ENERGY AUDIT – FINAL REPORT

WARREN COUNTY
CORRECTIONS CENTER

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BELVIDERE, NJ 07823
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CEG PROJECT NO. 9C09086

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I. EXECUTIVE SUMMARY

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

Warren County
Corrections Center
175 County Road
Belvidere, NJ 07823

Municipal Contact Person: Christopher J. Pessolano
Facility Contact Person: Byron M. Foster

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	$ 159,639
Natural Gas	$ 70,989
Total	$ 230,628

The potential annual energy cost savings for each energy conservation measure (ECM) are shown below in Table 1. Be aware that the ECM'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
Energy Conservation Measures (ECM's)

ECMs	ECM Description	COST[A]	ANNUAL SAVINGS[B]	SIMPLE PAYBACK (Years)	LIFETIME ROI
ECM #1	Lighting Upgrade	$55,435	$23,135	2.4	943.3%
ECM #2	Air Cooled Chiller	$83,680	$4,276	19.6	2.2%
ECM #3	Solar Thermal System	$272,645	$22,741	12.0	108.5%
ECM #4	Absorption Chiller	$187,175	$6,292	29.7	-32.8%
ECM #5	Combined Heat and	N/A	NA	NA	NA
ECM #6	Solar Photovoltaic	$1,560,780	$103,003	15.2	65.0%

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

The estimated demand and energy savings for each ECM is shown below in Table 2. The information in this table corresponds to the ECM's in Table 1.

Table 2
Estimated Energy Savings

ECMs	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELEC. DEMAND (KW)	ELEC. CONSUMPTION (KWH)	Gas (Therms)
ECM#1	Lighting Upgrade	25.4	135,203	NA
ECM#2	Air Cooled Chiller	32.6	26,071	NA
ECM#3	Solar thermal System	NA	NA	15,060
ECM#4	Absorption Chiller	90.4	127,472	(10,036)
ECM#5	Combined Heat and Power	NA	NA	NA
ECM#6	Solar Photovoltaic	173.42	200,395	NA

*Elec. Demand Savings are calculated for cooling season only. Elec. consumption savings are totaled annually.

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 Warren County Correctional Facility:

- **ECM #1:** Lighting Upgrade

ECM #3 should be considered as a viable option for this facility since the IRR of this ECM is 6.7%. A positive value for any ECM IRR represents the current rate of return of an investment in today's dollars. If the IRR rate is greater than the rate of return on an alternative form of investment, it should be strongly considered. The proposed solar thermal system would provide a substantial reduction in the buildings domestic hot water energy use with a renewable energy alternative.

Lighting controls are not expected to be beneficial for this facility. Although lighting control technologies reduce energy use, occupancy sensors and daylight sensors take controllability of lighting away from the facility personnel. Due to the strict requirements for the correctional facility, lighting controls are not recommended.

In addition to the ECMs, maintenance and operational measures can provide significant energy savings and 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. Provide frequent air filter changes if not already done so to decrease overall system power usage and maintain better IAQ. This is especially important in a VFD driven AHU where the supply air will vary to meet load. If the filters are becoming clogged, the VFD will automatically increase air speed therefore "hiding" the underlining filter issue, meanwhile energy usage is increasing unnecessarily.
3. Set hot water re-circ pump temperature set-point below the domestic hot water supply temperature setting. This will avoid continuous operation of the hot water re-circ pump while still providing the benefit of on demand hot water to the remote fixtures in the facility. It is also recommended to install an overriding time clock on the hot water re-circ pump to shut down and avoid standby piping losses at night.
4. Check operation of outdoor lighting photocells to ensure lighting is only on as desired for the needs of the facility and only at night.
5. Confirm proper operation of all outside air dampers and mixing boxes on air handling unit throughout the building. Outside air dampers that have unintentionally opened more than the original setting will cause significant increases in heating and cooling energy consumption as well as decreased occupant comfort and humidity control.

The nature of a 24/7 facility will demand higher than average energy use when compared to typical commercial and residential buildings. Overall this facility's "Source Energy Use Index" rating is approximately 25% when compared to other Public Order and Safety buildings (0%-lowest efficiency, 100%-highest efficiency). Public Order and Safety buildings are the closest representative building style. Since data does not exist specifically for correctional facilities, the comparison is made for a point of reference. The "relatively" low rating is partially due to the building's age and construction. The primary reason for increased energy usage is due to the operational needs of the high energy demand correctional facility. The rating is also a function of mechanical equipment efficiency, and lighting efficiency. Both of these reasons have effective energy reduction solutions that can be implemented.

HVAC equipment replacements are difficult to justify with the energy savings alone. Due to the age of the existing air cooled chiller and increased need for cooling for this facility, the energy savings pays for the entire installation within 19.6 years. The replacement of the chiller to a new energy efficient unit is more easily achieved compared to other systems since the main cooling equipment is packaged into one machine. With the added incentive for increased reliability and due to the existing equipment's age and condition, this option is recommended to be considered despite the fact that the payback is not less than 10 years.

Lighting retrofits are a simple and effective approach to reduce energy use. The operational hours of the correctional facility compounds the benefits making a major lighting retrofit pay back extremely quickly (2.4 years.) compared to most facilities. In addition to reduced energy consumption, a lighting retrofit provides reduced maintenance costs and added occupant comfort with improved light quality.

Domestic hot water usage is responsible for approximately 15% of the facilities energy use. Although the payback is longer than the ECM in the recommended list, a solar thermal system has the potential to provide the entire facilities domestic hot water heating needs. Solar thermal panels provide a nearly pollution free method of supplying domestic hot water. Combined heat and power was also studied for the facilities hot water production. The initial analysis shows that the size of the necessary combined heat and power plant is below the industry's cost effective production capability.

Retro commissioning for this facility could prove to uncover large energy "leaks" In the building. Systems and components may appear to be operating correctly when they are not. Older systems and components typically do not reflect the original building's design parameters resulting in unnecessary energy waste. CEG recommends a commissioning effort take place on the major mechanical equipment for this facility.

II. INTRODUCTION

The comprehensive energy audit provided within this report, covers the 46,570 square foot Warren County Correctional Facility. The facility runs 24 hours per day, 7 days per week. The Energy utilities for the building are comprised of electricity for general use, cooling, and lighting, and natural gas for heating, cooking, laundry, and domestic hot water production. The facility includes inmate cell blocks, activity spaces, therapy and medical rooms, consultation rooms, laundry equipment, a small commercial kitchen, administration office areas, and outdoor recreation area.

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 in section IV.)

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 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 electric usage profile represents the actual electrical usage for the facility. Jersey Central Power and Light (JCP&L) provides electricity to the facility under their General Service Secondary Three-Phase rate structure. The electric utility measures consumption in kilowatt-hours (KWH) and maximum demand in kilowatts (KW). One KWH usage is equivalent to 1000 watts running for one hour. One KW of electric demand is equivalent to 1000 watts running at any given time. The basic usage charges are shown as generation service and delivery charges along with several non-utility generation charges. Rates used in this report reflect the historical data received for the facility.

The gas usage profile shows the actual natural gas energy usage for the facility. Elizabethtown Gas provides natural gas to the facility under the Multi Family Use rate structure. The gas utility measures consumption in cubic feet x 100 (CCF), and converts the quantity into Therms of energy. One Therm is equivalent to 100,000 BTUs of energy.

The overall cost for utilities is calculated by dividing the total cost by the total usage. Based on the utility history provided, the average cost for utilities at this facility is as follows:

Description	Average
Electricity	16.4¢ / kWh
Natural Gas	$1.51 / Therm

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 base on the information provided by the owner.

Table 3
Electricity Billing Data

Utility Provider: JCP&L, General Service Secondary 3 Phase (Meter # G28642484)			
MONTH OF USE	**CONSUMPTION KWH**	**DEMAND**	**TOTAL BILL**
Jun-08	99,360	239.0	$17,483
Jul-08	112,480	243.5	$19,701
Aug-08	94,400	236.8	$16,759
Sep-08	99,040	232.6	$15,011
Oct-08	86,240	209.1	$13,103
Nov-08	63,520	200.0	$10,001
Dec-08	64,800	140.6	$10,250
Jan-09	67,520	142.9	$10,730
Feb-09	69,920	163.2	$11,184
Mar-09	63,680	168.5	$10,091
Apr-09	70,880	193.0	$11,268
May-09	80,000	183.7	$14,059
Totals	**971,840**	**243.5 Max**	**$159,639**
AVERAGE DEMAND 196.1 KW average			
AVERAGE RATE $0.164 $/kWh			

Figure 1
Electricity Usage Profile

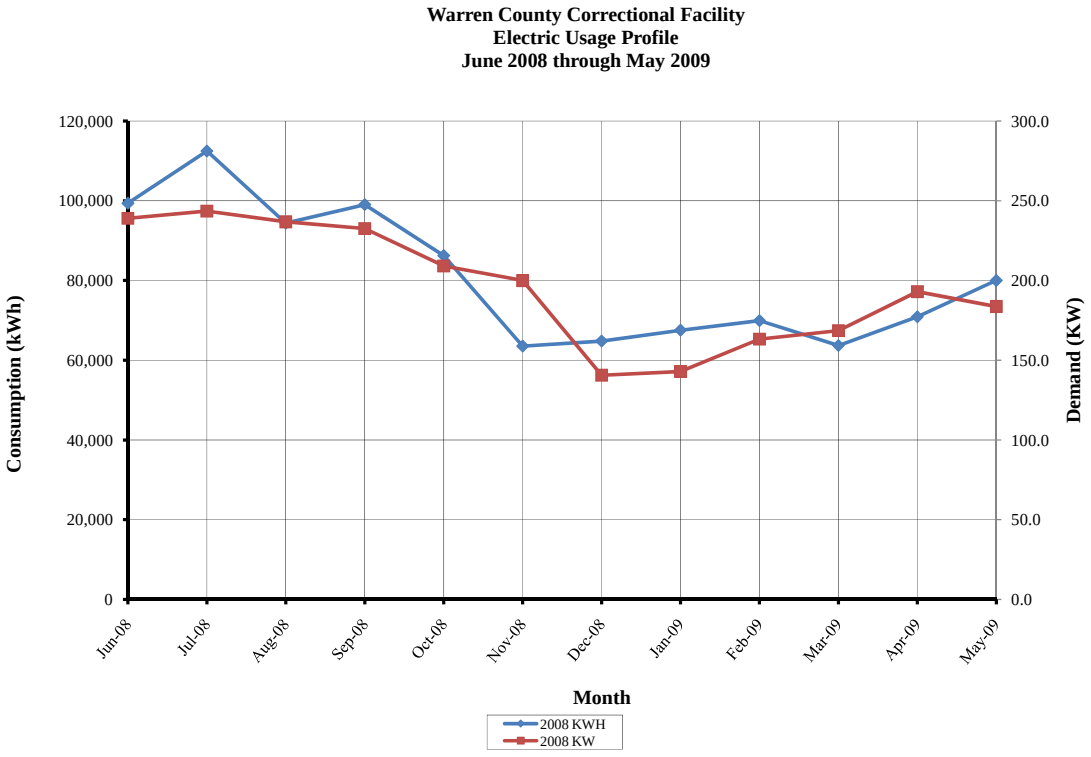
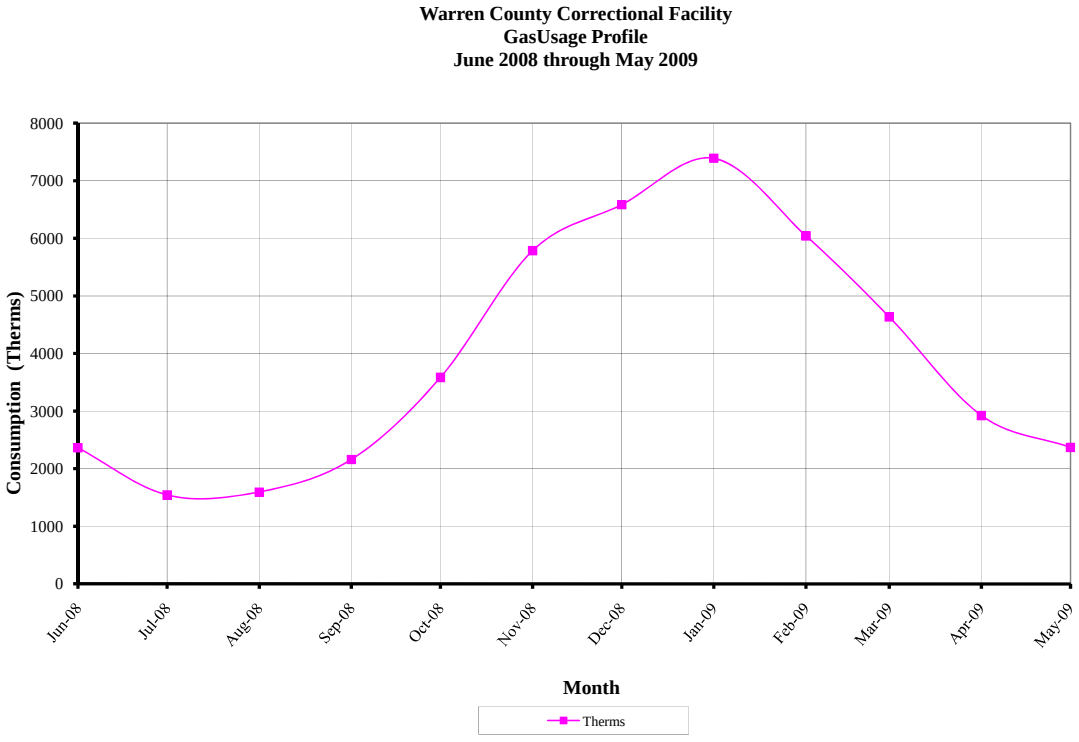


Table 4
Gas Billing Data

Utility Provider: Elizabethtown Gas, Rate - Multi Family Use, (Meter # 09237494)		
MONTH OF USE	**CONSUMPTION (Therms)**	**TOTAL BILL**
Jun-08	2,363.50	$3,067.25
Jul-08	1,543.30	$2,039.01
Aug-08	1,595.10	$2,092.34
Sep-08	2,159.40	$2,969.66
Oct-08	3,584.30	$5,602.01
Nov-08	5,785.60	$8,907.59
Dec-08	6,584.10	$10,104.69
Jan-09	7,389.50	$11,311.17
Feb-09	6,042.80	$9,293.02
Mar-09	4,635.40	$7,183.90
Apr-09	2,922.90	$4,621.64
May-09	2,369.30	$3,796.67
TOTALS	**46,975**	**$70,988.95**
AVERAGE RATE:	**$1.51**	**$/Therm**

Figure 2
Gas Usage Profile



B. Energy Use Index

Energy Use Index (EUI) is a measure of a building's annual energy utilization per square foot of building (also known as energy use intensity.) 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:

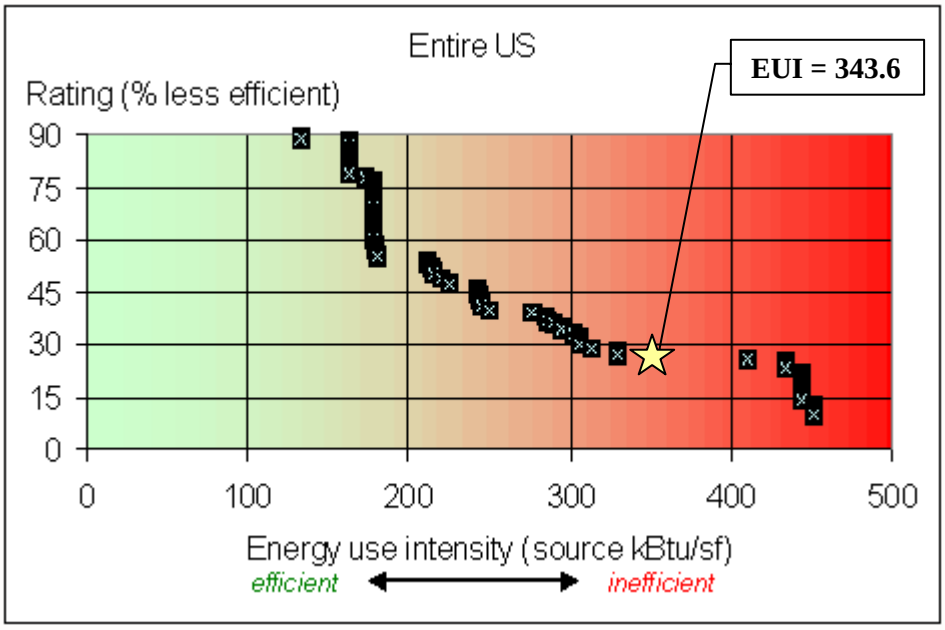
$$Building\ \ Site\ EUI = \frac{(Electric\ Usage\ in\ kBtu + Gas\ Usage\ in\ kBtu)}{Building\ \ Square\ \ Footage}$$

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

Table 5
Warren County Correctional Facility EUI Calculations

ENERGY TYPE	BUILDING USE			SITE ENERGY	SITE-SOURCE	SOURCE ENERGY
	kWh	Therms	Gallons	kBtu	RATIO	kBtu
ELECTRIC	971,840			3,317,862	3.340	11,081,658
NATURAL GAS		46,975.20		4,697,520	1.047	4,918,303
FUEL OIL			0.00	0	1.010	0
PROPANE			0.00	0	1.010	0
TOTAL				8,015,382		15,999,962
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.						
BUILDING AREA		46,570		SQUARE FEET		
BUILDING SITE EUI		172.11		kBtu/SF/YR		
BUILDING SOURCE EUI		**343.57**		**kBtu/SF/YR**		

Figure 3
Source Energy Use Intensity Distributions: Public Order and Safety



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 following is the user name and password for this account:

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

User Name:	warrencountylgea
Password:	lgeaceg2009
Security Question:	What is your birth city?
Security Answer:	"warren county"

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

FACILITY DESCRIPTION	ENERGY PERFORMANCE RATING	NATIONAL AVERAGE
Warren County Correctional Facility	N/A	N/A

The energy performance rating is unavailable because the facility does not fall within the acceptable categories defined by Energy Star. See the **Statement of Energy Performance Appendix** for the detailed energy summary.

V. FACILITY DESCRIPTION

General

The 46,570 square foot Corrections Center was built in 1984. The facility is comprised of a main floor with a mechanical mezzanine floor above housing the HVAC and electrical equipment. The building construction is CMU block with a brick façade. There is no insulation in the wall construction. It is unknown if the CMU blocks have been filled or not. The holding cells have ½" thick clear glass triple pane windows. The main hallway into the cell blocks has an 8 foot by 100 foot skylight made of frosted single pane glass for the length of the hallway. No significant additions or alterations have been made to the facility since it was built, however the building occupancy has been growing beyond the building's original design. The gymnasium is currently utilized as inmate living quarters with sleeping beds.

Operation

The corrections center operates 24 hours per day, 7 days per week. Total occupancy ranges from 180 to 220 people. Staff requirements are high to support the inmates. The inmates and staff occupy many different areas of the building throughout the day limiting the ability to close down or set-back any of the spaces. The laundry department and kitchen require staff that operates almost continuously throughout the day. The administration portion of the facility (approximately 5-10% of the floor space) operates on a typical office schedule.

Energy Utilities

Utilities for the facility are electricity and natural gas. The primary heat source is two natural gas fired heating water boilers that provide heating hot water throughout the facility to air handling equipment hot water coils and baseboards. Gas is also used for the domestic hot water boiler, kitchen cooking equipment, and laundry dryers. The primary use for electricity is lighting and air conditioning systems. Electrical power is also used for the kitchen refrigeration equipment and other general electrical loads such as computers, printers, cameras, and TVs throughout the building.

HVAC Systems

The main cooling system for the building is provided by an air cooled screw chiller located on the building roof and chilled water pumps on the mezzanine level. The 115 ton chiller is 13 years old and no longer manufactured making it difficult to find replacement and service parts. The chilled water is distributed by two 5 HP (operating and standby) chilled water pumps to the main central air handling unit's chilled water coil. All components of the cooling system are in fair condition and functioning correctly.

The main heating system for the building is provided by two heating hot water boilers located on the mezzanine level. The boilers were built in 1983 each with 2,100 MBH input gas capacity. The heating hot water is distributed throughout the building by two 5HP pumps to the AHUs,

baseboards, and VAV box re-heat coils throughout the facility. The boilers are manually shut down during the summer months to avoid standby losses.

Air distribution is provided by two air handling units (AHUs). The main AHU is a medium pressure variable speed AHU with chilled water coil and heating water coil. The main AHU provides air to the variable air volume boxes (VAV boxes.) The VAV boxes connected to the main AHU divide air into zones throughout the building. There are VAV boxes for each cell block and all other zones throughout the building such as the office administration area, corridor zones, visiting room, etc. All VAV boxes with exception of cell blocks E and F have heating hot water re-heat coils for individual zone temperature control in the heating season. The smaller AHU is a dedicated AHU for the Gymnasium. The Gym AHU has a DX cooling coil with remote condensing unit on the roof for cooling and heating water coil for heating. Both AHUs have return / O.A. mixing boxes for ventilation. The main AHU utilizes the mezzanine level as a plenum for return air. The gym AHU is has a ducted return.

The kitchen has a large kitchen exhaust hood over the cooking equipment and a make-up air handling unit which operates on a time clock. The make-up air unit is heating only and provides 100% outside air. The exhaust hood incorporates a supply air re-circ system which provides outdoor air directly below the hood intake to minimize the loss of conditioned air from the kitchen. This make-up air portion of the hood is manually controlled by a switch which is turned off when the ambient temperature is uncomfortably high.

Domestic Water

Domestic water is provided by the city. Domestic hot water is provided by a dedicated hot water boiler connected to an indirect domestic hot water storage tank with integral heat exchanger. The domestic hot water tank has approximately 1200 gallons in capacity. This tank provides hot water for the entire building's hot water needs including the kitchen, laundry and lavatories. The system is undersized and frequently not capable of producing adequate hot water.

HVAC Controls

Due to the thermal mass of the building the HVAC system has a heavy load to respond to when heating or cooling the building. The heating hot water loop temperature is controlled by a outdoor temperature re-set controller. Pneumatic controls throughout.

The HVAC control system in the building is a pneumatic system. This system controls most of the water control valves for heating and cooling throughout the building as well as the boilers, main AHU, baseboard, and VAV boxes. All thermostats are pneumatic some of which are leaking air. The gym AHU has been upgraded to electronic controls for the mixing box dampers and water coil control valves. The domestic hot water heater has a dedicated boiler which cycles its circulator pump to maintain the hot water heater storage tank temperature of 125°F. The kitchen make-up air handling unit is run on a time-clock independent of the kitchen make-up air exhaust hood. The make-up air is tempered by a thermostat in the kitchen in the heating season only. The kitchen exhaust fan operation and is manually controlled by the occupants in the kitchen. The building has a front end automation system located in the administration building. The front end system only monitors points in the corrections center.

Exhaust / Ventilation System

General exhaust is provided throughout the facility for bathrooms and maintenance rooms by rooftop exhaust fans. The exhaust fans operate continuously. The kitchen exhaust hood is ducted to a large up-blast grease exhaust fan manually operated in the kitchen.

Lighting

The lighting throughout building is fluorescent tube recessed fixtures with T-12 lamps and magnetic ballasts. Storage rooms and closets are lit with standard screw in fixtures replaced with compact fluorescent lamps. The entry waiting room is lit with recessed halogen fixtures. The gymnasium is lit with high bay metal halide fixtures. The parking lot is lit with light poles and high pressure sodium lamps. The lighting was overdesigned providing more than adequate lighting levels in the offices, storage rooms, security monitoring areas, etc. Many fixtures have lamps removed to reduce overall lighting output. Lights are manually operated throughout the facility on an as needed basis. Lighting levels are reduced at night in the inmate blocks. Hallways and common areas are light continuously.

VI. MAJOR EQUIPMENT LIST

The equipment list is considered major energy consuming equipment and through replacement 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 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 – General

Description:

The lighting in Warren County Correctional Facility is primarily made up of fluorescent fixtures with T-12 lamps and magnetic ballasts. There are a few storage rooms and closets with incandescent lighting and compact fluorescent fixtures.

This ECM includes replacement of the existing fixtures containing T12 lamps and magnetic ballasts with fixtures containing T8 lamps and electronic ballasts. The new energy efficient, T8 fixtures will provide adequate lighting and will save on electrical costs due to better performance of the lamp and ballasts. This ECM also includes maintenance savings through the reduced number of lamps replaced per year. The expected lamp life of a T8 lamp is approximately 30,000 burn-hours, in comparison to the existing T12 lamps which is approximately 20,000 burn-hours. The facility will need 33% less lamps replaced per year.

This ECM also includes replacement of all incandescent fixtures to compact fluorescent fixtures as well as the replacement of all exterior halogen (incandescent) fixtures to compact fluorescent fixtures. The energy usage of an incandescent compared to a compact fluorescent is approximately 3 to 4 times greater. In addition to the energy savings, compact fluorescent fixtures burn-hours are 8 to 15 times longer than incandescent fixtures ranging from 6,000 to 15,000 burn-hours compared to incandescent fixtures ranging from 750 to 1000 burn-hours.

Hours of Operation:

Inmate Cells / Support Rooms:
126 Hrs per week, 52 weeks per year – 6552 Hrs per year.

Hallways, Control rooms, Exit Signs:
24 Hrs per day, 7days per week, 365 days per year – 8760 Hrs per year.

Administration Areas:
8 Hrs per day, 7 days per week, 52 weeks per year – 2912 Hrs per year.

Storage rooms, closests, Boiler room, etc.:
25% of normal hours (above) – 728 Hrs per year.

Outdoor Lighting:
10 Hrs per day, 7 days per week, 52 weeks per year – 3640 Hrs per year.

Energy Savings Calculations:

The **Investment Grade Lighting Audit Appendix** outlines the proposed retrofits, costs, savings, and payback periods.

NJ Smart Start® Program Incentives are calculated as follows:

From the Smart Start Incentive appendix, the replacement of a T-12 fixture to a T-5 or T-8 fixture warrants the following incentive: T-5 or T-8 (1-2 lamp) = $10 per fixture; T-5 or T-8 (3-4 lamp) = $20 per fixture.

$$\text{Smart Start®}\ Incentive = (\#\ of\ 1-2\ lamp\ \ fixtures \times\ \$10) + (\#\ of\ 3-4\ lamp\ \ fixtures \times\ \$20)$$

$$\text{Smart Start®}\ Incentive = (482 \times\ \$10) + (69 \times\ \$20) = \underline{\$6{,}200}$$

Replacement and Maintenance Savings are calculated as follows:

$$Savings = (reduction\ in\ lamps\ replaced\ \ per\ \ year) \times (repacment\ \$\ per\ lamp + Labor\ \$\ per\ lamp)$$

$$Savings = (118\ lamps\ \ per\ \ year) \times (\$2.00 + \$5.00) = \underline{\$826}$$

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$61,635
NJ Smart Start Equipment Incentive ($):	($6,200)
Net Installation Cost ($):	$55,435
Yearly Maintenance Savings ($/Yr):	$826
Yearly Energy Savings ($/Yr):	$22,309
Total Yearly Savings ($/Yr):	$23,135
Estimated ECM Lifetime (Yr):	25
Simple Payback	2.4
Simple Lifetime ROI	943.3%
Simple Lifetime Maintenance Savings	$20,650
Simple Lifetime Savings	$578,363
Internal Rate of Return (IRR)	42%
Net Present Value (NPV)	$347,410.11

ECM #2: Air Cooled Chiller Replacement

Description:

The Correctional Facility is cooled by a 115 ton air cooled chiller. The air cooled chiller is in fair condition, however the unit is inefficient and no longer produced or supported for maintenance. The estimated efficiency of the chiller is 1.46 KW/Ton at full load capacity (Minimum efficiency requirement from ASHRAE 90.1-1989). High efficiency air cooled chillers operate at efficiencies as low as 1.0 KW/Ton.

This ECM includes the installation of a new high efficient air cooled chiller. The ECM is based on a Trane packaged air cooled chiller model number CGAM or equivalent. Sizing indicated within the calculation of this ECM is based on a one for one replacement of the existing equipment. The owner should have a Professional Engineer verify heating and cooling loads prior to moving forward.

Full Load Cooling Hrs.	= 800 hrs/yr.
Average Cost of Electricity	= $0.164/kWh
Cooling Capacity	= 115 Tons
Existing Unit Eff.	= 1.46 KW/Ton (8.22 EER)
New Unit Eff.	= 1.18 KW/Ton (10.2 EER)

Energy Savings Calculations:

Cooling Savings:

$$EnergySavings = \frac{Cooling(Tons) \times 12{,}000\left(\frac{Btu}{Ton\ hr}\right)}{1000\left(\frac{Wh}{kWh}\right)} \times \left(\frac{1}{EER_{OLD}} - \frac{1}{EER_{NEW}}\right) \times Full\ Load\ Hrs.$$

$$EnergySavings = \frac{115\,(Tons) \times 12{,}000\left(\frac{Btu}{Ton\ hr}\right)}{1000\left(\frac{Wh}{kWh}\right)} \times \left(\frac{1}{8.22\left(\frac{Btu}{W}\right)} - \frac{1}{10.2\left(\frac{Btu}{W}\right)}\right) \times 800\ hours$$

$$= 26{,}071\ kWh$$

$$Demand\ Savings = \frac{Energy\ Savings\,(kWh)}{Hrs\ of\ Cooling}$$

$$Demand\ Savings = \frac{26{,}071(kWh)}{800\ Hrs.} = 32.6\ KW$$

$$Cooling\ Cost\ Savings = 29{,}164(kWh) \times 0.164\left(\frac{\$}{kWh}\right) = \$4{,}276$$

Installation cost for the air cooled chiller is estimated to be $85,750 ($51,750 Materials).

From the NJ Smart Start® Program appendix, the unit falls under the category "Electric Chiller" and warrants an incentive based on efficiency (EER) at 1.18 KW/Ton. The program incentives are calculated as follows:

$$\text{Smart Start®}\ Incentive = (Cooling\ Tons \times\ \$/Ton\ Incentive)$$
$$= (115 Tons \times \$18/Ton) = \$2{,}070$$

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$85,750
NJ Smart Start Equipment Incentive ($):	($2,070)
Net Installation Cost ($):	$83,680
Yearly Maintenance Savings ($/Yr):	$0
Yearly Energy Savings ($/Yr):	$4,276
Total Yearly Savings ($/Yr):	$4,276
Estimated ECM Lifetime (Yr):	20
Simple Payback	19.6
Simple Lifetime ROI	2.2%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$85,520
Internal Rate of Return (IRR)	0%
Net Present Value (NPV)	($20,063.92)

ECM #3: Solar Thermal Installation

Description:

Warren County Correctional Facility has a large year round demand for hot water production. The hot water is supplied by a dedicated gas fired domestic hot water boiler and large indirect domestic hot water storage tank. The efficiency of the existing hot water heating system is based on the efficiency of the existing boilers.

This ECM includes the installation of a solar thermal system to produce domestic hot water. The system includes solar thermal panels mounted on the roof, piping distribution to the domestic hot water tank in the mezzanine, a pre-heat hot water heat exchanger, solar PV panels and pumps for glycol distribution, and controls. The system features a pre-heat tank with the existing tank still in place as a back-up means for hot water production to ensure no loss of hot water production. The calculations are based on Viesmann Flat Plat collectors model VITOSOL 200F or equivalent.

Note: Installation of solar thermal system will require 4,476 SF of roof area for solar thermal panels. This installation will reduce the potential for roof mounted PV system. The proposed solar thermal ECM utilizes a portion of the roof space shown for the solar PV system installation. See Renewable Distributive Energy Measures section below. See the **Solar Thermal Calculations Appendix** for Solar PV installation details.

Existing Domestic Hot Water Parameters:

Boiler Efficiency	= 80%
Estimated Standby Losses	= 3%
Total Domestic HW Efficiency	= 77%
Estimated Dom Hot Water Gas Usage	= 1,255 Therms*
(*Averaged from Jul, & Aug gas usage minus 20%)	
Ave Nat Gas Cost	= $1.51/Therm

Solar Thermal System Parameters:

Solar Thermal System Production:	2,979,620 kBtu/Yr
(See Solar Thermal Calculations appendix for details.)	

Energy Savings Calculations:

$$DHW\ Load = \left(Summer\ Gas\ Usage\left(\frac{Therms}{Month}\right) \times 12(Months) \times Eff\,(\%) \times Heating\ Value\left(\frac{Btu}{Therm}\right)\right)$$

$$DHW\ Load = \left(1{,}255\left(\frac{Therms}{Month}\right)\times 12(Months)\times 77\%\times 100\left(\frac{kBtu}{Therm}\right)\right) = 1{,}159{,}620(kBtu)$$

$$Solar\ Sys\ Heat\ \% = \frac{Solar\ Heat(kBtu)}{DHW\ Load(kBtu)}$$

$$Gas\ Usage\ \text{Re}duction = Gas\ Usage\left(\frac{Therms}{Month}\right)\times 12(Months)$$

$$Gas\ Usage\ \text{Re}duction = 1255\left(\frac{Therms}{Month}\right)\times 12(Months) = 15{,}060(Therms)$$

$$Savings = Gas\ Usage\ \text{Re}duction \times Ave\ Cost\left(\frac{\$}{Therm}\right)$$

$$Savings = 15{,}060\times 1.51\left(\frac{\$}{Therm}\right) = \$22{,}741$$

Installed cost of the solar thermal system including panels, piping, equipment, and controls is estimated to be $272,645.

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$272,645
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$272,645
Yearly Maintenance Savings ($/Yr):	$0
Yearly Energy Savings ($/Yr):	$22,741
Total Yearly Savings ($/Yr):	$22,741
Estimated ECM Lifetime (Yr):	25
Simple Payback	12.0
Simple Lifetime ROI	108.5%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$568,525
Internal Rate of Return (IRR)	7%
Net Present Value (NPV)	$123,347.39

ECM #4: Absorption Chiller Installation

Description:

The Correctional Facility is cooled by a 115 ton air cooled chiller. The air cooled chiller is in fair condition, however the unit is inefficient and no longer produced or supported for maintenance. The estimated efficiency of the chiller is 1.46 KW/Ton at full load capacity (Minimum efficiency requirement from ASHRAE 90.1-1989). Absorption chillers are liquid coolers that operate the compression cycle with gas as the fuel in lieu of electricity. Absorption chillers are inherently less efficient than electric chillers however the overall "Source energy" use is reduced by utilizing natural gas in lieu of electricity. In addition the energy source of a gas fired absorption chiller is less expensive compared to electricity. Nat gas appliances reduce the peak demand stress on the electric grid in the summer months. The relatively short periods of high electric demand in the summer cooling months account for an extremely high electric consumption and overall inefficiency for electric production and distribution. As a result significant incentives are available for the installation of gas fired cooling equipment. Reduced gas rate structures are also available for facilities that utilize gas fired cooling equipment.

This ECM includes the installation of a new gas fired absorption chiller, cooling tower, pumps, piping and unit controls. The ECM is based on a Thermax packaged absorption chiller model number GD10DCE or equivalent. The full load efficiency of the absorption chiller is 1.16 COP. Sizing indicated within the calculation of this ECM is based on a one for one replacement of the existing equipment. The owner should have a Professional Engineer verify heating and cooling loads prior to moving forward.

Full Load Cooling Hrs.	= 800 hrs/yr.
Average Cost of Electricity	= $0.164/kWh
Average Cost of Natural Gas	= $1.51/Therm
Cooling Capacity	= 115 Tons
Cooling Tower Total HP	= 10 HP
Existing Unit Eff.	= 1.46 KW/Ton (8.22 EER)
New Unit Eff.	= 1.16 COP

Energy Savings Calculations:

$$CoolingEnergy = Cooling(Tons) \times 12{,}000 \left(\frac{Btu}{Ton\ hr} \right) \times Full\ Load\ Hrs.$$

$$CoolingEnergy = 115\,(Tons) \times 12{,}000 \left(\frac{Btu}{Ton\ hr} \right) \times 800\ hours = 1{,}104{,}000(kBtu)$$

$$Electric\ Usage = Cooling(Tons) \times Eff\,(KW/Ton) \times Full\ Load\ Hrs.$$

$$Electric\ Usage = 115(Tons) \times 1.46\,(KW/Ton) \times 800(Hrs.) = 134{,}320(kWh)$$

$$\text{Proposed Gas Usage} = \frac{\text{CoolingEnergy}(kBtu)}{\text{Eff}(C.O.P.) \times \text{HeatValue}\left(\frac{Btu}{Therm}\right)}$$

$$\text{Proposed Gas Usage} = \frac{1{,}104{,}000(kBtu)}{1.16(C.O.P.) \times 100\left(\frac{kBtu}{Therm}\right)} = 9{,}517(Therms)$$

$$\text{Proposed Electric Usage} = (\text{CoolingTowerEnergy}(KW) + \text{AbsorberEnergy}(KW)) \times \text{Full Load Hrs.}$$

$$\text{Proposed Electric Usage} = (7.46(KW) + 2.95(KW)) \times 800(Hrs.) = 8{,}328(kWh)$$

$$\text{Electric EnergySavings} = \text{ExistingElecEnergy}(kWh) - \text{ProposedElecEnergy}(kWh)$$

$$\text{Electric EnergySavings} = 134{,}320(kWh) - 8{,}328(kWh) = 125{,}992(kWh)$$

$$\text{Demand Savings} = \text{ExistingChillerDemand}(KW) - \text{AbsorberDemand}(KW)$$

$$\text{Demand Savings} = 98.95(KW) - 10.4(KW) = 88.5(KW)$$

$$\text{Existing Cooling Cost} = \text{ExistingUsage}(kWh) \times \text{AveCost}\left(\frac{\$}{kWh}\right)$$

$$\text{Existing Cooling Cost} = 134{,}320(kWh) \times 0.164\left(\frac{\$}{kWh}\right) = \$22{,}028$$

$$\text{Proposed Cooling Cost} = \text{ProposedGasUsage}(Therms) \times \text{AveCost}\left(\frac{\$}{Therm}\right) + \ldots$$

$$\text{ProposedElecUsage}(kWh) \times \text{AveCost}\left(\frac{\$}{kWh}\right)$$

$$\text{Proposed Cooling Cost} = 9{,}517(Therms) \times 1.51\left(\frac{\$}{Therm}\right) + 8{,}328(kWh) \times 0.164\left(\frac{\$}{kWh}\right) = \$15{,}736$$

$$\text{Savings} = \text{ExistingCost}(\$) - \text{ProposedCost}(\$) = \$6{,}292$$

Installation cost for the absorption chiller, cooling tower, pumps, piping and controls is estimated to be $213,625 ($170,825 Materials).

From the NJ Smart Start® Program appendix, the absorption chiller falls under "Gas Cooling" and warrants an incentive based on capacity and efficiency at or above 1.1 COP. The program incentives are calculated as follows:

$$\text{Smart Start®}\ \textit{Incentive} = \left(\textit{Cooling Tons} \times\ \$/\textit{Ton Incentive}\right)$$
$$= \left(115\textit{Tons} \times \$230/\textit{Ton}\right) = \$26{,}450$$

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$213,625
NJ Smart Start Equipment Incentive ($):	($26,450)
Net Installation Cost ($):	$187,175
Yearly Maintenance Savings ($/Yr):	$0
Yearly Energy Savings ($/Yr):	$6,292
Total Yearly Savings ($/Yr):	$6,292
Estimated ECM Lifetime (Yr):	20
Simple Payback	29.7
Simple Lifetime ROI	-32.8%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$125,840
Internal Rate of Return (IRR)	-4%
Net Present Value (NPV)	($93,565.93)

ECM #5: Combined Heat and Power Plant (Determined Not Applicable)

A combined heat and power plant utilizes the rejected heat from an electric generator. The heat is used for the building's heating loads such as HVAC system heating, domestic hot water, etc. The electric production is used for the building's electrical loads. EPA has determined the typical range of "total system efficiency," for typical CHP systems. The efficiency range is as follows:

Micro Turbine: 70%-80%

CEG conducted a review of the applicability of a combined heat and power (CHP) plant installation. The base line heating load for the facility is limited by the domestic hot water usage. Based on typical output published by the EPA, the averaged energy production from a CHP is 30% electric production and 45% heat production. Since the baseline heating load is the limiting factor, the system size is based on the minimum continuous heat load. The remaining electric production potential is provided to offset the purchase of electric energy from the electric grid. The runtime factor is estimated to be 93% based on the EPA "Combined Heat and Power Partnership" Incentive grant reduction for maintenance due to downtime.

Baseline Heating Load = 1255 Therms / Month

$$Baseline\ Heat = \frac{Ave\ Dom.\ HW\ Use\left(\frac{Therms}{Month}\right) \times HeatValue\left(\frac{Btu}{Therm}\right) \times Boiler\ Eff\ \%}{30.12\left(\frac{Day}{Month}\right) \times 24\left(\frac{Hr}{Day}\right)}$$

$$Baseline\ Heat = \frac{1255\left(\frac{Therms}{Month}\right) \times 100{,}000\left(\frac{Btu}{Therm}\right) \times 77\%}{30.12\left(\frac{Day}{Month}\right) \times 24\left(\frac{Hr}{Day}\right)} = 133{,}681\left(\frac{Btu}{Hr.}\right)$$

$$Sys\ Elec\ Size = \frac{Base\ Heat\ Load\left(\frac{Btu}{Hr.}\right)}{Heat\ \mathrm{Pr}oduction\ Eff\ \%} \times Electric\ \mathrm{Pr}oduction\ Eff\ \% \times \left(\frac{1(KWH)}{3{,}414(BTU)}\right)$$

$$Sys\ Elec\ Size = \frac{133{,}681\left(\frac{kBtu}{Hr.}\right)}{45\%} \times 30\% \times \left(\frac{1(KWH)}{3{,}414(BTU)}\right) = 26(KW)$$

The required system KW size for the Correctional Facility would be approximately 26KW of power generation. This size would provide usable heat for the facility's domestic hot water needs year round. A combined heat and power of this size is not commercially available. Although

micro-turbines are available at production ratings at 30KW, these systems are not available for production of combined heat and power. Therefore, a combined heat and power system is not applicable for this facility.

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 technologies for Warren Haven Nursing Home, and concluded that there is potential for solar energy generation.

Solar energy produces clean energy and reduces a building's carbon footprint. This is accomplished via photovoltaic panels which will be mounted on all south and southwestern facades of the building. Flat roof, as well as sloped areas can be utilized; flat areas will have the panels turned to an optimum solar absorbing angle. (A structural survey of the roof would be necessary before the installation of PV panels is considered). 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 of the building being audited for the purposes of determining a potential for a roof mounted photovoltaic system. A roof area of 11,078 S.F. can be utilized for a PV system. A depiction of the area utilized is shown in Renewable / Distributed Energy Measures Calculation appendix. Using this square footage it was determined that a system size of 173.42 kilowatts could be installed. A system of this size has an estimated kilowatt hour production of 200,395 KWh annually, reducing the overall utility bill by approximately 20.6% 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 solar panel system analysis is based on Sun Power SPR-230 panels. The panel efficiency is 18%. The overall DC-to-AC derate factor is 81%. The panel tilt angle and direction is based on the actual proposed roof conditions and roof slope. For flat roof installations, the tilt is based on 10° from horizontal and facing South. The solar radiation and resultant AC energy calculations are based on the "National Renewable Energy Laboratory PVWatts Version 1.0 Calculator." The monthly energy output and savings from the PVWatts calculator is shown in the **Renewable / Distributed Energy Measures Calculation Appendix**.

The proposed solar PV system utilizes the New Jersey guidelines for net metering. Net metering allows excess energy generated at production peaks to flow onto the grid. The excess energy is metered and subtracted from the facility's total energy usage on an annual basis. Due to this allowance the system design excludes the use of inefficient battery storage.

CEG has reviewed financing options for the owner. Two options were studied and they are as follows: Self-financed and direct purchase without finance. Self-finance was calculated with 95% of the total project cost financed at a 7% interest rate over 25 years. Direct purchase involves the local government paying for 100% of the total project cost upfront via one of the methods noted in the Installation Funding Options section below. Both of these calculations include a utility inflation rate as well as the degradation of the solar panels over time. Based on our calculations the following are the payback periods for the respective method of payment:

PAYMENT TYPE	SIMPLE PAYBACK	INTERNAL RATE OF RETURN
Self-Finance	15.2 Years	-3.32%
Direct Purchase	15.2 Years	4.9%

The resultant Internal Rate of Return indicates that if the Owner was able to "Direct Purchase" the solar project, the project would be more beneficial to the Owner. If the Owner was able to work out a Power Purchase Agreement with a third-party and agree upon a decent base energy rate for kilowatt hour production, the "Self-Finance" option could also, prove to be a beneficial route, however it is not beneficial under the assumptions for the calculation shown.

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 this facility, it was determined that the average wind speed is not adequate. Therefore, wind energy is not a viable option.

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 electric load profile. There is steady but substantial usage throughout the year based on the fact that it is a densely populated building operating 24 hours, 7 days a week. Additionally, because this facility houses inmates, closing off or setting back sections of this facility cannot be accomplished. And the laundry and the kitchen require staff that operates almost continuously throughout the day. These factors all contribute to this elevated base-load electric profile that is observed annually. The primary use in this facility for electricity is air conditioning (thus the summer peak June-October) and lighting. Air conditioning is supplied by a 115 ton air cooled screw handler. Other secondary loads contributing to the base electric usage are the kitchen exhaust fan, computers, printers, cameras and TV's distributed throughout the building. A flatter load profile, will allow for more competitive energy prices when shopping for alternative suppliers.

Natural Gas:

The Natural Gas Usage Profile demonstrates a typical natural gas, heating load profile. With the winter period (October –March), demonstrating the largest use of energy. This of course is due to the demand for heating the building. The primary source for heat are (2) two natural gas-fired heating hot water boilers. Natural gas is also the energy source for the domestic hot water boiler, kitchen cooking equipment and laundry driers. These latter uses help contribute to the year-long slightly elevated use for natural gas. The (2) two boilers are shutdown in the summer months, as demonstrated in the load profile. Domestic hot water is supplied by a hot water boiler. The flatter the load profile the easier it is to procure more competitive energy when shopping for a Third Party Supplier.

Tariff Analysis:

Electricity:

This facility receives electrical service through Jersey Central Power & Light (JCP&L) on a GSS (General Service Secondary – 3 Phase) rate. Service classification GS is available for general service purposes on secondary voltages not included under Service Classifications RS, RT, RGT

or GST. This facility's rate is a single or three phase service at secondary voltages. For electric supply (generation), the customer will use the utilities Basic Generation Service (BGS) or a Third Party Supplier (TPS). This facility uses Basic Generation service from the utility. Therefore, they will pay according to the BGS default service. The Delivery Service includes the following charges: Customer Charge, Supplemental Customer Charge, Distribution Charge (kW Demand), kWh Charge, Non-utility Generation Charge, TEFA, SBC, SCC, Standby Fee and RGGI.

Natural Gas:

Natural gas service is provided by Elizabethtown Gas Company on a Multi Family Service (MFS) natural gas tariff service rate. This service classification is closed, and only available to customers who are currently receiving this service as of December 1, 2002, and whose annual weather normalized usage as determined by the Company is equal to or greater 3,000 therms per year and have maintained continuous thereafter. Additional facilities added at these customers' existing site after this date will qualify for service under this classification. The following building types qualify for this service:

Governmental Buildings
Religious Institutions
Hospitals and Nursing Homes

Provided that gas supplied under this rates is the primary source of energy for all of the following purposes:

a). Central Heating
b). Heating water where water is used..

..and Gas Company's facilities are suitable and the required quantity of gas is available for the service desired. Commercial or Industrial use is not permitted under this rate. This service is not available for new or additional boiler equipment with a rated input in excess of 12.5 million BTU's per hour. The Gas Company may waive this limitation in cases where the Customer enters into a longer term contract or agrees to guarantee a monthly minimum revenue level as may be determined by the Gas Company. This is a continuous service.
The following are the charges associated with this service classification:

Service Charge
Demand Charge
Distribution Charge
Commodity Charge (Ride A)

Recommendations:

CEG recommends a global approach that will be consistent with all facilities within the BOE. The primary area for potential improvement is seen in the electric costs. The average price per kWh (kilowatt hour) for all buildings based on 1-year historical average price is $.1398/kWh (this is the average "price to compare" if the client intends to shop for energy). The average price per decatherm for natural gas is $ 11.46 / dth (dth, is the common unit of measure). The weighted average price per gallon for propane is $1.4934 / gallon. The average price per gallon for Heating Oil is $2.2763/ gallon.

Energy commodities are among the most volatile of all commodities, however at this point and time, energy is extremely competitive. Warren County could see improvement in its energy costs if it were to take advantage of these current market prices quickly, before energy prices increase. Based on annual historical consumption (July 2008 through June 2009) and current electric rates, the county could see an improvement in its electric costs of up to 24% annually. This number is substantial noting that the annual expenditure is over $500,000. (Note: Savings were calculated using Average Annual Consumption and a variance to a Fixed Average One-Year commodity contract). CEG recommends aggregating the entire electric load to gain the most optimal energy costs. CEG recommends advisement for alternative sourcing and supply of energy on a "managed approach".

CEG's second recommendation coincides with the natural gas costs. Based on the current market, Warren County could improve its natural gas costs by up to 24%. CEG recommends the county receive further advisement on these prices through an energy advisor. They should also consider procuring energy (natural gas) through an alternative supply source.

CEG's third recommendation coincides with the propane costs associated with the Nursing Home. Based on a one-year weighted average price per gallon, Warren County pays $1.4934 / gallon for propane. The county has a contract with Amerigas Propane Inc., for a (2) two year period, expiring August 31, 2009. Because of the liquidity and volatility issues associated with propane, CEG strongly recommends renegotiating this contract with Amerigas for a (1) or (2) year fixed price contract. This will allow the county to improve its propane costs by up to 29%. CEG suggests the use of an energy advisor for the procurement of propane.

CEG's forth recommendation coincides with the Heating Oil (HO; # 2 Fuel Oil), costs. The county's average annual price per gallon of HO is $2.2763 / gallon. At the current time "spot" (daily or monthly) prices are very competitive. The fear is that along with crude price increases (and crude will escalate first), the HO will follow. Also as the winter approaches, Heating Oil prices will increase (subject to many physical factors such as refining). CEG noticed that the county has a 2-year contract with Allied Oil Company expiring August 2009. While energy prices remain competitive, CEG would suggest renegotiating this contract for a (1) or (2) year fixed price. This will allow for budget certainty while hedging the county against HO price increases.

CEG also recommends scheduling a meeting with the current utility providers to review their utility charges and current tariff structures for electricity and natural gas. This meeting would provide insight regarding alternative procurement options that are currently available. Through its meeting with the Local Distribution Company (LDC), the municipality can learn more about the competitive supply process. The county can acquire a list of approved Third Party Suppliers from the New Jersey Board of Public Utilities website at www.nj.gov/bpu. They should also consider using a billing-auditing service to further analyze the utility invoices, manage the data and use the information for ongoing demand-side management projects. Furthermore, special attention should be given to credit mechanisms, imbalances, balancing charges and commodity charges when meeting with the utility representative. Warren County should ask the utility representative about alternative billing options, such as consolidated billing when utilizing the

service of a Third Party Supplier. Finally, if the supplier for energy (natural gas) is changed, closely monitor balancing, particularly when the contract is close to termination. This could be performed with the aid of an “energy advisor”.

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.

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. As stated in the executive summary these items should be considered the first form of action for this facility.

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

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

C. Confirm that outside air economizers on the rooftop units are functioning properly to take advantage of free cooling and minimize potential for over ventilation energy consumption.

D. Set hot water re-circ pump temperature set-point below hot water supply temperature setting to avoid continuous operation. Provide time clock in addition to hot water re-circ aqua stat to stop hot water circulation during unoccupied periods.

E. Confirm proper operation of outdoor lighting controls including photocells and time clocks to minimize outdoor lighting energy usage.

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 US department of energy reports that commissioning for buildings on average save 5%-15% savings on energy usage.

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Warren County Correctional Facility

ECMs	ECM Description	Installation Cost				Yearly Savings			ECM Lifetime	Lifetime Savings	Lifetime Maint. Savings	Lifetime ROI	Payback	Internal Rate of Return (IRR)	Net Present Value (NPV)
		Material	Labor	NJ Smart Start	Net	Energy	Maint.	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	$30,817	$30,817	($6,200.00)	$55,435	$22,309	$826	$23,135	25	$578,363	$20,650	943.3%	2.4	41.73%	$347,410.11
ECM #2	Air Cooled Chiller Replacement	$51,750	$34,000	($2,070.00)	$83,680	$4,276	$0	$4,276	20	$85,520	$0	2.2%	19.6	0.21%	($20,063.92)
ECM #3	Solar Thermal System	$152,005	$120,640	$0.00	$272,645	$22,741	$0	$22,741	25	$568,525	$0	108.5%	12.0	6.69%	$123,347.39
ECM #4	Absorption Chiller	$170,825	$42,800	($26,450.00)	$187,175	$6,292	$0	$6,292	20	$125,840	$0	-32.8%	29.7	-3.52%	($93,565.93)
ECM #5	Combined Heat and	NA	NA	NA	#N/A	NA	NA	#N/A	NA	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
ECM #6	Solar Photovoltaic System	$1,560,780	$0	$0.00	$1,560,780	$103,003	$0	$103,003	25	$2,575,075	$0	65.0%	15.2	4.29%	$232,826.45

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* .

Concord Engineering Group, Inc.

520 BURNT MILL ROAD
VOORHEES, NEW JERSEY 08043
PHONE: (856) 427-0200
FAX: (856) 427-6508

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 January, 2009:

Electric Chillers

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

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

Ground Source Heat Pumps

Closed Loop & Open Loop	$370 per ton

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

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

Premium Motors

Three-Phase Motors	$45 - $700 per motor

Prescriptive Lighting

T-5 and T-8 Lamps w/Electronic Ballast in Existing Facilities	$10 - $30 per fixture, (depending on quantity)
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

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

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

"Warren County Correctional Facility"

Boiler

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Input (MBh)	Output (MBh)	Efficiency (%)	Fuel	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Mezzanine - Boiler Room	Heating Water Loop	Columbia Boiler Co	2	-	-	2,100	-	75% (Est)	Nat Gas	26	35	9	Burner: Power Flame, 3/4 HP, Model: CR2-GO-15, Serial:68335112
Mezzanine - Boiler Room	Domestic Hot Water Tank	Bryan Boiler	1	CL90-W-WT-FD	83686	900	720	80%	Nat Gas	10	35	25	Burner: Bryan, 1/3 HP, Model: R6.2-GO-03

Pumps

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	HP	RPM	GPM	Ft. Hd	Frame Size	Volts	Phase	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Mezzanine - Mechanical Room	Building Heating Water Loop	Armstrong	2	4030 2.5E		5	1750	178	46	-	480	3	26 (Est)	20	(6)	Base Mounted Pumps, Leeson Elec Motor
Mezzanine - Mechanical Room	Building Chilled Water Loop	Armstrong	2	4380 BF	-	5	1750	260	50	-	480	3	13	20	7	Inline Base Mounted Pumps, Marathon Elec Motor

Domestic Hot Water Heater

Location	Area Served	Manufacturer	Qty	Model #	Serial #	Input (MBh)	Recovery (gal/h)	Capacity (gal)	Efficiency (%)	Fuel	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Mezzanine - Mechanical Room	Whole Bldg.	-	1	-	-	Indirect	-	1,100 (Est.)	Heated By Main Boiler	-	26 (Est)	10	(16)	Indirect heat exchanger from boiler loop, set to 140°F

Domestic Hot Water - Pump

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	HP	Volts	GPM	Ft. Hd	Amps	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Mezzanine - Mechanical Room	Whole Bldg.	Bell & Gossett	1	HV Series	-	6-Jan	208	-	-		Unknown	10	-	Dedicated domestic water boiler pump.

Air Handling Units

Location	Area Served	Manufacturer	Qty	Model #	Serial #	Fan HP	Cooling Type	Heating Type	Volts	Phase	Amps	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Main AHU - Mezzanine - Mechanical Room	All VAV Units	Gamewell	1	-	-	40	Chilled Water Coil	Hot Water Coil	208	3	-	26 (Est)	15	(11)	Supply fan controlled by VFD through ductwork static pressure. Witt cooling coil added approximately 13 years old (1294 MBH cooling, 891 MBH heating)
Gym AHU - Mezzanine - Mechanical Room	Gymnasium	Central Aire	1	L0612	19208N01	-	DX Cooling Coil	Hot Water Coil	208	3	-	26 (Est)	15	(11)	Witt heating coil added approximately 13 years old
Kitchen Make Up AHU - Roof	Kitchen	Duo Aire	1	CAA Series	10876	-	None	Gas Fired	480	3	7	26 (Est)	15	(11)	

AC Condensers / Condensing Units

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Cooling Capacity	Eff.	Refrigerant	Volts	Phase	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Gym CU - Roof	Gymnasium	York Lux Aire	1	HEHB-W090AA	(S) N0D6128488	90 MBH	9.4	R-22	480	3	8 (Est.)	15	7	
Kitchen Equipment Condenser	Kitchen Refrigerator	Russell	1	RLH215L44-E	W05E28259029006	-	-	R-404A	208	3	Unknown	15	-	Condenser for kitchen refrigerator
Kitchen Equipment Condenser	Kitchen Refrigerator	Russell	1	RLH100H22-E	W05H30326203001	-	-	R-22	208	3	Unknown	15	-	Condenser for kitchen refrigerator

Packaged AC Units

Location	Area Served	Manufacturer	Qty	Model #	Serial #	Cooling Capacity	Cooling Eff. (EER)	Heating Type	Volts	Phase	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Roof	Control Room	Command / Aire Corp	1	-	-	-	8.5 (Est.)	-	-	-	20	15	(5)	No Data Available

Chiller

Location	Area Served	Manufacturer	Qty	Model #	Serial #	Cooling Capacity	Cooling Eff. (KW/Ton)	Refrigerant	Volts	Phase	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Roof	Whole Bldg	Applied Products	1	ASC115B2DP	A96K00036	1,380 MBH	1.46 (Est.)	R-22	480	3	13	15	2	Air Cooled, (2) Hitachi screw compressors, (8) condenser fans

Split Systems

Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Cooling Capacity	Eff.	Refrigerant	Volts	Phase	Amps	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Indoor - IT / Data	IT / Data Room	Mitsubishi Electric Corp	1	PL24AK	-	24 MBH	9.9 EER (Est.)	R-22	208	1		Unknown	15	-	
Outdoor - Roof			1	PU24EK	-				208	1					

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Warren County Corrections

Building ID: 1867818
For 12-month Period Ending: May 31, 2009[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: October 01, 2009

Facility
Warren County Corrections
175 County Road
Belvidere, NJ 07823

Facility Owner
County of Warren
165 County Rd. 519S Wayne Dumont, Jr.
Administration Building
Velvidere, NJ 07823

Primary Contact for this Facility
Chris Pessolano
165 County Rd. 519S Wayne Dumont, Jr.
Administration Building
Belvidere, NJ 07823

Year Built: 1984
Gross Floor Area (ft²): 46,570

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

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	3,315,918
Natural Gas (kBtu)[4]	4,697,420
Total Energy (kBtu)	8,013,338

Energy Intensity[5]

Site (kBtu/ft²/yr)	172
Source (kBtu/ft²/yr)	343

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	755

Electric Distribution Utility
Jersey Central Power & Lt Co

National Average Comparison

National Average Site EUI	104
National Average Source EUI	213
% Difference from National Average Source EUI	61%
Building Type	Other

Stamp of Certifying Professional

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

Meets Industry Standards[6] **for Indoor Environmental Conditions:**

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

Certifying Professional
Ray Johnson
520 S Burnt Mill Road
Voorhees, NJ 08043

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Natural Gas values in units of volume (e.g. cubic feet) are converted to kBtu with adjustments made for elevation based on Facility zip code.
5. Values represent energy intensity, annualized to a 12-month period.
6. Based on Meeting ASHRAE Standard 62 for ventilation for acceptable indoor air quality, ASHRAE Standard 55 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Warren County Corrections	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Other	Is this an accurate description of the space in question?		☐
Location	175 County Road, Belvidere, NJ 07823	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐
Correctional Facility (Other)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	46,570 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Number of PCs	32 (Optional)	Is this the number of personal computers in the space?		☐
Weekly operating hours	168 Hours(Optional)	Is this the total number of hours per week that the space is 75% occupied? This number should exclude hours when the facility is occupied only by maintenance, security, or other support personnel. For facilities with a schedule that varies during the year, "operating hours/week" refers to the total weekly hours for the schedule most often followed.		☐
Workers on Main Shift	200 (Optional)	Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100.		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: Jersey Central Power & Lt Co

Fuel Type: Electricity		
Meter: Electric Meter (kWh (thousand Watt-hours)) **Space(s):** Entire Facility **Generation Method:** Grid Purchase		
Start Date	**End Date**	**Energy Use (kWh (thousand Watt-hours))**
05/01/2009	05/31/2009	80,000.00
04/01/2009	04/30/2009	70,880.00
03/01/2009	03/31/2009	63,680.00
02/01/2009	02/28/2009	69,920.00
01/01/2009	01/31/2009	67,520.00
12/01/2008	12/31/2008	64,800.00
11/01/2008	11/30/2008	63,520.00
10/01/2008	10/31/2008	86,240.00
09/01/2008	09/30/2008	99,040.00
08/01/2008	08/31/2008	94,400.00
07/01/2008	07/31/2008	112,480.00
06/01/2008	06/30/2008	99,360.00
Electric Meter Consumption (kWh (thousand Watt-hours))		**971,840.00**
Electric Meter Consumption (kBtu (thousand Btu))		**3,315,918.08**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**3,315,918.08**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas		
Meter: Gas Meter (therms) **Space(s):** Entire Facility		
Start Date	**End Date**	**Energy Use (therms)**
05/01/2009	05/31/2009	2,369.30
04/01/2009	04/30/2009	2,922.90
03/01/2009	03/31/2009	4,635.40
02/01/2009	02/28/2009	6,042.80
01/01/2009	01/31/2009	7,389.50
12/01/2008	12/31/2008	6,584.10
11/01/2008	11/30/2008	5,785.60
10/01/2008	10/31/2008	3,584.30
09/01/2008	09/30/2008	2,159.40
08/01/2008	08/31/2008	1,595.10

07/01/2008	07/31/2008	1,543.30
06/01/2008	06/30/2008	2,362.50
Gas Meter Consumption (therms)		**46,974.20**
Gas Meter Consumption (kBtu (thousand Btu))		**4,697,420.00**
Total Natural Gas Consumption (kBtu (thousand Btu))		**4,697,420.00**
Is this the total Natural Gas consumption at this building including all Natural Gas meters?		☐

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

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

Certifying Professional

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

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
Warren County Corrections
175 County Road
Belvidere, NJ 07823

Facility Owner
County of Warren
165 County Rd. 519S Wayne Dumont, Jr.
Administration Building
Velvidere, NJ 07823

Primary Contact for this Facility
Chris Pessolano
165 County Rd. 519S Wayne Dumont, Jr.
Administration Building
Belvidere, NJ 07823

General Information

Warren County Corrections	
Gross Floor Area Excluding Parking: (ft^2)	46,570
Year Built	1984
For 12-month Evaluation Period Ending Date:	May 31, 2009

Facility Space Use Summary

Correctional Facility	
Space Type	Other - Other
Gross Floor Area(ft^2)	46,570
Number of PCs[o]	32
Weekly operating hours[o]	168
Workers on Main Shift[o]	200

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 05/31/2009)	**Baseline** (Ending Date 05/31/2009)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	N/A	N/A	75	N/A	N/A
Energy Intensity					
Site (kBtu/ft^2)	172	172	0	N/A	104
Source (kBtu/ft^2)	343	343	0	N/A	213
Energy Cost					
$/year	N/A	N/A	N/A	N/A	N/A
$/$ft^2$/year	N/A	N/A	N/A	N/A	N/A
Greenhouse Gas Emissions					
$MtCO_2e$/year	755	755	0	N/A	456
$kgCO_2e/ft^2$/year	16	16	0	N/A	10

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

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

CEG Job #: 9C09086
Project: Warren County Correctional Facility
Address: 175 County Road
Belvidere, NJ 07823
Building SF: 46,570

"Warren County - Correctional Center"

KWH COST: $0.165

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
201	Main Lobby	2912	10	0	1-Lamp Incandescent Fixture	50	0.50	1,456	$240.24	10	0	18 W CFL Lamp	18	0.18	524	$86.49	$5.75	$57.50	0.32	931.84	$153.75	0.37
807		2912	2	0	2 x 2, 2-Lamp, T8, U-Lamp, Electronic Ballast, Recessed Mounted	73	0.15	425	$70.15	2	0	No Change	73	0.15	425	$70.15	$0.00	$0.00	0.00	0	$0.00	0.00
802	26 Hall/Corridor	8760	10	0	1 X 4, 2-Lamp, T8, Electronic Ballast, Surface Mounted	58	0.58	5,081	$838.33	10	0	No Change	58	0.58	5,081	$838.33	$0.00	$0.00	0.00	0	$0.00	0.00
1203	Center Control	8760	5	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.80	7,008	$1,156.32	5	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.46	3,986	$657.66	$140.00	$700.00	0.35	3022.2	$498.66	1.40
1204	Garage	728	9	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	94	0.85	616	$101.62	9	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.50	360	$59.46	$100.00	$900.00	0.35	255.528	$42.16	21.35
1202	Property Room	728	7	2	1 X 4, 2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	94	0.66	479	$79.04	7	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.39	280	$46.25	$100.00	$700.00	0.27	198.744	$32.79	21.35
1205	Intake Room	8760	7	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.66	5,764	$951.07	7	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.39	3,373	$556.48	$100.00	$700.00	0.27	2391.48	$394.59	1.77
1205	Intake room	8760	7	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.66	5,764	$951.07	7	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.39	3,373	$556.48	$100.00	$700.00	0.27	2391.48	$394.59	1.77
1205	33 Hall	8760	13	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	1.22	10,705	$1,766.28	13	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.72	6,263	$1,033.46	$100.00	$1,300.00	0.51	4441.32	$732.82	1.77
1203	Classification	8760	4	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.64	5,606	$925.06	4	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.36	3,189	$526.13	$140.00	$560.00	0.28	2417.76	$398.93	1.40
1203	Medical	8760	8	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	1.28	11,213	$1,850.11	8	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.73	6,377	$1,052.25	$140.00	$1,120.00	0.55	4835.52	$797.86	1.40
1203	Treatment	8760	3	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.48	4,205	$693.79	3	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.27	2,391	$394.59	$140.00	$420.00	0.21	1813.32	$299.20	1.40
1203	Medical office	6552	2	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.32	2,097	$345.95	2	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.18	1,192	$196.76	$140.00	$280.00	0.14	904.176	$149.19	1.88
1205		6552	2	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.19	1,232	$203.24	2	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.11	721	$118.92	$100.00	$200.00	0.08	511.056	$84.32	2.37

1205	61 Isolation Cell	6552	2	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.19	1,232	$203.24	2	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.11	721	$118.92	$100.00	$200.00	0.08	511.056	$84.32	2.37
1205	60 Cell	6552	4	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.38	2,464	$406.49	4	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.22	1,441	$237.84	$100.00	$400.00	0.16	1022.112	$168.65	2.37
1205		6552	1	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.09	616	$101.62	1	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	360	$59.46	$100.00	$100.00	0.04	255.528	$42.16	2.37
1205	A Block Day Room/ A block 8 cells	6552	16	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	1.50	9,854	$1,625.94	16	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.88	5,766	$951.35	$100.00	$1,600.00	0.62	4088.448	$674.59	2.37
1205		6552	8	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.75	4,927	$812.97	8	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.44	2,883	$475.68	$100.00	$800.00	0.31	2044.224	$337.30	2.37
1203	A & B Satelite	6552	1	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.16	1,048	$172.97	1	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.09	596	$98.38	$140.00	$140.00	0.07	452.088	$74.59	1.88
1205	A & B 12 cells	6552	12	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	1.13	7,391	$1,219.46	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.66	4,324	$713.51	$100.00	$1,200.00	0.47	3066.336	$505.95	2.37
1205	A & B Block Day Room	6552	26	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	2.44	16,013	$2,642.16	26	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	1.43	9,369	$1,545.94	$100.00	$2,600.00	1.01	6643.728	$1,096.22	2.37
1205	C Block Day Room	6552	20	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	1.88	12,318	$2,032.43	20	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	1.10	7,207	$1,189.19	$100.00	$2,000.00	0.78	5110.56	$843.24	2.37
1203	C block monitor room	6552	1	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.16	1,048	$172.97	1	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.09	596	$98.38	$140.00	$140.00	0.07	452.088	$74.59	1.88
1205	C Block Dayroom	6552	17	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	1.60	10,470	$1,727.57	17	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.94	6,126	$1,010.81	$100.00	$1,700.00	0.66	4343.976	$716.76	2.37
1205	C Block 12 cells	6552	12	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	1.13	7,391	$1,219.46	12	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.66	4,324	$713.51	$100.00	$1,200.00	0.47	3066.336	$505.95	2.37
1205	C Block 8 cells	6552	8	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.75	4,927	$812.97	8	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.44	2,883	$475.68	$100.00	$800.00	0.31	2044.224	$337.30	2.37
1203	Library	6552	5	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.80	5,242	$864.86	5	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.46	2,981	$491.89	$140.00	$700.00	0.35	2260.44	$372.97	1.88
1205	C Block Corridor	8760	17	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	1.60	13,998	$2,309.75	17	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.94	8,191	$1,351.45	$100.00	$1,700.00	0.66	5807.88	$958.30	1.77
1205	C Block weight room	6552	7	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.66	4,311	$711.35	7	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.39	2,523	$416.22	$100.00	$700.00	0.27	1788.696	$295.13	2.37
1205	Room 100 3 cells	6552	3	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.28	1,848	$304.86	3	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.17	1,081	$178.38	$100.00	$300.00	0.12	766.584	$126.49	2.37

1205	Room 100 Day Room	6552	4	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.38	2,464	$406.49	4	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.22	1,441	$237.84	$100.00	$400.00	0.16	1022.112	$168.65	2.37
302	Room 105 Gym/Multipurpose room	6552	9	0	1-Lamp Metal Halide Fixture	295	2.66	17,396	$2,870.27	9	0	No Change	295	2.66	17,396	$2,870.27	$0.00	$0.00	0.00	0	$0.00	0.00
204	2 Showers area in gym/multi rm	6552	2	0	1-Lamp Incandescent Fixture	60	0.12	786	$129.73	2	0	18 W CFL Lamp	18	0.04	236	$38.92	$5.75	$11.50	0.08	550.368	$90.81	0.13
1202	Gym 105	6552	1	2	1 X 4, 2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	94	0.09	616	$101.62	1	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	360	$59.46	$100.00	$100.00	0.04	255.528	$42.16	2.37
1206	Supply Closet	728	2	1	1 X 4, 1-Lamp, T12, Magnetic Ballast, Surface Mounted, No Lens	50	0.10	73	$12.01	2	1	1'X4' 1-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	30	0.06	44	$7.21	$100.00	$200.00	0.04	29.12	$4.80	41.63
1206	107 Janitor room	728	2	1	1 X 4, 1-Lamp, T12, Magnetic Ballast, Surface Mounted, No Lens	50	0.10	73	$12.01	2	1	1'X4' 1-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	30	0.06	44	$7.21	$100.00	$200.00	0.04	29.12	$4.80	41.63
1205	Day Room 108	6552	2	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.19	1,232	$203.24	2	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.11	721	$118.92	$100.00	$200.00	0.08	511.056	$84.32	2.37
1205	108 1 Cell	6552	1	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.09	616	$101.62	1	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	360	$59.46	$100.00	$100.00	0.04	255.528	$42.16	2.37
1203	115 Control Room	8760	1	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.16	1,402	$231.26	1	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.09	797	$131.53	$140.00	$140.00	0.07	604.44	$99.73	1.40
1205	E Day Room	6552	9	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.85	5,543	$914.59	9	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.50	3,243	$535.13	$100.00	$900.00	0.35	2299.752	$379.46	2.37
1205	E 4 Cells, 1 fixture per cell	6552	1	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.09	616	$101.62	1	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	360	$59.46	$100.00	$100.00	0.04	255.528	$42.16	2.37
1205	F Day Room	6552	9	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.85	5,543	$914.59	9	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.50	3,243	$535.13	$100.00	$900.00	0.35	2299.752	$379.46	2.37
1207	F121 4 cells, 1 fixture per cell	6552	1	1	1 X 4, 1-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	50	0.05	328	$54.05	1	1	1'X4' 1-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	30	0.03	197	$32.43	$100.00	$100.00	0.02	131.04	$21.62	4.63
1203	Recreation Satelite	6552	1	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.16	1,048	$172.97	1	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.09	596	$98.38	$140.00	$140.00	0.07	452.088	$74.59	1.88
303	Outdoor Recreation	3640	4	0	1-Lamp High Pressure Soduim Fixture	125	0.50	1,820	$300.30	4	0	No Change	125	0.50	1,820	$300.30	$0.00	$0.00	0.00	0	$0.00	0.00
102		3640	4	0	1-Lamp Compact Flourescent	26	0.10	379	$62.46	4	0	No Change	26	0.10	379	$62.46	$0.00	$0.00	0.00	0	$0.00	0.00
1205	Intake	6552	3	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.28	1,848	$304.86	3	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.17	1,081	$178.38	$100.00	$300.00	0.12	766.584	$126.49	2.37

1205	Intake Holding	6552	4	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.38	2,464	$406.49	4	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.22	1,441	$237.84	$100.00	$400.00	0.16	1022.112	$168.65	2.37
1205	Bathroom	6552	1	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.09	616	$101.62	1	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	360	$59.46	$100.00	$100.00	0.04	255.528	$42.16	2.37
1207	G Block 5 Cells	6552	1	1	1 X 4, 1-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	50	0.05	328	$54.05	1	1	1'X4' 1-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	30	0.03	197	$32.43	$100.00	$100.00	0.02	131.04	$21.62	4.63
1205	G Block	6552	9	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.85	5,543	$914.59	9	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.50	3,243	$535.13	$100.00	$900.00	0.35	2299.752	$379.46	2.37
1205	Staff Lunch room	6552	9	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.85	5,543	$914.59	9	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.50	3,243	$535.13	$100.00	$900.00	0.35	2299.752	$379.46	2.37
1204	Kitchen	6552	31	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	94	2.91	19,093	$3,150.27	31	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	1.71	11,171	$1,843.24	$100.00	$3,100.00	1.21	7921.368	$1,307.03	2.37
1203	Kitchen Office	6552	1	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.16	1,048	$172.97	1	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.09	596	$98.38	$140.00	$140.00	0.07	452.088	$74.59	1.88
1202	136 Kitchen Storage	728	3	2	1 X 4, 2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	94	0.28	205	$33.87	3	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.17	120	$19.82	$100.00	$300.00	0.12	85.176	$14.05	21.35
101	Kitchen Hood	6552	8	0	1-Lamp Compact Flourescent	14	0.11	734	$121.08	8	0	No Change	14	0.11	734	$121.08	$0.00	$0.00	0.00	0	$0.00	0.00
204	Kitchen Freezer	728	2	0	1-Lamp Incandescent Fixture	60	0.12	87	$14.41	2	0	18 W CFL Lamp	18	0.04	26	$4.32	$5.75	$11.50	0.08	61.152	$10.09	1.14
101		728	2	0	1-Lamp Compact Flourescent	14	0.03	20	$3.36	2	0	No Change	14	0.03	20	$3.36	$0.00	$0.00	0.00	0	$0.00	0.00
1202	Supply closet	728	1	2	1 X 4, 2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	94	0.09	68	$11.29	1	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	40	$6.61	$100.00	$100.00	0.04	28.392	$4.68	21.35
1203	Room 56 General Library	6552	4	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.64	4,193	$691.89	4	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.36	2,385	$393.51	$140.00	$560.00	0.28	1808.352	$298.38	1.88
1203	55 Attorney Client room	2912	4	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.64	1,864	$307.51	4	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.36	1,060	$174.89	$140.00	$560.00	0.28	803.712	$132.61	4.22
1203	Room 54 Attorney Client room	2912	4	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.64	1,864	$307.51	4	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.36	1,060	$174.89	$140.00	$560.00	0.28	803.712	$132.61	4.22
1203	Room 53 Barber Shop	2912	3	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.48	1,398	$230.63	3	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.27	795	$131.17	$140.00	$420.00	0.21	602.784	$99.46	4.22
1203	12 Intake search	6552	1	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.16	1,048	$172.97	1	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.09	596	$98.38	$140.00	$140.00	0.07	452.088	$74.59	1.88

1205	Room 11 Contact Visitation	2912	13	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	1.22	3,558	$587.15	13	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.72	2,082	$343.54	$100.00	$1,300.00	0.51	1476.384	$243.60	5.34
1203	Room 07	2912	2	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.32	932	$153.75	2	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.18	530	$87.45	$140.00	$280.00	0.14	401.856	$66.31	4.22
1205	Room 05 Non contact visitation	2912	4	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.38	1,095	$180.66	4	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.22	641	$105.71	$100.00	$400.00	0.16	454.272	$74.95	5.34
1203	Room 08 Video Court	2912	2	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.32	932	$153.75	2	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.18	530	$87.45	$140.00	$280.00	0.14	401.856	$66.31	4.22
1202	Room 150 Washer/Dryer	6552	8	2	1 X 4, 2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	94	0.75	4,927	$812.97	8	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.44	2,883	$475.68	$100.00	$800.00	0.31	2044.224	$337.30	2.37
1205	Room 152A	6552	5	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.47	3,079	$508.11	5	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.28	1,802	$297.30	$100.00	$500.00	0.20	1277.64	$210.81	2.37
1205	Room 151 Area Corridor	8760	3	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.28	2,470	$407.60	3	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.17	1,445	$238.49	$100.00	$300.00	0.12	1024.92	$169.11	1.77
1205	Satelite Office	2912	2	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.19	547	$90.33	2	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.11	320	$52.85	$100.00	$200.00	0.08	227.136	$37.48	5.34
1209	Air Handler	728	25	2	1 X 4, 2-Lamp, T12, Magnetic Ballast, Surface Mounted, No Lens	94	2.35	1,711	$282.28	25	2	4' - 2-Lamp 32W T-8 Industrial Strip w/ Elect Ballast; Metalux M/N SNF232	73	1.83	1,329	$219.22	$123.00	$3,075.00	0.53	382.2	$63.06	48.76
1209	Blue Print room	2912	2	2	1 X 4, 2-Lamp, T12, Magnetic Ballast, Surface Mounted, No Lens	94	0.19	547	$90.33	2	2	4' - 2-Lamp 32W T-8 Industrial Strip w/ Elect Ballast; Metalux M/N SNF232	73	0.15	425	$70.15	$123.00	$246.00	0.04	122.304	$20.18	12.19
1209	IDF Room	2912	1	2	1 X 4, 2-Lamp, T12, Magnetic Ballast, Surface Mounted, No Lens	94	0.09	274	$45.17	1	2	4' - 2-Lamp 32W T-8 Industrial Strip w/ Elect Ballast; Metalux M/N SNF232	73	0.07	213	$35.08	$123.00	$123.00	0.02	61.152	$10.09	12.19
1205	26A Lounge	2912	6	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.56	1,642	$270.99	6	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.33	961	$158.56	$100.00	$600.00	0.23	681.408	$112.43	5.34
1210		2912	4	2	2 X 2, 2-Lamp, T12 U-Tube, Magnetic Ballast, Recessed Mounted, Prismatic Lens	60	0.24	699	$115.32	4	2	2'x2' 2-Lamp T-8, Prism Lens Electronic Ballast, Architectural surface or Recessed static METALUX 2AC-217-UNV-EB81-U	34	0.14	396	$65.35	$204.00	$816.00	0.10	302.848	$49.97	16.33
1211	Womens Bathroom	2912	2	1	2 Ft 1-Lamp, T12, Magnetic Ballast, Surface Mounted, Vanity Light	30	0.06	175	$28.83	2	1	2' 1-Lamp T-8 17W wall Mtd. Metalux BC117	20	0.04	116	$19.22	$148.00	$296.00	0.02	58.24	$9.61	30.80
1205	Room 48 Office	2912	2	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.19	547	$90.33	2	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.11	320	$52.85	$100.00	$200.00	0.08	227.136	$37.48	5.34
1205	Room 47 Office	2912	2	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.19	547	$90.33	2	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.11	320	$52.85	$100.00	$200.00	0.08	227.136	$37.48	5.34

1205	I.T. Closet	728	1	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.09	68	$11.29	1	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	40	$6.61	$100.00	$100.00	0.04	28.392	$4.68	21.35
1212	Mens Bathroom	2912	2	2	2 X 2, 2-Lamp, T12 U-Tube, Magnetic Ballast, Surface Mounted, Prismatic Lens	60	0.12	349	$57.66	2	2	2'x2' 2-Lamp T-8, Prism Lens Electronic Ballast, Architectural surface or Recessed static METALUX 2AC-217-UNV-EB81-U	34	0.07	198	$32.67	$204.00	$408.00	0.05	151.424	$24.98	16.33
1211		2912	2	1	2 Ft 1-Lamp, T12, Magnetic Ballast, Surface Mounted, Vanity Light	30	0.06	175	$28.83	2	1	2' 1-Lamp T-8 17W wall Mtd. Metalux BC117	20	0.04	116	$19.22	$148.00	$296.00	0.02	58.24	$9.61	30.80
1205	Room 34 Office	2912	6	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.56	1,642	$270.99	6	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.33	961	$158.56	$100.00	$600.00	0.23	681.408	$112.43	5.34
1203	Health Service	2912	2	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.32	932	$153.75	2	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.18	530	$87.45	$140.00	$280.00	0.14	401.856	$66.31	4.22
1203	Deputy Warden	2912	2	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.32	932	$153.75	2	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.18	530	$87.45	$140.00	$280.00	0.14	401.856	$66.31	4.22
1205	Administration Office	2912	16	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	1.50	4,380	$722.64	16	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.88	2,563	$422.82	$100.00	$1,600.00	0.62	1817.088	$299.82	5.34
1205	Hallway	2912	2	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.19	547	$90.33	2	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.11	320	$52.85	$100.00	$200.00	0.08	227.136	$37.48	5.34
1203	Armory	728	1	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.16	116	$19.22	1	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.09	66	$10.93	$140.00	$140.00	0.07	50.232	$8.29	16.89
1203	Warden Office	2912	2	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.32	932	$153.75	2	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.18	530	$87.45	$140.00	$280.00	0.14	401.856	$66.31	4.22
1203	Storage Closet	728	2	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.32	233	$38.44	2	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.18	132	$21.86	$140.00	$280.00	0.14	100.464	$16.58	16.89
1203	Shift Commander	2912	3	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.48	1,398	$230.63	3	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.27	795	$131.17	$140.00	$420.00	0.21	602.784	$99.46	4.22
1205	Internal Affair	2912	8	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.75	2,190	$361.32	8	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.44	1,281	$211.41	$100.00	$800.00	0.31	908.544	$149.91	5.34
1203	Room 25A Hall	2912	5	4	2 X 4, 4-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	160	0.80	2,330	$384.38	5	3	2'x4' 3-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N 2GC8	91	0.46	1,325	$218.62	$140.00	$700.00	0.35	1004.64	$165.77	4.22
1209	Generator Room	728	5	2	1 X 4, 2-Lamp, T12, Magnetic Ballast, Surface Mounted, No Lens	94	0.47	342	$56.46	5	2	4' - 2-Lamp 32W T-8 Industrial Strip w/ Elect Ballast; Metalux M/N SNF232	73	0.37	266	$43.84	$123.00	$615.00	0.11	76.44	$12.61	48.76
1206	Janitor closet	728	2	1	1 X 4, 1-Lamp, T12, Magnetic Ballast, Surface Mounted, No Lens	50	0.10	73	$12.01	2	1	1'X4' 1-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	30	0.06	44	$7.21	$100.00	$200.00	0.04	29.12	$4.80	41.63

1207	J Block Cells	6552	8	1	1 X 4, 1-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	50	0.40	2,621	$432.43	8	1	1'X4' 1-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	30	0.24	1,572	$259.46	$100.00	$800.00	0.16	1048.32	$172.97	4.63
1207	H Block Cells	6552	8	1	1 X 4, 1-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	50	0.40	2,621	$432.43	8	1	1'X4' 1-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	30	0.24	1,572	$259.46	$100.00	$800.00	0.16	1048.32	$172.97	4.63
1205	Supply Area	728	3	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.28	205	$33.87	3	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.17	120	$19.82	$100.00	$300.00	0.12	85.176	$14.05	21.35
1202	241 Electrical room	728	2	2	1 X 4, 2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	94	0.19	137	$22.58	2	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.11	80	$13.21	$100.00	$200.00	0.08	56.784	$9.37	21.35
1202	Storage Area	728	1	2	1 X 4, 2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	94	0.09	68	$11.29	1	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	40	$6.61	$100.00	$100.00	0.04	28.392	$4.68	21.35
1209	Storage Area	728	2	2	1 X 4, 2-Lamp, T12, Magnetic Ballast, Surface Mounted, No Lens	94	0.19	137	$22.58	2	2	4' - 2-Lamp 32W T-8 Industrial Strip w/ Elect Ballast; Metalux M/N SNF232	73	0.15	106	$17.54	$123.00	$246.00	0.04	30.576	$5.05	48.76
1205	J Day Room	6552	8	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.75	4,927	$812.97	8	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.44	2,883	$475.68	$100.00	$800.00	0.31	2044.224	$337.30	2.37
1202	Stairwell to room on second floor	8760	4	2	1 X 4, 2-Lamp, T12, Magnetic Ballast, Surface Mounted, Prismatic Lens	94	0.38	3,294	$543.47	4	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.22	1,927	$317.99	$100.00	$400.00	0.16	1366.56	$225.48	1.77
1208	Workshop	728	1	1	1 X 8, 1-Lamp, T12, Magnetic Ballast, Pendant Mounted, No Lens	93	0.09	68	$11.17	1	1	1'X8' 1-Lamp 32W T-8 Industrial Strip w/ Elect Ballast; Metalux M/N SSF	62	0.06	45	$7.45	$100.00	$100.00	0.03	22.568	$3.72	26.85
1205	Storage	728	1	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.09	68	$11.29	1	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.06	40	$6.61	$100.00	$100.00	0.04	28.392	$4.68	21.35
1209	Boiler Room	728	12	2	1 X 4, 2-Lamp, T12, Magnetic Ballast, Surface Mounted, No Lens	94	1.13	821	$135.50	12	2	4' - 2-Lamp 32W T-8 Industrial Strip w/ Elect Ballast; Metalux M/N SNF232	73	0.88	638	$105.23	$123.00	$1,476.00	0.25	183.456	$30.27	48.76
1209	237 Electrical Room	728	2	2	1 X 4, 2-Lamp, T12, Magnetic Ballast, Surface Mounted, No Lens	94	0.19	137	$22.58	2	2	4' - 2-Lamp 32W T-8 Industrial Strip w/ Elect Ballast; Metalux M/N SNF232	73	0.15	106	$17.54	$123.00	$246.00	0.04	30.576	$5.05	48.76
1206	Bathroom	728	1	1	1 X 4, 1-Lamp, T12, Magnetic Ballast, Surface Mounted, No Lens	50	0.05	36	$6.01	1	1	1'X4' 1-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	30	0.03	22	$3.60	$100.00	$100.00	0.02	14.56	$2.40	41.63
1205	H Day Room	6552	8	2	2 X 4, 2-Lamp, T12, Magnetic Ballast, Recessed Mounted, Prismatic Lens	94	0.75	4,927	$812.97	8	2	1'X4' 2-Lamp 32W T-8 Prism Lens/Elect Ballast; Metalux M/N GC	55	0.44	2,883	$475.68	$100.00	$800.00	0.31	2044.224	$337.30	2.37
1209	Gas Shut Off/office area	728	6	2	1 X 4, 2-Lamp, T12, Magnetic Ballast, Surface Mounted, No Lens	94	0.56	411	$67.75	6	2	4' - 2-Lamp 32W T-8 Industrial Strip w/ Elect Ballast; Metalux M/N SNF232	73	0.44	319	$52.61	$123.00	$738.00	0.13	91.728	$15.14	48.76
208	Outside - Main Entrance	3640	10	0	1-Lamp Incandescent Recessed fixture	250	2.50	9,100	$1,501.50	10	0	55 Watt CFL Lamp	16	0.16	582	$96.10	$15.72	$157.20	2.34	8517.6	$1,405.40	0.11
304	Outside - Building Walls	3640	22	0	1-Lamp Metal Halide Fixture	375	8.25	30,030	$4,954.95	22	0	No Change	375	8.25	30,030	$4,954.95	$0.00	$0.00	0.00	0	$0.00	0.00

304	Outside - Parking lot	3640	11	0	1-Lamp Metal Halide Fixture	375	4.13	15,015	$2,477.48	11	0	No Change	375	4.13	15,015	$2,477.48	$0.00	$0.00	0.00	0	$0.00	0.00
401	Exit Signs	8760	26	0	2-Lamp Incandescent Exit Sign	30	0.78	6,833	$1,127.41	26	0	LED Exit Sign	4	0.10	911	$150.32	$56.00	$1,456.00	0.68	5921.76	$977.09	1.49
	Totals		673	243			75.31	376,423	$62,109.81	673	218			49.91	241,220	$39,801.28		$61,634.70	25.40	135203	$22,308.52	2.76

NOTES: 1. Simple Payback noted in this spreadsheet does not include Maintenance Savings and NJ Smart Start Incentives.
2. Some fixtures are estimated due to inaccessibility
3. Lamp totals only include T-12 tube replacment calculations

Project Name: LGEA Solar PV Project - Warren County Correctional Facility
Location: Belvidere, NJ
Description: Photovoltaic System 95% Financing - 25 year

Simple Payback Analysis

	Photovoltaic System 95% Financing - 25 year
Total Construction Cost	$1,560,780
Annual kWh Production	200,395
Annual Energy Cost Reduction	$32,865
Annual SREC Revenue	$70,138
First Cost Premium	**$1,560,780**
Simple Payback:	**15.15** Years

Life Cycle Cost Analysis

Analysis Period (years): 25
Financing Term (mths): 240
Average Energy Cost ($/kWh) **$0.164**
Financing Rate: 7.00%
Financing %: 95%
Maintenance Escalation Rate: 3.0%
Energy Cost Escalation Rate: 3.0%
SREC Value ($/kWh) $0.350

Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Interest Expense	Loan Principal	Net Cash Flow	Cumulative Cash Flow
0	$78,039	0	0	0	$0	0	0	(78,039)	0
1	$0	200,395	$32,865	$0	$70,138	$102,674	$35,274	($34,945)	($112,984)
2	$0	199,393	$33,851	$0	$69,788	$100,124	$37,824	($34,310)	($147,294)
3	$0	198,396	$34,866	$0	$69,439	$97,390	$40,558	($33,643)	($180,937)
4	$0	197,404	$35,912	$0	$69,091	$94,458	$43,490	($32,944)	($213,882)
5	$0	196,417	$36,990	$2,023	$68,746	$91,314	$46,634	($34,236)	($248,117)
6	$0	195,435	$38,099	$2,013	$68,402	$87,943	$50,005	($33,460)	($281,577)
7	$0	194,458	$39,242	$2,003	$68,060	$84,328	$53,620	($32,649)	($314,225)
8	$0	193,486	$40,420	$1,993	$67,720	$80,452	$57,496	($31,802)	($346,027)
9	$0	192,518	$41,632	$1,983	$67,381	$76,296	$61,652	($30,918)	($376,944)
10	$0	191,555	$42,881	$1,973	$67,044	$71,839	$66,109	($29,996)	($406,940)
11	$0	190,598	$44,168	$1,963	$66,709	$67,060	$70,888	($29,035)	($435,975)
12	$0	189,645	$45,493	$1,953	$66,376	$61,935	$76,013	($28,033)	($464,008)
13	$0	188,697	$46,857	$1,944	$66,044	$56,441	$81,508	($26,991)	($490,998)
14	$0	187,753	$48,263	$1,934	$65,714	$50,548	$87,400	($25,905)	($516,904)
15	$0	186,814	$49,711	$1,924	$65,385	$44,230	$93,718	($24,776)	($541,680)
16	$0	185,880	$51,202	$1,915	$65,058	$37,455	$100,493	($23,602)	($565,282)
17	$0	184,951	$52,738	$1,905	$64,733	$30,191	$107,757	($22,382)	($587,664)
18	$0	184,026	$54,320	$1,895	$64,409	$22,401	$115,547	($21,114)	($608,778)
19	$0	183,106	$55,950	$1,886	$64,087	$14,048	$123,900	($19,797)	($628,575)
20	$0	182,190	$57,629	$1,877	$63,767	$5,091	$132,857	($18,429)	($647,005)
21	$0	181,279	$59,357	$1,867	$63,448	$4,316	$122,136	($5,514)	($652,519)
22	$0	180,373	$61,138	$1,858	$63,131	$2,954	$100,507	$18,950	($633,569)
23	$0	179,471	$62,972	$1,849	$62,815	$0	$0	$123,939	($509,631)
24	$0	178,574	$64,861	$1,839	$62,501	$0	$0	$125,523	($384,108)
25	$0	177,681	$66,807	$1,830	$62,188	$0	$0	$127,166	($256,942)
Totals:	3,823,117	$883,089	$31,184	$1,338,091	$1,276,221	$1,482,741	$1,705,384	($10,552,567)	
Net Present Value (NPV)								**($280,908)**	
Internal Rate of Return (IRR)								**-3.32%**	

Project Name: LGEA Solar PV Project - Warren County Correctional Facility
Location: Belvidere, NJ
Description: Photovoltaic System - Direct Purchase

Simple Payback Analysis

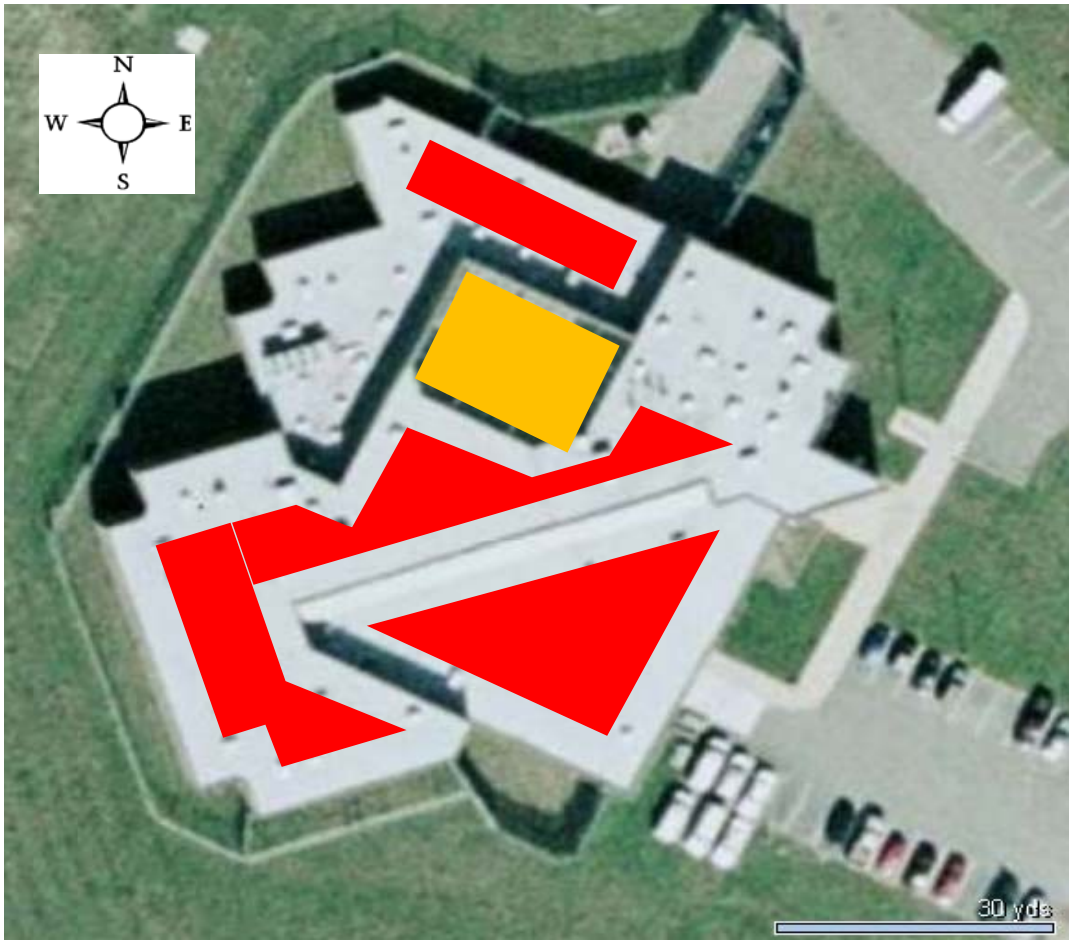
	Photovoltaic System - Direct Purchase
Total Construction Cost	$1,560,780
Annual kWh Production	200,395
Annual Energy Cost Reduction	$32,865
Annual SREC Revenue	$70,138
First Cost Premium	**$1,560,780**
Simple Payback:	**15.15** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.164**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/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	$1,560,780	0	0	0	$0	(1,560,780)	0
1	$0	200,395	$32,865	$0	$70,138	$103,003	($1,457,777)
2	$0	199,393	$33,851	$0	$69,788	$103,638	($1,354,139)
3	$0	198,396	$34,866	$0	$69,439	$104,305	($1,249,834)
4	$0	197,404	$35,912	$0	$69,091	$105,004	($1,144,830)
5	$0	196,417	$36,990	$2,023	$68,746	$103,712	($1,041,118)
6	$0	195,435	$38,099	$2,013	$68,402	$104,489	($936,629)
7	$0	194,458	$39,242	$2,003	$68,060	$105,300	($831,330)
8	$0	193,486	$40,420	$1,993	$67,720	$106,147	($725,183)
9	$0	192,518	$41,632	$1,983	$67,381	$107,031	($618,152)
10	$0	191,555	$42,881	$1,973	$67,044	$107,952	($510,200)
11	$0	190,598	$44,168	$1,963	$66,709	$108,914	($401,286)
12	$0	189,645	$45,493	$1,953	$66,376	$109,915	($291,372)
13	$0	188,697	$46,857	$1,944	$66,044	$110,958	($180,414)
14	$0	187,753	$48,263	$1,934	$65,714	$112,043	($68,371)
15	$0	186,814	$49,711	$1,924	$65,385	$113,172	$44,800
16	$0	185,880	$51,202	$1,915	$65,058	$114,346	$159,146
17	$0	184,951	$52,738	$1,905	$64,733	$115,566	$274,712
18	$0	184,026	$54,320	$1,895	$64,409	$116,834	$391,546
19	$0	183,106	$55,950	$1,886	$64,087	$118,151	$509,698
20	$0	182,190	$57,629	$1,877	$63,767	$119,519	$629,216
21	$1	181,279	$59,357	$1,867	$63,448	$120,938	$750,154
22	$2	180,373	$61,138	$1,858	$63,131	$122,411	$872,565
23	$3	179,471	$62,972	$1,849	$62,815	$123,939	$996,504
24	$4	178,574	$64,861	$1,839	$62,501	$125,523	$1,122,027
25	$5	177,681	$66,807	$1,830	$62,188	$127,166	$1,249,192
Totals:		3,823,117	$883,089	$31,184	$1,338,091	$2,809,972	$2,189,996
				Net Present Value (NPV)		**$1,249,217**	
				Internal Rate of Return (IRR)		**4.9%**	

Building	Roof Area (sq ft)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW	Total Annual kWh	Panel Weight (33 lbs)	W/SQFT
Warren County Correctional Facility	11078	Sunpower SPR230	754	14.7	11,087	173.42	200,395	24,882	15.64



.= Proposed PV Layout
.= Additional PV Layout Over Outdoor Rec Area

Notes:

1. Estimated kWH based on National Renewable Energy Laboratory PVWatts Version 1 Calculator Program.
2. Total PV Area including Rec Area is 14,770 SF. Est. reduction due to mech equipment is 25%. (Net 11,078 SF)

PVWatts * * * AC Energy & Cost Savings

Cautions for Interpreting the Results

Station Identification	
City:	Newark
State:	New_Jersey
Latitude:	40.70° N
Longitude:	74.17° W
Elevation:	9 m
PV System Specifications	
DC Rating:	173.4 kW
DC to AC Derate Factor:	0.810
AC Rating:	140.5 kW
Array Type:	Fixed Tilt
Array Tilt:	10.0°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	16.4 ¢/kWh

Results			
Month	Solar Radiation ($kWh/m^2/day$)	AC Energy (kWh)	Energy Value ($)
1	2.39	10405	1706.42
2	3.17	12614	2068.70
3	4.07	17654	2895.26
4	4.83	19560	3207.84
5	5.70	23271	3816.44
6	5.94	22740	3729.36
7	5.77	22563	3700.33
8	5.38	20898	3427.27
9	4.65	17980	2948.72
10	3.61	14801	2427.36
11	2.35	9440	1548.16
12	2.01	8470	1389.08
Year	4.16	200395	32864.78

Output Hourly Performance Data * Output Results as Text

About the Hourly Performance Data Saving Text from a Browser

Run PVWATTS v.1 for another US location or an International location
Run PVWATTS v.2 (US only)

Please send questions and comments regarding PVWATTS to Webmaster

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Solar Thermal Calculations

Concord Engineering Group

Warren County Correctional Facility

Solar Panel Thermal Efficiency (seasonal average)	52%
Solar Thermal Panel SF	4,776
Solar Panel Qty	100
Piping Distribution Losses	5%
Panel Direction	180° (South)
Tilt Angle (degree from horizontal)	40.7°

*Solar Panel Efficiencies are based on Viesmann Flat Plate collector model VITOSOL 200F

Month	Solar Radiation		DHW Production		
	KWH/M^2/Day	KWH/SF/Day	Net KWH/SF/Day	Net KWH	Net kBtu
1	3.36	0.312	0.147	21,328	72,812
2	4.05	0.376	0.177	25,707	87,765
3	4.58	0.425	0.200	29,071	99,250
4	4.84	0.450	0.211	30,722	104,884
5	5.3	0.492	0.231	33,642	114,853
6	5.33	0.495	0.233	33,832	115,503
7	5.27	0.490	0.230	33,451	114,202
8	5.25	0.488	0.229	33,324	113,769
9	5.06	0.470	0.221	32,118	109,652
10	4.46	0.414	0.195	28,310	96,649
11	3.15	0.293	0.138	19,995	68,261
12	2.87	0.267	0.125	18,217	62,194
Average	4.46	0.414	0.195	28,310	96,649
Total Annual				339,717	1,159,794

Notes: Solar radiation values obtained from National Renewable Energy Laboratory PVWatts Version 1 Calculator Program