parking lot space at the existing facility. Estimated solar array generation was then calculated based on the National Renewable Energy Laboratory PVWatts Version 1.0 Calculator. In order to calculate the array generation an appropriate location with solar data on file must be selected. In addition the system DC rated kilowatt (kW) capacity must be inputted, a DC to AC de-rate factor, panel tilt angle, and array azimuth angle. The DC to AC de-rate factor is based on the panel nameplate DC rating, inverter and transformer efficiencies (95%), mismatch factor (98%), diodes and connections (100%), dc and ac wiring(98%, 99%), soiling, (95%), system availability (95%), shading (if applicable), and age(new/100%). The overall DC to AC de-rate factor has been calculated at an overall rating of 81%. The PVWatts Calculator program then calculates estimated system generation based on average monthly solar irradiance and user provided inputs. The monthly energy generation and offset electric costs from the PVWatts calculator is shown in the **Renewable/Distributed Energy Measures Calculation Appendix**.

The proposed solar array is qualified by the New Jersey Board of Public Utilities Net Metering Guidelines as a Class I Renewable Energy Source. These guidelines allow onsite customer generation using renewable energy sources such as solar and wind with a capacity of 2 megawatts (MW) or less. This limits a customer system design capacity to being a net user and not a net generator of electricity on an annual basis. Although these guidelines state that if a customer does net generate (produce more electricity than they use), the customer will be credited those kilowatt-hours generated to be carried over for future usage on a month to month basis. Then, on an annual basis if the customer is a net generator the customer will then be compensated by the utility the average annual PJM Grid LMP price per kilowatt-hour for the over generation. Due to the aforementioned legislation, the customer is at limited risk if they generate more than they use at times throughout the year. With the inefficiency of today's energy storage systems, such as batteries, the added cost of storage systems is not warranted and was not considered in the proposed design.

Direct purchase involves the Detention Center paying for 100% of the total project cost upfront via one of the methods noted in the Installation Funding Options section below. Calculations include a utility inflation rate as well as the degradation of the solar panels over time. Based on our calculations the following is the payback period:

Table 7
Financial Summary – Photovoltaic System

FINANCIAL SUMMARY - PHOTOVOLTAIC SYSTEM			
PAYMENT TYPE	**SIMPLE PAYBACK**	**SIMPLE ROI**	**INTERNAL RATE OF RETURN**
Direct Purchase	14.84 Years	68.4%	4.9%

*The solar energy measure is shown for reference in the executive summary Renewable Energy Measure (REM) table

Given the large amount of capital required by the county to invest in a solar system through a Direct Purchase CEG does not recommend the county pursue this route. It would be more advantageous for the county to solicit Power Purchase Agreement (PPA) Providers who will own, operate, and maintain the system for a period of 15 years. During this time the PPA Provider would sell all of the electric generated by Solar Arrays to the county at a reduced rate compared to their existing electric rate.

Wind Generation

In addition to the Solar Analysis, CEG also conducted a review of the applicability of wind energy for the facility. Wind energy production is another option available through the Renewable Energy Incentive Program. Wind turbines of various types can be utilized to produce clean energy on a per building basis. Cash incentives are available per kWh of electric usage. Based on CEG's review of the applicability of wind energy for the facility, it was determined that the average wind speed is not adequate for purchase of a commercial wind turbine. Therefore, wind energy is not a viable option to implement.

IX. ENERGY PURCHASING AND PROCUREMENT STRATEGY

Load Profile:

Load Profile analysis was performed to determine the seasonal energy usage of the facility. Irregularities in the load profile will indicate potential problems within the facility. Consequently based on the profile a recommendation will be made to remedy the irregularity in energy usage. For this report, the facility's energy consumption data was gathered in table format and plotted in graph form to create the load profile. Refer to The Electric and Natural Gas Usage Profiles included within this report to reference the respective electricity and natural gas usage load profiles.

Electricity:

The Electric Usage Profile demonstrates a fairly typical cooling load profile. The summer (May-August) demonstrates increased consumption typical to air conditioning load. There is a fairly steady yearlong electric load most likely attributable to the water-source heat pumps and lighting/miscellaneous plug loads in the facility. A flat load profile will allow for more competitive energy prices when shopping for alternative suppliers.

Natural Gas:

The Natural Gas Usage Profile demonstrates a very steady profile minus a spike that occurs in March. The steady profile is due to the consistent use of gas-fired equipment in the laundry, kitchen and domestic hot water systems. A base-load shaping (flat) will secure more competitive energy prices when procuring through an alternative energy source.

Tariff Analysis:

Electricity:

The facility receives electric distribution service through Public Service Electric & Gas Company (PSE&G) on rate schedule LPLS (Large Power and Light Service). The facility is currently contracted with a Third Party Supplier (TPS) to provide electric commodity service. For electric supply (generation) service, the client has a choice to either use PSE&G's default service rate (BGS-FP) or contract with a Third Party Supplier (TPS) to supply electric. Currently, via online auction, Hess is providing the TPS duties for the County.

Each year since 2002, the four New Jersey Electric Distribution Companies (EDCs) - Public Service Gas & Electric Company (PSE&G), Atlantic City Electric Company (ACE), Jersey Central Power & Light Company (JCP&L), and Rockland Electric Company (RECO) - have procured several billion dollars of electric supply to serve their Basic Generation Service (BGS) customers through a statewide auction process held in February.

BGS refers to the service of customers who are not served by a third party supplier or competitive retailer. This service is sometimes known as Standard Offer Service, Default Service, or Provider of Last Resort Service.

The Auction Process has consisted of two auctions that are held concurrently, one for larger customers on an hourly price plan (BGS-CIEP) and one for smaller commercial and residential customers on a fixed-price plan (BGS-FP). This facility's rate structure is based on the fixed-price plan (BGS-FP).

The utility, PSE&G will continue to be responsible for maintaining the existing network of wires, pipes and poles that make up the delivery system, which will serve all consumers, regardless of whom they choose to purchase their electricity or natural gas from. PSE&G's delivery service rate includes the following charges: Customer Service Charge, Distribution Charge (kWh and Demand), Societal Benefits Charge (SBC), and Securitization Transition Charge.

Natural Gas:

This facility currently receives natural gas distribution service through PSE&G on rate schedule LVG (Large Volume General Service). This facility is currently receiving natural gas commodity supply from Great Eastern Energy as the Third Party Supplier via the County's online auction.

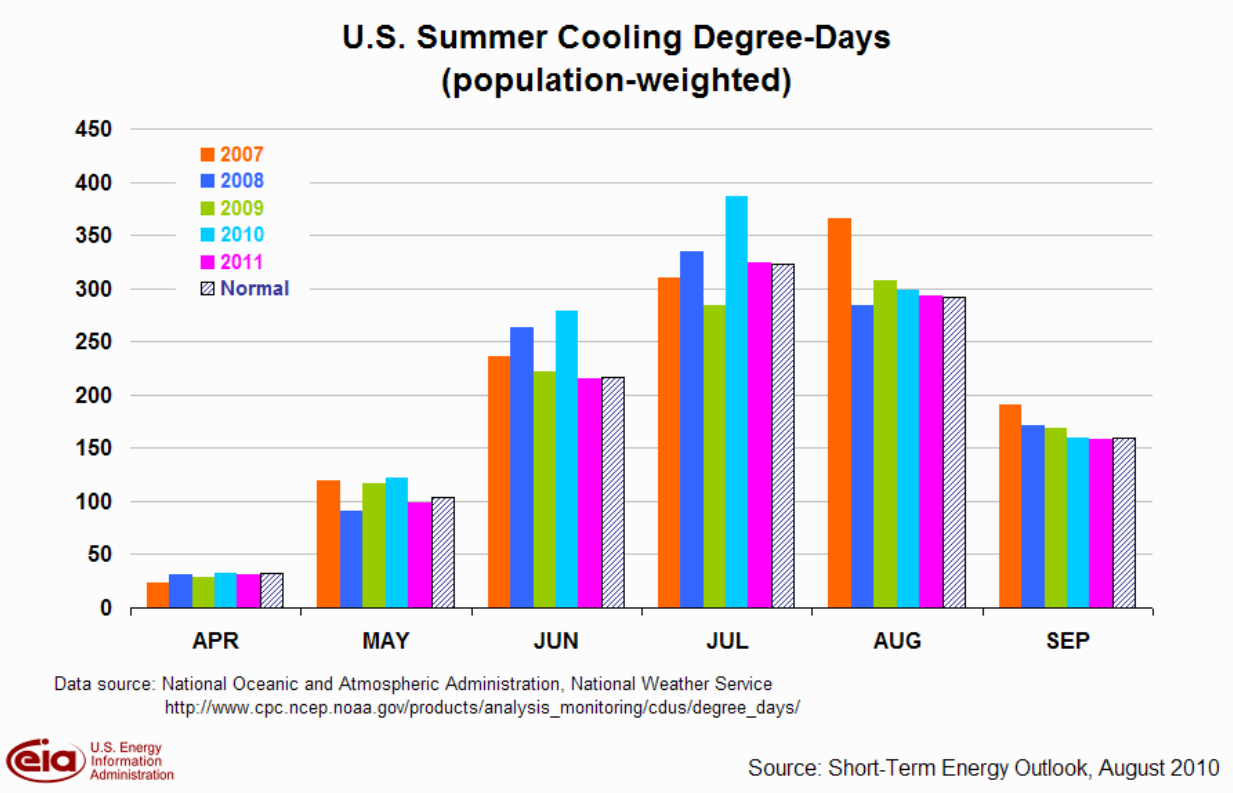
PSE&G provides basic gas supply service (BGSS) to customers who choose not to shop from a Third Party Supplier (TPS) for natural gas commodity. The option is essential to protect the reliability of service to consumers as well as protecting consumers if a third party supplier defaults or fails to provide commodity service. Please refer to the link below for a recap of natural gas BGSS charges from PSE&G for rate schedule LVG. http://www.pseg.com/companies/pseandg/schedules/pdf/commodity.pdf

The utility, PSE&G, is responsible for maintaining the existing network of wires, pipes and poles that make up the delivery system, which will serve all consumers, regardless of whom they choose to purchase their electricity or natural gas from. PSE&G's delivery service rate includes the following charges: Customer Service Charge, Distribution Charge, & Societal Benefits Charge (SBC).

Electric and Natural Gas Commodities Market Overview:

Current electricity and natural gas market pricing has remained relatively stable over the last year. Commodity pricing in 2008 marked historical highs in both natural gas and electricity commodity. Commodity pricing commencing spring of 2009 continuing through 2010, has decreased dramatically over 2008 historic highs and continues to be favorable for locking in long term (2-5 year) contracts with 3rd Party Supplier's for both natural gas and electricity supply requirements.

It is important to note that both natural gas and electric commodity market prices are moved by supply and demand, political conditions, market technicals and trader sentiment. This market is continuously changing. Energy commodity pricing is also correlated to weather forecasts. Because weather forecasts are dependable only in the short-term, prolonged temperature extremes can really cause extreme price swings.



Short Term Energy Outlook - US Energy Information Administration (10/13/2010):

U.S. Natural Gas Prices. The Henry Hub spot price averaged $3.89 per MMBtu in September, $0.43 per MMBtu lower than the average spot price in August. Prices are expected to remain below $4 per MMBtu in October but rise to $4.68 per MMBtu by January as space-heating demand increases this winter. EIA has revised its projections for natural gas prices downward through 2011. Expectations are now for a price of $4.16 per MMBtu for the last quarter of 2010, $0.27 per MMBtu (6 percent) lower than last month's Outlook, based on several weeks of strong inventory builds. Price expectations for 2011 are $4.58 per MMBtu, which is $0.18 per MMBtu (4 percent) lower than last month's forecast, primarily due to a stronger domestic production forecast.

Uncertainty over future natural gas prices is lower this year compared with last year at this time. Natural gas futures for December 2010 delivery for the 5-day period ending October 7 averaged $4.07 per MMBtu, and the average implied volatility over the same period was 39 percent. This produced lower and upper bounds for the 95-percent confidence interval of $3.09 per MMBtu and $5.37 per MMBtu, respectively. At this time last year, the natural gas December 2009 futures contract averaged $5.59 per MMBtu and implied volatility averaged 56 percent. The

corresponding lower and upper limits of the 95-percent confidence interval were $3.70 per MMBtu and $8.50 per MMBtu.

U.S. Electricity Consumption. The summer months of 2010 were warmer than normal, especially in the regions east of the Mississippi. Cooling degree-days in the east during June, July, and August ranged from 26 percent (in the South Atlantic region) to 46 percent (in New England) higher than normal. In contrast, cooling degree-days in the East as a whole were 7 percent lower than normal during 2009. The large year-over-year increase in cooling degree-days should help push up total 2010 consumption of electricity by 5 percent over last year's level. Total consumption is expected to fall slightly in 2011 as forecast temperatures return to near-normal levels

U.S. Electricity Retail Prices. Although the average U.S. residential retail price of electricity fell by nearly 1 percent during the first half of 2010 compared with the same period last year, prices are expected to increase by 1.5 percent year-over-year during the second half of 2010. Higher generation fuel costs this year are expected to be passed through to retail consumers during 2011, pushing up residential prices by 1.4 percent next year.

Recommendations:

1. CEG recommends a continued aggregated approach for 3rd party commodity supply procurement strategies for both electric and natural gas supply service. Currently the County is procuring electric & natural gas supply from a TPS administered by Birdsall Services Group. By aggregating all sites in the County for electricity and natural gas procurement, the County is capable of realizing the continued significant reduction in energy supply costs. Energy commodities are among the most volatile of all commodities, however at this point and time, energy is extremely competitive.

   The below recommendations presented by CEG are based on current information provided by the County for its utility usage, any savings presented with these recommendations are estimates only based on that information. It is recommended that further analysis and review of more recent utility data and any current 3rd party supply contracts be performed prior to performing any of the presented recommendations.

   Overall, after review of the utility consumption, billing, and current commodity pricing outlook, CEG recommends that the County continue to utilize the advisement of 3rd party unbiased Energy Consulting Firms experienced in the aggregation of facilities and procurement of retail natural gas and electricity commodity. The Energy Consulting Firm should incorporate a rational, defensible strategy for purchasing commodity in volatile markets based upon the following:

   - Budgets that reflect sound market intelligence
   - An understanding of historical prices and trends
   - Awareness of seasonal opportunities (e.g. shoulder months)
   - Negotiation of fair contractual terms
   - An aggressive, market based price

2. CEG recommends that the County consider utilizing a third party utility billing-auditing service (if not being implemented already) to further analyze historical utility invoices such as water, sewer, electric and natural gas for incorrect billings and rate tariff optimization services. This service could provide refunds on potential over billings experienced by the County.

3. CEG recommends that the County explore Demand Response Programs that may be available in aggregate for its facilities. Demand response is the action of end users lowering their demand for electric (reducing consumption) in order to help balance supply and demand on the electric grid and ensure stability. The greatest need for demand response typically occurs during times of peak electricity demand, between the hours of 11 am and 6 pm, when extra strain is placed on the grid from situations such as increased air conditioning use on hot days or downed power lines resulting from a storm. Significant incentives are available for clients enrolled in demand response programs. It is strongly recommended that the County utilize an experienced 3rd party unbiased energy consulting firm prior to initiating any demand response programs. This is recommended due to the potential conflicts with existing and/or future electric supply service agreements and transparency created by the evaluation of current programs and incentives available.

X. INSTALLATION FUNDING OPTIONS

CEG has reviewed various funding options for the facility owner to utilize in subsidizing the costs for installing the energy conservation measures noted within this report. Below are a few alternative funding methods:

i. *Energy Savings Improvement Program (ESIP)* – Public Law 2009, Chapter 4 authorizes government entities to make energy related improvements to their facilities and par for the costs using the value of energy savings that result from the improvements. The "Energy Savings Improvement Program (ESIP)" law provides a flexible approach that can allow all government agencies in New Jersey to improve and reduce energy usage with minimal expenditure of new financial resources.

ii. *Municipal Bonds* – Municipal bonds are a bond issued by a city or other local government, or their agencies. Potential issuers of municipal bonds include cities, counties, redevelopment agencies, school districts, publicly owned airports and seaports, and any other governmental entity (or group of governments) below the state level. Municipal bonds may be general obligations of the issuer or secured by specified revenues. Interest income received by holders of municipal bonds is often exempt from the federal income tax and from the income tax of the state in which they are issued, although municipal bonds issued for certain purposes may not be tax exempt.

iii. *Power Purchase Agreement* – Public Law 2008, Chapter 3 authorizes contractor of up to fifteen (15) years for contracts commonly known as "power purchase agreements." These are programs where the contracting unit (Owner) procures a contract for, in most cases, a third party to install, maintain, and own a renewable energy system. These renewable energy systems are typically solar panels, windmills or other systems that create renewable energy. In exchange for the third party's work of installing, maintaining and owning the renewable energy system, the contracting unit (Owner) agrees to purchase the power generated by the renewable energy system from the third party at agreed upon energy rates.

iv. *Pay For Performance* – The New Jersey Smart Start Pay for Performance program includes incentives based on savings resulted from implemented ECMs. The program is available for all buildings that were audited as part of the NJ Clean Energy's Local Government Energy Audit Program. The facility's participation in the program is assisted by an approved program partner. An "Energy Reduction Plan" is created with the facility and approved partner to shown at least 15% reduction in the building's current energy use. Multiple energy conservation measures implemented together are applicable toward the total savings of at least 15%. No more than 50% of the total energy savings can result from lighting upgrades / changes.

Total incentive is capped at 50% of the project cost. The program savings is broken down into three benchmarks; Energy Reduction Plan, Project Implementation, and Measurement and Verification. Each step provides additional incentives as the energy reduction project continues. The benchmark incentives are as follows:

1. Energy Reduction Plan – Upon completion of an energy reduction plan by an approved program partner, the incentive will grant $0.10 per square foot between $5,000 and $50,000, and not to exceed 50% of the facility's annual energy expense. (Benchmark #1 is not provided in addition to the local government energy audit program incentive.)

2. Project Implementation – Upon installation of the recommended measures along with the "Substantial Completion Construction Report," the incentive will grant savings per KWH or Therm based on the program's rates. Minimum saving must be 15%. (Example $0.11 / kWh for 15% savings, $0.12/ kWh for 17% savings, … and $1.10 / Therm for 15% savings, $1.20 / Therm for 17% saving, …) Increased incentives result from projected savings above 15%.

3. Measurement and Verification – Upon verification 12 months after implementation of all recommended measures, that actual savings have been achieved, based on a completed verification report, the incentive will grant additional savings per kWh or Therm based on the program's rates. Minimum savings must be 15%. (Example $0.07 / kWh for 15% savings, $0.08/ kWh for 17% savings, … and $0.70 / Therm for 15% savings, $0.80 / Therm for 17% saving, …) Increased incentives result from verified savings above 15%.

v. *Energy Efficiency and Conservation Block Grants* – The EECGB rebate provides supplemental funding up to $20,000 for counties and local government entities to implement energy conservation measures. For 2011, the supplemental funding is expected to be increased to $50,000. The EECGB funding is provided through the American Recovery and Reinvestment Act (ARRA). The local government must be among the eligible local government entities listed on the NJ Clean Energy website as follows - http://njcleanenergy.com/commercial-industrial/programs/eecbg-eligible-entities. This program is limited to municipalities and counties that have not already received grants directly through the US department of Energy.

This incentive is provided in addition to the other NJ Clean Energy program funding. This program's incentive is considered the entity's capital and therefore can be applied to the LGEA program's requirements to implement the recommended energy conservation measures totaling at least 25% of the energy audit cost. Additional requirements of this program are as follows:

1. The entity must utilize additional funding through one or more of the NJ Clean Energy programs such as Smart Start, Direct Install, and Pay for Performance.

2. The EECBG funding in combination with other NJ Clean Energy programs may not exceed the total cost of the energy conservation measures being implemented.

3. Envelope measures are applicable only if recommended by the LGEA energy audit and if the energy audit was completed within the past 12 months.

4. New construction and previously installed measures are not eligible for the EECBG rebate.

5. Energy conservation measures eligible for the EECBG must fall within the list of approved energy conservation measures. The complete list of eligible measures and other program requirements are included in the "EECBG Complete Application Package." The application package is available on the NJ Clean Energy website - http://njcleanenergy.com/commercial-industrial/programs/energy-efficiency-and-conservation-block-grants.

CEG recommends the Owner review the use of the above-listed funding options in addition to utilizing their standard method of financing for facilities upgrades in order to fund the proposed energy conservation measures.

XI. ADDITIONAL RECOMMENDATIONS

The following recommendations include no cost/low cost measures, Operation & Maintenance (O&M) items, and water conservation measures with attractive paybacks. These measures are not eligible for the Smart Start Buildings incentives from the office of Clean Energy but save energy none the less.

A. Chemically clean the condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%.

B. Maintain all weather stripping on windows and doors.

C. Clean all light fixtures to maximize light output.

D. Provide more frequent air filter changes to decrease overall system power usage and maintain better IAQ.

E. Confirm that outside air economizers on the rooftop units are functioning properly to take advantage of free cooling and avoid excess outside air during occupied periods.

In addition to the recommendations above, implementing Retro-Commissioning would be beneficial for this facility. Retro-Commissioning is a means to verify your current equipment is operating at its designed efficiency, capacity, airflow, and overall performance. Retro-Commissioning provides valuable insight into systems or components not performing correctly or efficiently. The commissioning process defines the original system design parameters and recommends revisions to the current system operating characteristics.

XII. ENERGY AUDIT ASSUMPTIONS

The assumptions utilized in this energy audit include but are not limited to following:

A. Cost Estimates noted within this report are based on industry accepted costing data such as RS Means™ Cost Data, contractor pricing and engineering estimates. All cost estimates for this level of auditing are +/- 20%. Prevailing wage rates for the specified region has been utilized to calculate installation costs. The cost estimates indicated within this audit should be utilized by the owner for prioritizing further project development post the energy audit. Project development would include investment grade auditing and detailed engineering.
B. Energy savings noted within this audit are calculated utilizing industry standard procedures and accepted engineering assumptions. For this level of auditing, energy savings are not guaranteed.
C. Information gathering for each facility is strongly based on interviews with operations personnel. Information dependent on verbal feedback is used for calculation assumptions including but not limited to the following:
    a. operating hours
    b. equipment type
    c. control strategies
    d. scheduling
D. Information contained within the major equipment list is based on the existing owner documentation where available (drawings, O&M manuals, etc.). If existing owner documentation is not available, catalog information is utilized to populate the required information.
E. Equipment incentives and energy credits are based on current pricing and status of rebate programs. Rebate availability is dependent on the individual program funding and applicability.
F. Equipment (HVAC, Plumbing, Electrical, & Lighting) noted within an ECM recommendation is strictly noted as a **basis for calculation** of energy savings. The owner should use this equipment information as a benchmark when pursuing further investment grade project development and detailed engineering for specific energy conservation measures.

Utility bill annual averages are utilized for calculation of all energy costs unless otherwise noted. Accuracy of the utility energy usage and costs are based on the information provided. Utility information including usage and costs is estimated where incomplete data is provided.

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Burlington County Detention Center

ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN (IRR)	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Svaing * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum_{n=0}^{N} \frac{C_n}{(1+IRR)^n}$	$\sum_{n=0}^{N} \frac{C_n}{(1+DR)^n}$
		($)	($)	($)	($)	($/Yr)	($/Yr)	($/Yr)	(Yr)	($)	($)	(%)	(Yr)	($)	($)
ECM #1	Lighting Upgrade	$2,416	$604	$0	$3,020	$1,942	$0	$1,942	15	$29,130	$0	864.6%	1.6	64.27%	$20,163.47
ECM #2	High Efficiency Boiler Upgrade	$143,200	$43,300	$4,000	$182,500	$7,239	$0	$7,239	30	$217,170	$0	19.0%	25.2	1.16%	($40,612.41)
ECM #3	Premium Efficient Motors	$6,288	$1,572	$328	$7,532	$398	$0	$398	18	$7,164	$0	-4.9%	18.9	-0.52%	($2,058.10)
ECM #4	Dryers	$6,720	$1,680	$0	$8,400	$854	$0	$854	15	$12,810	$0	52.5%	9.8	5.81%	$1,795.00
ECM #5	Refrigerator Freezers	$16,287	$4,072	$0	$20,359	$6,619	$0	$6,619	15	$99,285	$0	387.7%	3.1	32.01%	$58,658.19
ECM #6	MELINK	$32,000	$8,000	$0	$40,000	$2,695	$0	$2,695	15	$40,425	$0	1.1%	14.8	0.13%	($7,827.26)
ECM #7	Air Conditioning Unit Upgrade	$13,844	$3,456	$920	$16,380	$829	$0	$829	15	$12,435	$0	-24.1%	19.8	-3.26%	($6,483.45)
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	530.84 KW PV Canopy System	$4,777,560	$0	$0	$4,777,560	$82,680	$239,156	$321,836	25	$8,045,900	$5,978,900	68.4%	14.8	4.49%	$826,617.80

Notes: 1) The variable Cn in the formulas for Internal Rate of Return and Net Present Value stands for the cash flow during each period.
2) The variable DR in the NPV equation stands for Discount Rate
3) For NPV and IRR calculations: From n=0 to N periods where N is the *lifetime of ECM* and Cn is the *cash flow during each period* .

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SmartStart Building Incentives

The NJ SmartStart Buildings Program offers financial incentives on a wide variety of building system equipment. The incentives were developed to help offset the initial cost of energy-efficient equipment. The following tables show the current available incentives as of February, 2010:

Electric Chillers

Water-Cooled Chillers	$12 - $170 per ton
Air-Cooled Chillers	$8 - $52 per ton

Energy Efficiency must comply with ASHRAE 90.1-2004

Gas Cooling

Gas Absorption Chillers	$185 - $400 per ton
Gas Engine-Driven Chillers	Calculated through custom measure path)

Desiccant Systems

$1.00 per cfm – gas or electric

Electric Unitary HVAC

Unitary AC and Split Systems	$73 - $93 per ton
Air-to-Air Heat Pumps	$73 - $92 per ton
Water-Source Heat Pumps	$81 per ton
Packaged Terminal AC & HP	$65 per ton
Central DX AC Systems	$40- $72 per ton
Dual Enthalpy Economizer Controls	$250
Occupancy Controlled Thermostat (Hospitality & Institutional Facility)	$75 per thermostat

Energy Efficiency must comply with ASHRAE 90.1-2004

Ground Source Heat Pumps

Closed Loop & Open Loop	$450 per ton, EER ≥ 16 $600 per ton, EER ≥ 18 $750 per ton, EER ≥ 20

Energy Efficiency must comply with ASHRAE 90.1-2004

Gas Heating

Gas Fired Boilers < 300 MBH	$300 per unit
Gas Fired Boilers ≥ 300 - 1500 MBH	$1.75 per MBH
Gas Fired Boilers ≥1500 - ≤ 4000 MBH	$1.00 per MBH
Gas Fired Boilers > 4000 MBH	(Calculated through Custom Measure Path)
Gas Furnaces	$300 - $400 per unit, AFUE ≥ 92%

Variable Frequency Drives

Variable Air Volume	$65 - $155 per hp
Chilled-Water Pumps	$60 per hp
Compressors	$5,250 to $12,500 per drive

Natural Gas Water Heating

Gas Water Heaters ≤ 50 gallons	$50 per unit
Gas-Fired Water Heaters > 50 gallons	$1.00 - $2.00 per MBH
Gas-Fired Booster Water Heaters	$17 - $35 per MBH
Gas Fired Tankless Water Heaters	$300 per unit

Prescriptive Lighting

Retro fit of T12 to T-5 or T-8 Lamps w/Electronic Ballast in Existing Facilities	$10 per fixture (1-4 lamps)
Replacement of T12 with new T-5 or T-8 Lamps w/Electronic Ballast in Existing Facilities	$25 per fixture (1-2 lamps) $30 per fixture (3-4 lamps)
Replacement of incandescent with screw-in PAR 38 or PAR 30 (CFL) bulb	$7 per bulb
T-8 reduced Wattage (28w/25w 4', 1-4 lamps) Lamp & ballast replacement	$10 per fixture
Hard-Wired Compact Fluorescent	$25 - $30 per fixture
Metal Halide w/Pulse Start	$25 per fixture
LED Exit Signs	$10 - $20 per fixture
T-5 and T-8 High Bay Fixtures	$16 - $284 per fixture
HID ≥ 100w Retrofit with induction lamp, power coupler and generator (must be 30% less watts/fixture than HID system)	$50 per fixture
HID ≥ 100w Replacement with new HID ≥ 100w	$70 per fixture
LED Refrigerator/Freezer case lighting replacement of fluorescent in medium and low temperature display case	$42 per 5 foot $65 per 6 foot

Lighting Controls – Occupancy Sensors

Wall Mounted	$20 per control
Remote Mounted	$35 per control
Daylight Dimmers	$25 per fixture
Occupancy Controlled hi-low Fluorescent Controls	$25 per fixture controlled

Lighting Controls – HID or Fluorescent Hi-Bay Controls

Occupancy hi-low	$75 per fixture controlled
Daylight Dimming	$75 per fixture controlled
Daylight Dimming - office	$50 per fixture controlled

Premium Motors

Three-Phase Motors	$45 - $700 per motor
Fractional HP Motors Electronic Communicated Motors (replacing shaded pole motors in refrigerator/freezer cases)	$40 per electronic communicated motor

Other Equipment Incentives

Performance Lighting	$1.00 per watt per SF below program incentive threshold, currently 5% more energy efficient than ASHRAE 90.1-2004 for New Construction and Complete Renovation
Custom Electric and Gas Equipment Incentives	not prescriptive
Custom Measures	$0.16 KWh and $1.60/Therm of 1st year savings, or a buy down to a 1 year payback on estimated savings. Minimum required savings of 75,000 KWh or 1,500 Therms and a IRR of at least 10%.
Multi Measures Bonus	15%

MAJOR EQUIPMENT LIST

Concord Engineering Group

Burlington County - Detention Center

Rooftop / AC Units

Tag	RTU-1 & 2	HRU-1-A,B,C	HP-1
Unit Type	Condensing Units	Heat Recovery Unit	Heat Pump
Qty	2	3	1
Location	Roof	Roof	Roof
Area Served	UVs in Offices	Cell Blocks	-
Manufacturer	Trane	Semco Inc.	Climate Master
Model #	BTA060D300A0	FVS000V 4RT4AB	GLV300AHC3ACBTS
Serial #	S49218099/S49218113	35146/M022663-01	F13594491
Cooling Type	DX	N/A	CW
Cooling Capacity (Tons)	5 Tons	5 HP Supply / 5 HP Exhaust	25 Tons
Cooling Efficiency (SEER/EER)	8.0 EER	N/A	11.8 EER
Heating Type	N/A	N/A	Water Loop
Heating Input (MBH)	N/A	N/A	318 MBH
Efficiency	N/A	80%	4.0 COP
Fuel	N/A	N/A	HW
Approx Age	22	6	6
ASHRAE Service Life	15	15	15
Remaining Life	(7)	9	9
Comments			

Rooftop / AC Units

Tag	HP-55	HP-12	Split Unit Ventilators
Unit Type	Heat Pump	Heat Pump	Horizontal UV
Qty	1	1	2
Location	Roof	Roof	Offices
Area Served	Data Closet	Gym	Offices
Manufacturer	Climate Master	Climate Master	Trane
Model #	GRH024BGC30CRSS	GLV100AHC3ACBTS	Trane No. 20
Serial #	F13695164	F13292688	N/A
Cooling Type	CW	CW	DX Coil
Cooling Capacity (Tons)	2 Tons	8.5 Tons	5-Tons
Cooling Efficiency (SEER/EER)	12.3 EER	12.5 EER	N/A
Heating Type	Water Loop	Water Loop	HW Coil
Heating Input (MBH)	27.6 MBH	111 MBH	60 MBH @ 3 GPM
Efficiency	4.2 COP	4.5 COP	N?A
Fuel	HW	HW	HW
Approx Age	6	6	22
ASHRAE Service Life	15	15	15
Remaining Life	9	9	(7)
Comments			Served by Trane Condensing Units on Roof (RTU-1 & 2)

MAJOR EQUIPMENT LIST

Concord Engineering Group

Burlington County - Detention Center

Boilers

Tag	Boiler-1 & 2		
Unit Type	Gas Fired Boiler		
Qty	2		
Location	Boiler Room		
Area Served	Original Detention Center		
Manufacturer	Weil-McLain		
Model #	BGL 788-WS		
Serial #	-		
Input Capacity (MBH)	2,049 MBH		
Rated Output Capacity (MBH)	1,632 MBH		
Approx. Efficiency % (Existing Condition)	75%		
Fuel	Nat Gas		
Approx Age	22		
ASHRAE Service Life	30		
Remaining Life	8		
Comments	Gordon Piatt Burner M/N: WR 8.3-G0-15 1.5 HP Burner Motor		

MAJOR EQUIPMENT LIST

Concord Engineering Group

Burlington County - Detention Center

Cooling Tower

Tag	CT-1		
Unit Type	Closed Circuit Cooling Tower		
Qty	1		
Location	Roof		
Area Served	Original Detention Facility		
Manufacturer	Evapco		
Model #	ATW-102-3J-2		
Serial #	4-107228		
Rated Flow GPM	550		
EWT / LWT	104°F/92°F		
Fan Motor HP/CFM	15 HP / 57,490 CFM		
Spray Pump	7.5 HP / 1,200 GPM		
Condenser Water GPM / ΔT	511 GPM/12°F delta T		
Approx Age	6		
ASHRAE Service Life	20		
Remaining Life	14		
Comments	(2) 4 kW Pan Heaters Cooling Tower Fan was cycling on and off during site inspection		

MAJOR EQUIPMENT LIST

Concord Engineering Group

Burlington County - Detention Center

Domestic Water Heaters

Tag	HWH-1 & 2	HWH-2	
Unit Type	Gas Fired Domestic Hot Water Heater	Gas Fired Kitchen Hot Water Heater	
Qty	2	1	
Location	Boiler Room	Boiler Room	
Area Served	Showers, Laundry, Restrooms, etc.	Kitchen	
Manufacturer	A.O. Smith	A.O. Smith	
Model #	BTP 200-600	BTR400A118	
Serial #	N/A	1018M000475	
Size (Gallons)	200 Gallon	100 Gallon	
Input Capacity (MBH/KW)	600 MBH	399 MBH	
Recovery (Gal/Hr)	582 Gal/Hr	378 Gal/Hr	
Efficiency %	80%	80%	
Fuel	Nat Gas	Nat Gas	
Approx Age	6	1	
ASHRAE Service Life	12	12	
Remaining Life	6	11	
Comments	1/4 HP Burner Blower (Power Flame) UNITS ARE LEAKING WATER		

MAJOR EQUIPMENT LIST

Concord Engineering Group

Burlington County - Detention Center

Pumps

Tag	P-1 & P-2	P-3 & P-4	
Unit Type	Boiler Water	WSHP Loop Pumps	
Qty	2	2	
Location	Boiler Room	Boiler Room	
Area Served	Various Terminal Units	WSHPs	
Manufacturer	Peerless Pumps	Peerless Pumps	
Model #	F1825AM-BF	F11030AMBF	
Serial #	4416124	441610	
Horse Power	3 HP	15 HP	
Flow	130 GPM @ 52' TDH	510 GPM @ 75' TDH	
Motor Info	Baldor Motor	Marathon Motor	
Electrical Power	208-230/460/3/60	208-230/460/3/60	
RPM	1725 RPM	1745 RPM	
Motor Efficiency %	80.0%	88.5%	
Approx Age	22	22	
ASHRAE Service Life	20	20	
Remaining Life	(2)	(2)	
Comments			

MAJOR EQUIPMENT LIST

Concord Engineering Group

Burlington County - Detention Center

Kitchen HVAC

Tag	MUA-1
Unit Type	Horizontal Draw-Thru
Qty	1
Location	Roof
Area Served	Kitchen Hood # 15 and #40
Manufacturer	Trane Climate Changer
Fan HP	1
Fan CFM	4,000
Heating Type	Hot Water Coil
Heating Input (MBH)	350 MBH @ 17.5 GPM
Fuel	Hot Water Coil
Approx Age	9
Ashrae Service Life	15
Remaining Life	6
Comments	100% O/A

MAJOR EQUIPMENT LIST

Concord Engineering Group

BURLINGTON COUNTY - DENTION CENTER

Large Exhaust Fans				
Tag	**EF-1**	**EF-24**	**EF-13**	**EF-14**
Unit Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal
Qty	1	1	1	1
Location	Roof	Roof	Roof	Roof
Area Served	Medical Suite		Kitchen Hood	Kitchen Hood
Manufacturer	Twin City	Brundage	ACME	ACME
Model #	04-194513-1-1	SW-8	PUB-245L	PUB-200J
Serial #	M34001770			
Fan HP	1 1/2	3	2	1
Fan CFM	3,000	6,500	3,750	1,500
Approx Age	6	22	22	22
Ashrae Service Life	25	25	25	25
Remaining Life	19	3	3	3
Comments				

Investment Grade Lighting Audit

CEG Job #: 9C10048

Project: Burlington County Detention Center

Address: 49 Rancocas Road
Mount Holly, NJ 08060

Burlington County Detention Center

KWH COST: $0.121

ECM #1 Lighting Upgrade

EXISTING LIGHTING										PROPOSED LIGHTING										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost INSTALLED	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
221.11	County Record Storage	2600	46	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	2.67	6,936.8	$839.35	46	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Storage 11	2600	10	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.58	1,508.0	$182.47	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Elevator Mechanical Room	800	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.06	46.4	$5.61	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Corridor 02	8760	6	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.35	3,048.5	$368.87	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
700		8760	6	1	50w MH, Recessed Down Light	70	0.42	3,679.2	$445.18	6	1	Bypass Ballast, Install Mogul to Medium Base Socket Adapter and (1) 26w R40 CFL Lamp	26	0.16	1366.6	$165.35	$50.00	$300.00	0.26	2312.64	$279.83	1.07
221.34	Boiler Room	8760	37	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	58	2.15	18,799.0	$2,274.67	37	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Gen Set Room	4400	13	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.75	3,317.6	$401.43	13	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Switch Gear Room	4400	14	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.81	3,572.8	$432.31	14	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
712	Outdoor Corridor	4400	4	1	100w HPS Surface Mnt., 18" Square, Fresnel Lens	125	0.50	2,200.0	$266.20	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
211.21	Lobby	8760	24	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	30	0.72	6,307.2	$763.17	24	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
700		8760	4	1	50w MH, Recessed Down Light	70	0.28	2,452.8	$296.79	4	1	Bypass Ballast, Install Mogul to Medium Base Socket Adapter and (1) 26w R40 CFL Lamp	26	0.10	911.04	$110.24	$50.00	$200.00	0.18	1541.76	$186.55	1.07
601		8760	1	2	(2) 7w CFL Exit Sign	16	0.02	140.2	$16.96	1	1	LED Exit Sign	2	0.00	17.52	$2.12	$65.00	$65.00	0.01	122.64	$14.84	4.38
221.21	Work Room	2600	21	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	1.22	3,166.8	$383.18	21	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.21	Food Storage Area	2600	25	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	1.45	3,770.0	$456.17	25	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.21	Corridor	8760	16	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.93	8,129.3	$983.64	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.21	Receiving	8760	4	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.23	2,032.3	$245.91	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Jail Storage	2600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.70	1,809.6	$218.96	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Meter Room	2600	4	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.23	603.2	$72.99	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

221.21	Inmate Passage	8760	10	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.58	5,080.8	$614.78	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.21	Stair 2	8760	6	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.35	3,048.5	$368.87	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.21	Control 2	8760	4	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.23	2,032.3	$245.91	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.21	Stair 3	8760	6	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.35	3,048.5	$368.87	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.21	Control 3	8760	4	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens	58	0.23	2,032.3	$245.91	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
231.41	A-Wing Cells	8760	30	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	86	2.58	22,600.8	$2,734.70	30	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
231.41	Day Space	8760	34	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	86	2.92	25,614.2	$3,099.32	34	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11		8760	16	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.93	8,129.3	$983.64	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Sally Port	8760	6	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.35	3,048.5	$368.87	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Control 4	8760	7	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.41	3,556.6	$430.34	7	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
231.41	B-Wing Cells	8760	20	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	86	1.72	15,067.2	$1,823.13	20	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
231.41	Day Space	8760	28	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	86	2.41	21,094.1	$2,552.38	28	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11		8760	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.70	6,097.0	$737.73	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Day Space Restroom	2600	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.06	150.8	$18.25	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Custodial Closet	2600	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.06	150.8	$18.25	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Sally Port	8760	6	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.35	3,048.5	$368.87	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.22	Control - A/B Wings	8760	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	104	0.42	3,644.2	$440.94	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
231.41	C-Wing Cells	8760	13	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	86	1.12	9,793.7	$1,185.04	13	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
231.41	Day Space	8760	17	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	86	1.46	12,807.1	$1,549.66	17	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11		8760	8	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.46	4,064.6	$491.82	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Sally Port	8760	6	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.35	3,048.5	$368.87	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
231.41	D-Wing Cells	8760	34	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	86	2.92	25,614.2	$3,099.32	34	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

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231.41	Day Space	8760	34	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	86	2.92	25,614.2	$3,099.32	34	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11		8760	16	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.93	8,129.3	$983.64	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Sally Port	8760	6	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.35	3,048.5	$368.87	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Day Space Restroom	2600	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.06	150.8	$18.25	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Custodial Closet	2600	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.06	150.8	$18.25	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.22	Control - C/D Wings	8760	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	104	0.42	3,644.2	$440.94	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
231.41	E-Wing Cells	8760	13	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	86	1.12	9,793.7	$1,185.04	13	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
231.41	Day Space	8760	17	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	86	1.46	12,807.1	$1,549.66	17	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11		8760	8	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.46	4,064.6	$491.82	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Sally Port	8760	6	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.35	3,048.5	$368.87	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
231.41	F-Wing Cells	8760	34	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	86	2.92	25,614.2	$3,099.32	34	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
231.41	Day Space	8760	34	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	86	2.92	25,614.2	$3,099.32	34	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11		8760	16	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.93	8,129.3	$983.64	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Sally Port	8760	6	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.35	3,048.5	$368.87	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Day Space Restroom	2600	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.06	150.8	$18.25	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Custodial Closet	2600	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.06	150.8	$18.25	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.22	Control - E/F Wings	8760	4	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	104	0.42	3,644.2	$440.94	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.11	Corridor to Wings	8760	6	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	86	0.52	4,520.2	$546.94	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.11	Corridor	8760	17	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	86	1.46	12,807.1	$1,549.66	17	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.22	Main Control Room	8760	6	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	104	0.62	5,466.2	$661.42	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
767	Gym Area	8760	12	1	400w MH Probe Start Low Bay	465	5.58	48,880.8	$5,914.58	12	1	Replace Ballast and Lamp; Venture Uni-Form Pulse Start M154 320w Lamp w/V90D7413K Ballast	349	4.19	36687	$4,439.11	$210.00	$2,520.00	1.39	12193.92	$1,475.46	1.71

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232.11	Laundry	8760	6	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	86	0.52	4,520.2	$546.94	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	Electrical Closet	1200	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	0.12	139.2	$16.84	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.11	Inmate Waiting	8760	16	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	86	1.38	12,053.8	$1,458.50	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	Storage	1200	4	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	0.23	278.4	$33.69	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Men's Restroom	4400	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.17	756.8	$91.57	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Women's Restroom	4400	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.17	756.8	$91.57	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Conference Room	4400	6	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.52	2,270.4	$274.72	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Visiting	8760	32	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	1.86	16,258.6	$1,967.29	32	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Infirmary	8760	16	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.93	8,129.3	$983.64	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.41		8760	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.70	6,097.0	$737.73	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.21	Kitchen	8760	28	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	2.91	25,509.1	$3,086.60	28	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Office	2600	4	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.23	603.2	$72.99	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Custodial Closet	1200	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.06	69.6	$8.42	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
231.11	Copy Room	2600	2	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.12	301.6	$36.49	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Pantry	2600	4	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.23	603.2	$72.99	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Women's Locker Room	8760	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.70	6,097.0	$737.73	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Men's Locker Room	8760	14	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.81	7,113.1	$860.69	14	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Lieutenant	2600	4	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.23	603.2	$72.99	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Sergeant	2600	4	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.23	603.2	$72.99	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Lunch Room	4400	11	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.95	4,162.4	$503.65	11	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.11	Corridor	8760	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	86	1.03	9,040.3	$1,093.88	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Files	2600	10	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.58	1,508.0	$182.47	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

221.11	Mail Room	2600	9	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.52	1,357.2	$164.22	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Captain	2600	4	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.23	603.2	$72.99	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Sergeant	2600	4	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.23	603.2	$72.99	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
710	Yard	4400	6	1	100w HPS Wallpack	125	0.75	3,300.0	$399.30	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
710	Roof	4400	6	1	100w HPS Wallpack	125	0.75	3,300.0	$399.30	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	Mech Room Near Roof Access	1200	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	0.12	139.2	$16.84	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.41	Stairway	8760	6	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.35	3,048.5	$368.87	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
	Totals		1,005	204			76.58	582,596	$70,494	1,005	4			4.5	38,982	$4,717		$3,085	1.8	16,171	$1,957	1.58

NOTES: 1. Simple Payback noted in this spreadsheet does not include Maintenance Savings and NJ Smart Start Incentives.

Project Name: LGEA Solar PV Project - Detention Center
Location: Burlington, NJ
Description: Photovoltaic System - Direct Purchase

Simple Payback Analysis

	Photovoltaic System - Direct Purchase
Total Construction Cost	$4,777,560
Annual kWh Production	683,303
Annual Energy Cost Reduction	$82,680
Annual SREC Revenue	$239,156
First Cost Premium	**$4,777,560**
Simple Payback:	**14.84** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.121**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/kWh)	$0.350

Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Net Cash Flow	Cumulative Cash Flow
0	$4,777,560	0	0	0	$0	(4,777,560)	0
1	$0	683,303	$82,680	$0	$239,156	$321,836	($4,455,724)
2	$0	679,886	$85,160	$0	$237,960	$323,120	($4,132,604)
3	$0	676,487	$87,715	$0	$236,770	$324,485	($3,808,119)
4	$0	673,105	$90,346	$0	$235,587	$325,933	($3,482,186)
5	$0	669,739	$93,057	$6,898	$234,409	$320,567	($3,161,619)
6	$0	666,390	$95,848	$6,864	$233,237	$322,221	($2,839,397)
7	$0	663,058	$98,724	$6,830	$232,070	$323,965	($2,515,433)
8	$0	659,743	$101,686	$6,795	$230,910	$325,800	($2,189,632)
9	$0	656,444	$104,736	$6,761	$229,756	$327,730	($1,861,902)
10	$0	653,162	$107,878	$6,728	$228,607	$329,757	($1,532,145)
11	$0	649,896	$111,115	$6,694	$227,464	$331,884	($1,200,260)
12	$0	646,647	$114,448	$6,660	$226,326	$334,114	($866,146)
13	$0	643,414	$117,881	$6,627	$225,195	$336,449	($529,697)
14	$0	640,197	$121,418	$6,594	$224,069	$338,893	($190,805)
15	$0	636,996	$125,060	$6,561	$222,948	$341,448	$150,643
16	$0	633,811	$128,812	$6,528	$221,834	$344,118	$494,761
17	$0	630,642	$132,677	$6,496	$220,725	$346,906	$841,666
18	$0	627,488	$136,657	$6,463	$219,621	$349,815	$1,191,481
19	$0	624,351	$140,757	$6,431	$218,523	$352,849	$1,544,330
20	$0	621,229	$144,979	$6,399	$217,430	$356,011	$1,900,341
21	$1	618,123	$149,329	$6,367	$216,343	$359,305	$2,259,646
22	$2	615,032	$153,809	$6,335	$215,261	$362,735	$2,622,381
23	$3	611,957	$158,423	$6,303	$214,185	$366,305	$2,988,685
24	$4	608,897	$163,175	$6,272	$213,114	$370,018	$3,358,703
25	$5	605,853	$168,071	$6,240	$212,049	$373,879	$3,732,582
	Totals:	16,095,852	$3,014,440	$137,846	$5,633,548	$8,510,142	($11,680,449)
				Net Present Value (NPV)			**$3,732,607**
				Internal Rate of Return (IRR)			**4.9%**

Building	Roof Area (sq ft)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW_{DC}	Total Annual kWh	Panel Weight (33 lbs)	W/SQFT
County Office & Courts	37700	Sunpower SPR230	2308	14.7	33,937	530.84	683,303	76,164	15.64

PVWatts

AC Energy & Cost Savings

Cautions for Interpreting the Results

(Type comments here to appear on printout; maximum 1 row of 80 characters.)

Station Identification	
City:	Atlantic_City
State:	New_Jersey
Latitude:	39.45° N
Longitude:	74.57° W
Elevation:	20 m
PV System Specifications	
DC Rating:	530.8 kW
DC to AC Derate Factor:	0.810
AC Rating:	430.0 kW
Array Type:	Fixed Tilt
Array Tilt:	20.0°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	11.2 ¢/kWh

Results			
Month	Solar Radiation (kWh/m²/day)	AC Energy (kWh)	Energy Value ($)
1	3.00	41022	4594.46
2	3.71	45810	5130.72
3	4.57	60334	6757.41
4	5.33	66205	7414.96
5	5.84	73625	8246.00
6	6.04	70824	7932.29
7	6.01	72096	8074.75
8	5.62	67625	7574.00
9	5.10	60399	6764.69
10	4.15	52021	5826.35
11	3.05	38619	4325.33
12	2.62	34724	3889.09
Year	4.59	683303	76529.93

.= Proposed PV Layout

Notes:

1. Estimated kWH based on the National Renewable Energy Laboratory PVWatts Version 1 Calculator Program.

energy control equipment, inc
(800) 522-6924

Frigitek® Single-Phase Savings Summary

Summary Sheet 1

Rev Date
02/21/06

Date -	December 7, 2010	
Customer -	Burlington County Detention Center	
Address -	54 Grant Street	
City, St, ZIP -	Mount Holly, NJ	
Sales Rep - Contact -		
Phone -		

*** Overall Summary ***

Summary Sheets - 1

Total Cost -	$20,358.99		**ROI -**	36.91	Mo
Total Dollar Savings -	$551.58	/Mo	$6,618.97	/Yr	
Total kWh Savings -	4,596.5	kWh/Mo	55,158.1	kWh/Yr	

*** Analysis Sheet Summaries ***

Analysis Sheets - 2

Sheet 1 - ID -	Main Kitchen Walk In Refrigerators/Freezers #1				
Frigitek Description -	120V - 25A		Quantity -	4	
Total Cost -	$10,179.50	ROI -	36.91	Months	
Dollar Savings -	$275.79	/Mo	$3,309.48	/Yr	
Energy Savings -	2,298.3	kWh/Mo	27,579.0	kWh/Yr	
Sheet 2 - ID -	Main Kitchen Walk In Refrigerators/Freezers #2				
Frigitek Description -	120V - 25A		Quantity -	4	
Total Cost -	$10,179.50	ROI -	36.91	Months	
Dollar Savings -	$275.79	/Mo	$3,309.48	/Yr	
Energy Savings -	2,298.3	kWh/Mo	27,579.0	kWh/Yr	
Sheet 3 - ID -					
Frigitek Description -					
Total Cost -	$0.00	ROI -	0.00	Months	
Dollar Savings -	$0.00	/Mo	$0.00	/Yr	
Energy Savings -	0.0	kWh/Mo	0.0	kWh/Yr	
Sheet 4 - ID -					
Frigitek Description -					
Total Cost -	$0.00	ROI -	0.00	Months	
Dollar Savings -	$0.00	/Mo	$0.00	/Yr	
Energy Savings -	0.0	kWh/Mo	0.0	kWh/Yr	
Sheet 5 - ID -					
Frigitek Description -					
Total Cost -	$0.00	ROI -	0.00	Months	
Dollar Savings -	$0.00	/Mo	$0.00	/Yr	
Energy Savings -	0.0	kWh/Mo	0.0	kWh/Yr	
Sheet 6 - ID -					
Frigitek Description -					
Total Cost -	$0.00	ROI -	0.00	Months	
Dollar Savings -	$0.00	/Mo	$0.00	/Yr	
Energy Savings -	0.0	kWh/Mo	0.0	kWh/Yr	

12/21/05

Frigitek® Single-Phase Savings Analysis				Analysis Sheet # 1 of	2	
Date -	December 7, 2010					
Customer -	Burlington County Detention Center					
Room and Evap. Description -	Main Kitchen Walk In Refrigerators/Freezers #1					
Contact -						
Phone -					0	
Number of Evaporators on this sheet -	4		Enter one of these -			
Fan motors per Evaporator -	3		Amps/Motor -		4.50	
Fan Voltage -	115		or Total Motor Amps -		0.00	
Motor Type (S, C or E) (1) -	S		Compressor Type (2)			
Motor Power Factor (1) -	0.58		(S)ingle or (T)hree Phase -		S	
Electricity Cost per KwH (3) -	12.0	Cents	Normal Duty Cycle (4) -		40.00	%
Operation time factor (5) -	100	%	Frigitek Duty Cycle (6) -		32.00	%
Fan Motors KwH/Mo -	2,629.3	Avg	Total Fan Motor Watts (7) -		3601.8	W
Frigitek Cost, Quan., Model -	$4,996.00	4	Model	120V - 25A		
Tax Rate (%) -	0.07	Tax -	$3.50			
Install, Shipping, other costs -	$5,180.00					
Total Cost -	$10,179.50					
Total Frigitek KwH Savings (8) -	2298.25	/Mo Avg		27,579.03	/Yr	
Total Frigitek Dollar Savings (8) -	$275.79	/Mo Avg		$3,309.48	/Yr	
Payback Time (ROI) (9) -	36.91	Months				
Analysis Details ----------						
Before Frigitek						
Full-time High Speed Fan Cost (10) -	$315.51	/Mo Avg		$3,786.13	/Yr	
With Frigitek						
Frigitek Power Reduction Factor (11) -	80	%				
Full-Time Low Speed Cost -	$63.10	/Mo		$757.23	/Yr	
Fans KwH Saved -	1430.32	/Mo Avg		17,163.79	/Yr	
Fan High Speed Cost (12) -	$100.96	/Mo Avg		$1,211.56	/Yr	
Fan Low Speed Cost (13) -	$42.91	/Mo Avg		$514.91	/Yr	
Total Fan Cost with Frigitek -	$143.87	/Mo Avg		$1,726.47	/Yr	
Fan Dollar Savings (14) -	$171.64	/Mo Avg		$2,059.65	/Yr	
Compressor Cost Reduction						
Fan Power Reduction (15) -	1959.38	Watts	Heat Transfer Factor (16) -		9500	
Fan Heat Reduction (17) -	6685.60	BTU/Hr	Comp. Kw/Hp (18) -		1.55	
Compressor Hp use Reduction (19) -	0.7037471	Hp/Hr				
Compressor Power use Reduction (20) -	1.09080806	Kw/Hr	Cond. fan Savings (21) -		$8.60	/Mo
Compressor Power use Reduction (20) -	796.27	KwH/Mo				
Compressor Cost reduction (22) -	$104.15	/Mo Avg		$1,249.83	/Yr	
Note - Numbers in parentheses refer to Explanation Sheet.						
				Sheet version -	02/21/06	

Frigitek® Single-Phase Savings Analysis				Analysis Sheet # 2 of	2	
Date -	December 7, 2010					
Customer -	Burlington County Detention Center					
Room and Evap. Description -	Main Kitchen Walk In Refrigerators/Freezers #2					
Contact -						
Phone -					0	
Number of Evaporators on this sheet -	4		Enter one of these -			
Fan motors per Evaporator -	3		Amps/Motor -		4.50	
Fan Voltage -	115		or Total Motor Amps -		0.00	
Motor Type (S, C or E) (1) -	S		Compressor Type (2)			
Motor Power Factor (1) -	0.58		(S)ingle or (T)hree Phase -		S	
Electricity Cost per KwH (3) -	12.0	Cents	Normal Duty Cycle (4) -		40.00	%
Operation time factor (5) -	100	%	Frigitek Duty Cycle (6) -		32.00	%
Fan Motors KwH/Mo -	2,629.3	Avg	Total Fan Motor Watts (7) -		3601.8	W
Frigitek Cost, Quan., Model -	$4,996.00	4	Model	120V - 25A		
Tax Rate (%) -	0.07	Tax -	$3.50			
Install, Shipping, other costs -	$5,180.00					
Total Cost -	$10,179.50					
Total Frigitek KwH Savings (8) -	2298.25	/Mo Avg		27,579.03	/Yr	
Total Frigitek Dollar Savings (8) -	$275.79	/Mo Avg		$3,309.48	/Yr	
Payback Time (ROI) (9) -	36.91	Months				
Analysis Details ----------						
Before Frigitek						
Full-time High Speed Fan Cost (10) -	$315.51	/Mo Avg		$3,786.13	/Yr	
With Frigitek						
Frigitek Power Reduction Factor (11) -	80	%				
Full-Time Low Speed Cost -	$63.10	/Mo		$757.23	/Yr	
Fans KwH Saved -	1430.32	/Mo Avg		17,163.79	/Yr	
Fan High Speed Cost (12) -	$100.96	/Mo Avg		$1,211.56	/Yr	
Fan Low Speed Cost (13) -	$42.91	/Mo Avg		$514.91	/Yr	
Total Fan Cost with Frigitek -	$143.87	/Mo Avg		$1,726.47	/Yr	
Fan Dollar Savings (14) -	$171.64	/Mo Avg		$2,059.65	/Yr	
Compressor Cost Reduction						
Fan Power Reduction (15) -	1959.38	Watts	Heat Transfer Factor (16) -		9500	
Fan Heat Reduction (17) -	6685.60	BTU/Hr	Comp. Kw/Hp (18) -		1.55	
Compressor Hp use Reduction (19) -	0.7037471	Hp/Hr				
Compressor Power use Reduction (20) -	1.09080806	Kw/Hr	Cond. fan Savings (21) -		$8.60	/Mo
Compressor Power use Reduction (20) -	796.27	KwH/Mo				
Compressor Cost reduction (22) -	$104.15	/Mo Avg		$1,249.83	/Yr	
Note - Numbers in parentheses refer to Explanation Sheet.						
				Sheet version -	02/21/06	