ENERGY AUDIT – FINAL REPORT

02/12/2010

BOROUGH OF COLLINGSWOOD

ZANE SCHOOL OFFICE BUILDING

756 HADDON AVENUE
COLLINGSWOOD, NJ 08108
ATTN: BRADFORD C. STOKES
ADMINISTRATOR

CEG PROJECT NO. 9C09083

CONCORD ENGINEERING GROUP

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Table of Contents

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I. EXECUTIVE SUMMARY

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

Borough of Collingswood
678 Haddon Avenue
Collingswood, NJ 08108

Municipal Contact Person: Bradford C. Stokes, Administrator

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	$ 57,894
Natural Gas	$ 1,114
Total	$ 59,008

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

Table 1
Financial Summary Table

ENERGY CONSERVATION MEASURES (ECM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST[A]**	**ANNUAL SAVINGS[B]**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
ECM #1	Lighting Upgrade - General	$890	$929	1.0	1241.6%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST**	**ANNUAL SAVINGS**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
REM #1	Photovoltaic System	$405,720	$35,808	11.3	120.6%

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

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

Table 2
Estimated Energy Savings Summary Table

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
ECM #1	Lighting Upgrade - General	5.6	5487.0	N/A
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
REM #1	Photovoltaic System	45.1	70349	N/A

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

- **ECM #1: Lighting upgrade**

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

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

II. INTRODUCTION

The comprehensive energy audit covers the Borough of Collingswood's Zane School office building located at 756 Haddon Ave. in Collingswood. Formerly a school house, the building is an office building for approximately 100 workers.

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

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

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

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

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

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

III. METHOD OF ANALYSIS

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

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

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

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

ECM Calculation Equations:

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

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

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

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

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

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

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

IV. HISTORIC ENERGY CONSUMPTION/COST

A. Energy Usage / Tariffs

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

The electric usage profile represents the actual electrical usage for the facility. Atlantic City Electric (ACE) provides electricity to the facility under their Annual General Service 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. South Jersey Gas (SJG) provides natural gas to the facility under the Basic General Supply Service (GSGH) 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	14.5¢ / kWh
Natural Gas	$2.190 / Therm

Table 3
Electricity Billing Data

ELECTRIC USAGE SUMMARY

Utility Provider: PSE & G
Rate: Annual general
Meter No: 778003508
Customer ID No: 61-491-035-01
Third Party Utility n/a
TPS Meter / Acct No: n/a

MONTH OF USE	CONSUMPTION KWH	DEMAND	TOTAL BILL
Jan-08	34,240	82.4	$4,318
Feb-08	29,560	77.6	$3,722
Mar-08	29,360	89.6	$3,619
Apr-08	34,640	108.0	$4,238
May-08	33,800	94.4	$5,917
Jun-08	37,640	92.4	$6,897
Jul-08	39,520	96.8	$7,371
Aug-08	37,240	80.0	$7,138
Sep-08	32,360	68.8	$4,889
Oct-08	28,720	73.2	$4,080
Nov-08	34,080	90.8	$4,633
Dec-08	27,240	78.4	$1,071
Totals	**398,400**	**108.0 Max**	**$57,894**

AVERAGE DEMAND **86.0 KW average**
AVERAGE RATE **$0.145 $/kWh**

Figure 1
Electricity Usage Profile

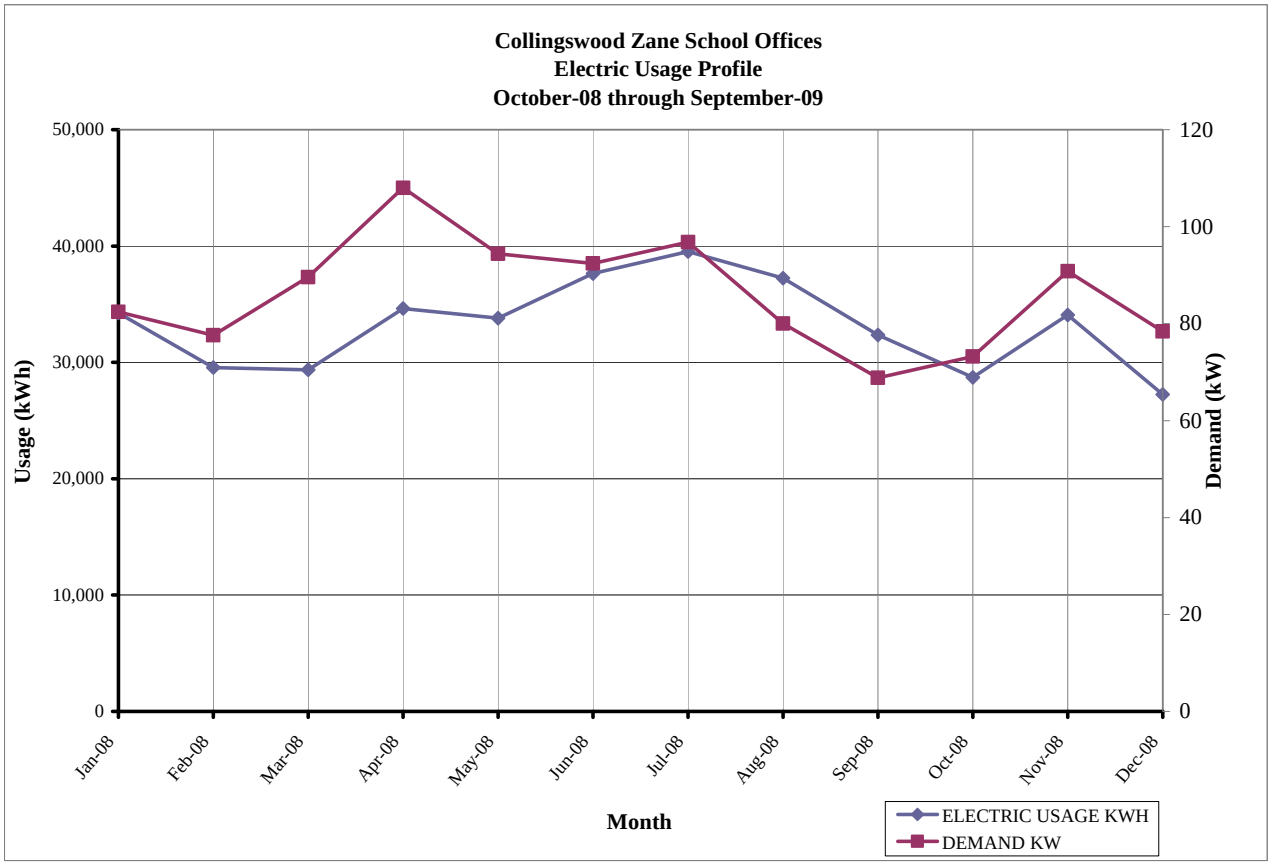


Table 4
Natural Gas Billing Data

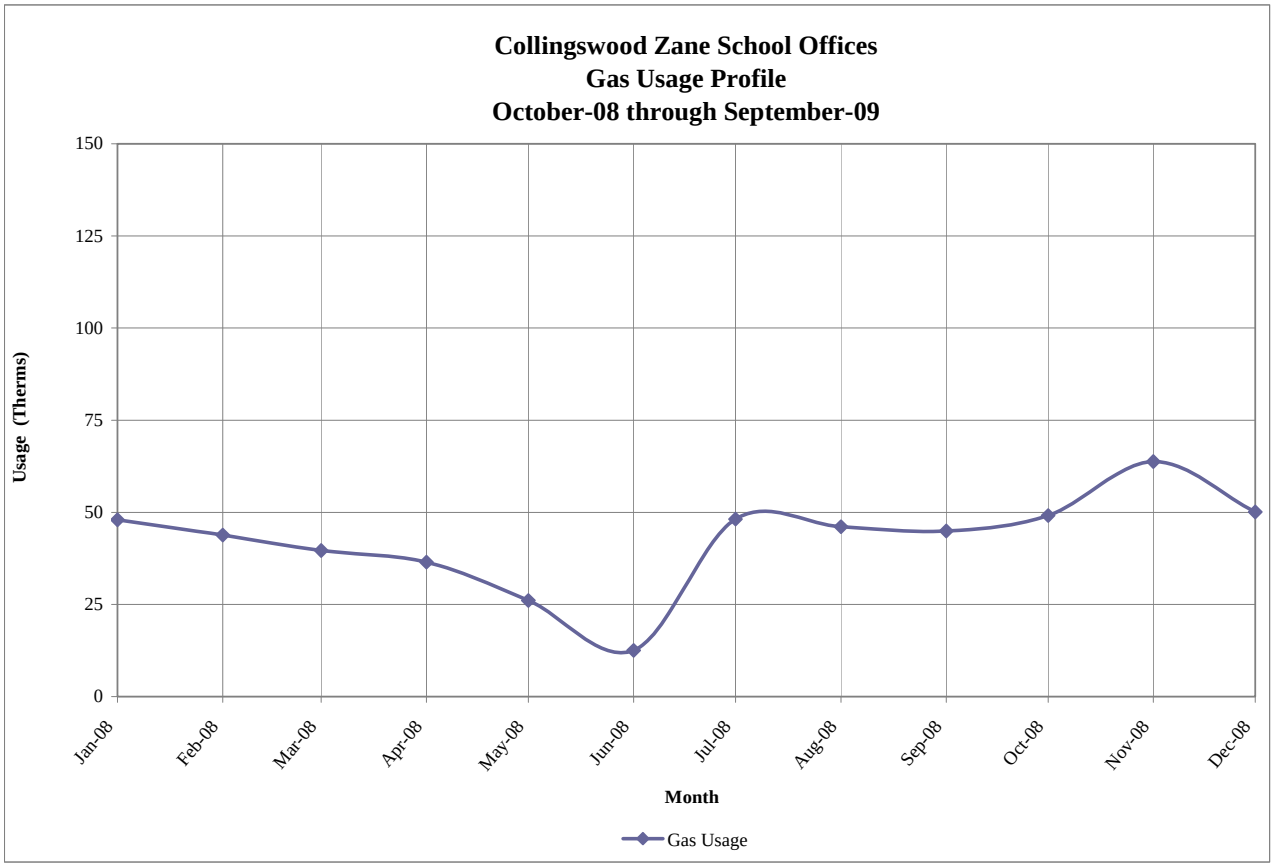
NATURAL GAS USAGE SUMMARY

Utility Provider: PSE & G
Rate: General Service gas
Account No: 1689793
Point of Delivery ID:
Third Party Utility Provider: Woodruff Energy
TPS Meter No: n/a

MONTH OF USE	CONSUMPTION (THERMS)	TOTAL BILL
Jan-08	47.95	$104.37
Feb-08	43.82	$96.26
Mar-08	39.65	$86.68
Apr-08	36.48	$80.54
May-08	26.06	$60.38
Jun-08	12.53	$34.18
Jul-08	48.18	$103.19
Aug-08	46.09	$99.14
Sep-08	44.95	$96.94
Oct-08	49.13	$106.83
Nov-08	63.77	$136.36
Dec-08	50.13	$109.52
TOTALS	**508.75**	**$1,114.40**

AVERAGE RATE: **$2.190** **$/THERM**

Figure 2
Natural Gas Usage Profile



B. Energy Use Index (EUI)

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

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

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

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

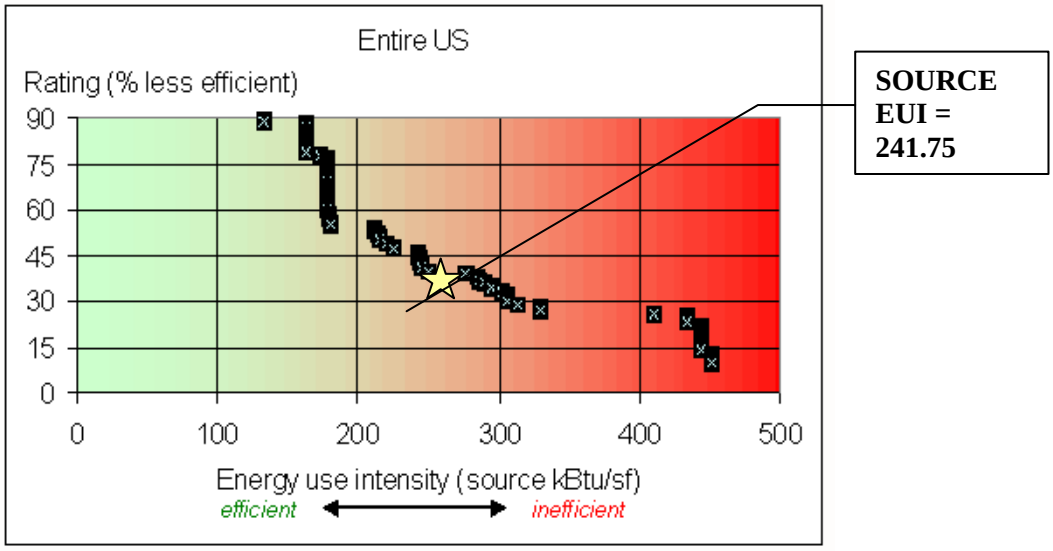
$$Building\ \ Source\ EUI = \frac{(Electric\ Usage\ in\ kBtu\ \ X\ \ SS\ \ Ratio + Gas\ Usage\ in\ kBtu\ \ X\ \ SS\ \ Ratio)}{Building\ \ Square\ \ Footage}$$

Table 5
Facility Energy Use Index (EUI) Calculation

ENERGY USE INTENSITY CALCULATION						
ENERGY TYPE	**BUILDING USE**			**SITE ENERGY**	**SITE-SOURCE RATIO**	**SOURCE ENERGY**
	kWh	**Therms**	**Gallons**	**kBtu**		**kBtu**
ELECTRIC	398400			1,360,138	3.340	4,542,860
NATURAL GAS		508.7		50,875	1.047	53,266
FUEL OIL			0.0	0	1.010	0
PROPANE			0.0	0	1.010	0
TOTAL				1,411,012		4,596,125
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.						
BUILDING AREA		21,600	SQUARE FEET			
BUILDING SITE EUI		*65.32*	kBtu/SF/YR			
BUILDING SOURCE EUI		*212.78*	kBtu/SF/YR			

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

Figure 3
Source Energy Use Intensity Distributions: Public Order Buildings



C. EPA Energy Benchmarking System

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

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

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

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

User Name: Collingswoodcity
Password: lgeaceg09023

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

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

Table 6
ENERGY STAR Performance Rating

ENERGY STAR PERFORMANCE RATING		
FACILITY DESCRIPTION	**ENERGY PERFORMANCE RATING**	**NATIONAL AVERAGE**
Collingswood Zane School Office	47	50

Refer to **Statement of Energy Performance Appendix** for the detailed energy summary.

V. FACILITY DESCRIPTION

The facility is a three story 1928 vintage building originally built and used as a school house. The building floor area totals 21,600 square feet. In 1999 the building was renovated to serve as a office building for approximately 100 workers. Construction is masonry with traditional red brick exterior walls. The roof is flat, and the membrane is a tar and paper type. The building is occupied Mon. – Fri, 9 to 5, or 40 hours per week. The building has historic value. The windows throughout the facility well maintained but drafty due to their age.

HVAC Systems (includes Heating and Cooling)

The building's primary heating and cooling fuel is electric, with natural gas used only for domestic hot water heating.

The 1999 renovations included a new open loop geothermal heating and cooling system. This system uses well water as the heat sink to reject or absorb heat, providing heating or cooling to each zone simultaneously.

The system consists of two open wells, supply and return, located in the parking lot with submersable well pumps. The ground water is pumped to two plate and frame heat exchangers located in the 1st floor mechanical room. A house water loop, connected to the other side of the heat exchanger, pumps water in a closed loop to unitary water source heat pump units located throughout the building. The unitary equipment consists of both console and horizontal ducted type units, for a total of about 60 Tons cooling and 717 Mbh heating. The unitary equipment is manufacturered by Water Furnace Co, a premier brand of energy efficient units.

In the past their have been continual problems with rust and scale build up on the heat exchanger, which reqiured frequent cleaning. However, recently, this has not been a problem. The reason for the improvement is unknown. The wells have also needed maintenance and have been re-developed several times.

Honeywell Chronotherm IV progammable thermostat are provided for each unitary heat pump.

Domestic Hot Water

A gas-fired, 40 gallon, 40,000 Btuh storage type hot water heater provides the facility with hot water. It is an State Water Heater brand, in good condition. This unit accounts for 100% of the building's minimal gas use.

Lighting

The original school building was renovated into a commercial office building approximately nine years ago with all new lighting fixtures that are primarily fluorescent tube fixtures containing T-8 lamps and electronic ballasts. A limited number of compact fluorescent fixtures and incandescent fixtures are also used. Standard switching is utilized and there are no other types of lighting controls present. The upper level (second floor) is entirely lighted with 1' x 4' & 2' x 4' ; 2 & 4

tube T-8 electronic ballast fixtures. Center corridor has eight pendant incandescent schoolhouse globe fixtures.

The exterior lighting uses partially high intensity discharge & incandescent lanterns wall mounted fixtures at the front & rear stair entrances.

The public parking lot is lit with high intensity discharge fixtures mounted on light poles/ utility company owned and maintained pole mounted fixtures.

VI. MAJOR EQUIPMENT LIST

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

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

VII. ENERGY CONSERVATION MEASURES

This facility, with an Energy Star rating of 47, is performing just below the 50 score average for buildings of this type in the US. By process of elimination, we believe the HVAC system may be the source of the higher than desired energy use for this building. Lighting is typical for an office building and the building envelope, although reported drafty, does not seem to be the culprit since winter energy use does not spike.

The existing open type geothermal wells have reportedly been a source of problems for this building. They have been redeveloped on occasion and dirt has fouled the heat exchanges in the past. A geothermal system, operating properly, is well documented as one of the most efficient building HVAC systems available. Thus, we do not recommend changing HVAC system for this building. Abandonment of the geothermal system in favor of a conventional system would require wholesale replacement and all new components. This work would be cost prohibitive and energy savings would not cover these costs.

We recommend that a geothermal well contractor be contracted to confirm that the geothermal wells are operating properly and the heat exchangers are checked and cleaned for fouling. This task should be budgeted annually.

ECM #1: Lighting Upgrade – General

Description:

Although the building primarily uses energy efficient compact fluorescent lamps and linear fluorescent T8 lamps with electronic ballasts, a limited number of lighting energy savings opportunities exist.

CEG recommends replacement of incandescent lamps with compact fluorescent lamps. Incandescent lamps use approximately 3 to 4 times the energy of compact fluorescent lamps. Maintenance savings will be realized by reducing the number of lamps replaced per year. The expected lamp life of a compact fluorescent lamp is approximately 6,000 to 15,000 burn-hours, in comparison to the existing incandescent lamps which are approximately 750 to 1,000 burn-hours. The facility will need approximately 75% fewer lamp replacements per year.

Existing egress fixture lamp replacement shall be excluded from this ECM so that the current egress light levels are maintained.

Energy Savings Calculations:

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

No incentives are available through the New Jersey Smart Start program for this ECM.

Maintenance Savings are calculated as follows:

Maintenance Savings = *(reduction in lamps replaced per year) x (replacement $ per lamp + labor $ per lamp)*

Maintenance Savings = *(19 lamps per year) x ($2.00 + $5.00) =$133*

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$890
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$890
Maintenance Savings ($/Yr):	$133
Energy Savings ($/Yr):	$796
Total Yearly Savings ($/Yr):	$929
Estimated ECM Lifetime (Yr):	15
Simple Payback	1.0
Simple Lifetime ROI	1465.7%
Simple Lifetime Maintenance Savings	$1,995
Simple Lifetime Savings	$11,940
Internal Rate of Return (IRR)	104%
Net Present Value (NPV)	$9,604.05

VIII. RENEWABLE/DISTRIBUTED ENERGY MEASURES

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

Solar 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 3200 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 45 kilowatts could be installed. A system of this size has an estimated kilowatt hour production of 70,349 KWh annually, reducing the overall electric utility bill by approximately 17.6% percent. A detailed financial analysis can be found in the **Renewable / Distributed Energy Measures Calculation Appendix**. This analysis illustrates the payback of the system over a 25 year period. The eventual degradation of the solar panels and the price of accumulated SREC's are factored into the payback.

The proposed photovoltaic array layout is designed based on the specifications for the Sun Power SPR-230 panel. This panel has a "DC" rated full load output of 230 watts, and has a total panel conversion efficiency of 18%. Although panels rated at higher wattages are available through Sun Power and other various manufacturers, in general most manufacturers who produce commercially available solar panels produce a similar panel in the 200 to 250 watt range. This provides more manufacturer options to the public entity if they wish to pursue the proposed solar recommendation without losing significant system capacity.

The array system capacity was sized on available roof space on the existing facility. Estimated solar array generation was then calculated based on the National Renewable Energy Laboratory

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

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

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:

Table 7
Financial Summary – Photovoltaic System

FINANCIAL SUMMARY - PHOTOVOLTAIC SYSTEM			
PAYMENT TYPE	**SIMPLE PAYBACK**	**LIFETIME ROI**	**INTERNAL RATE OF RETURN**
Self-Finance	11.3 Years	120.6%	20.8%
Direct Purchase	11.3 Years	120.6%	7.9%

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

The resultant Internal Rate of Return indicates that if the Owner was able to "self-finance" the solar project, the project would be slightly more beneficial to the Owner. However, 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 "direct purchase" option could also, prove to be a beneficial route.

The application of Solar Photovoltaic system is not recommended due to the fact that the roof is pitched in multiple directions, which would make installation and maintenance difficult.

Energy Savings Summary:

REM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$405,720
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$405,720
Maintenance Savings ($/Yr):	$24,622
Energy Savings ($/Yr):	$11,186
Total Yearly Savings ($/Yr):	$35,808
Estimated ECM Lifetime (Yr):	25
Simple Payback	11.3
Simple Lifetime ROI	120.6%
Simple Lifetime Maintenance Savings	$615,557
Simple Lifetime Savings	$279,639
Internal Rate of Return (IRR)	7%
Net Present Value (NPV)	$217,807.41

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

IX. ENERGY PURCHASING AND PROCUREMENT STRATEGY

Load Profile:

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

Electricity:

The Electric Usage Profile demonstrates a very flat load profile throughout the year. There is a slight electric drop in September and October. This is typical since the cooling load should be higher in the summer. This summer profile (May –August) does demonstrate a slight rise in consumption. Cooling, (air-conditioning) in this facility primarily provided by a Geothermal System. This facility utilizes the Delivery service (GLP), and its Commodity service (BGS) from Public Service Electric and Gas Company (PSE&G-based on information provided). A base-load shaping is important because a flat consumption profile will yield more competitive pricing when shopping for a Third Party Supplier.

Natural Gas:

The Natural Gas Usage Profile demonstrates a flat heating load throughout the year. This profile is not typical based on experience in this area. There is a dip in consumption in the month of June. Cooling in this facility is provided by The Geothermal Loop. Domestic hot water is provided by a natural gas fired water heater, adding to the natural gas profile. Natural Gas Delivery service (GSGH) is supplied by Public Service Electric and Gas (PSE&G) while it receives its Commodity service from Woodruff Energy, the Third Party Supplier.

Tariff Analysis:

Electricity:

This facility receives electrical service through Public Service Electric and Gas Company (PSE&G) on a GLP (General Lighting and Power Service) rate schedule.

The GLP utility tariff is for Delivery service for general purposes at secondary distribution voltages. Customers may either purchase electric supply from a Third Party Supplier (TPS) or from Public Service's Basic Generation Service default service as detailed in this rate schedule. This facility is currently receiving Generation service from PSE&G's Basic Generation Service.
The PSE&G Delivery service has the following charges: Service Charge, Distribution Charges, Societal Benefits Charges, Non-Utility Generation Charges, Securitization Transition Charges, System Control Charges, Customer Account Services Charges, Commercial and Industrial

Energy Pricing Standby Fee (CIEP), Base Rate Distribution Kilowatt Adjustment Charge, Solar Pilot Recovery Charge and Capital Adjustment Charge.

A flat load profile will allow for a more competitive energy price when shopping for an "alternate energy source".

Natural Gas:

This facility receives utility service through Public Service Electric and Gas Company (PSE&G). This facility utilizes the Delivery Service (GSGH) from PSE&G while receiving Commodity service from a Third Party Supplier (TPS), Woodruff Energy.

This facility receives natural gas Delivery service through Public Service Electric and Gas Company (PSE&G) on a GSGH (General Service Gas-Heating) rate. The utility tariff rate (GSGH) is for General Service. This is a firm delivery service (higher level of delivery) for general purposes where 1) customer does not qualify for RSG (residential) and 2) customers usage does not exceed 3,000 therms in any month. Customers may either purchase gas supply from a Third Party (TPS) or from Public Services Basic Gas Supply Service default service as detailed in the rate schedule.

The "firm" service described above has a much higher priority of delivery, based on the pipeline capacity. When the pipelines capacity was unbundled (much like the telecom service), it was divided into various levels of service. The "firm" service is the highest priority, and does not get interrupted.

This rate schedule has a Delivery Charge Mechanism which includes: Balancing Charge, Societal Benefits Charge, Realignment Adjustment Charge, Margin Adjustment Charge, RGGI Charge and Customer Account Service Charge. The customer can elect to have the Supply Charge (Commodity Charge) serviced through the utility or by a Third Party Supplier (TPS). In this facility the supplier for the Commodity is Woodruff Energy. Note: Should the TPS not deliver, the customer may receive service from PSE&G under Emergency Sales Service. Emergency Sales Service carries an extremely high penalty cost of service. Should the TPS un-deliver to the utility on behalf of the client, the utility will automatically supply this default service to the client.

Imbalances occur when Third Party Suppliers are used to supply natural gas, full-delivery is not made, and when a new supplier is contracted or the customer returns to the utility. It is important when utilizing a Third Party Supplier, that an experienced regional supplier is used. Otherwise, imbalances can occur, jeopardizing economics and scheduling.

Recommendations:

CEG recommends a global approach that will be consistent with all facilities. CEG's has observed potential savings in the electricity and natural gas costs. The Boroughs' "weighted average price-to-compare" per kWh (kilowatt hour) for all buildings is $.1053/kWh (kWh is the

common unit of electric measure). Primary electricity is consumed by the Water Treatment Facility.

The "price to compare" (electricity) is defined as the price that would be compared to the equivalent utility price extracting the utility transmission and distribution costs (wires charges). This would be a market based price that would be supplied by a Third Party Supplier (TPS) or an alternative supplier.

The average "price-to-compare" per decatherm for natural gas, based on the information provided, is $11.79/Dth (Dth is the common unit of measure). Energy commodities are among the most volatile of all commodities, however at this point and time, energy is extremely competitive. The Borough could see significant savings if it were to take advantage of these current market prices quickly, before energy increases. Based on last year's historical consumption and current electric rates, The Borough would see an improvement of over $80,000 or over 20% annually. Note: Savings were calculated using The Boroughs Average Annual Consumption of 3,286,856 kWh's and a variance of approximately $.0253/kWh and utilizing a fixed one-year commodity contract). Collingswood should aggregate its entire electric load to gain the most optimal energy costs and to base-load its usage. CEG recommends advisement for alternative sourcing and supply of energy on a "managed approach".

CEG's secondary recommendation coincides with the natural gas costs and the contract with Woodruff Energy. CEG has experience with this pricing structure, and while we are working on some assumptions, we believe a segment of the natural gas cost is not competitive with current market prices. Based on the current market, Collingswood could see an improvement in its natural gas costs of over 30%. CEG recommends further advisement on these prices. The Borough should also consider procuring energy (natural gas) on its own. By procuring energy through the current contract, they are paying a premium. CEG recommends alternative sourcing strategies.

CEG recommends the use of an "energy advisor" for review and implementation of a formal energy procurement program. The current program (fixed price contracts) may not meet the needs of the Borough. The Borough needs to build a program that is budget driven. This can be accomplished with the use of an "energy advisor".

CEG recommends scheduling a meeting with their 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 might be available. Through its meeting with the Local Distribution Company (LDC), The Borough will learn more about the competitive supply process. The Borough can acquire a list of approved Third Party Suppliers from the New Jersey Board of Public Utilities website at www.nj.gov/bpu. The Borough should also consider using a billing-auditing service to further analyze the utility invoices, manage the data and use the data to manage ongoing demand-side management projects. Furthermore, CEG recommends South Brunswick pay attention to credit mechanisms, imbalances, balancing charges and commodity charges when meeting with their utility representative. In addition, they should also ask the utility representative about alternative billing options. Some utilities allow for consolidated billing options when utilizing the service of a Third Party Supplier.

Finally, if Collingswood frequently changes its supplier for energy (natural gas), it needs to closely monitor balancing, particularly when the contract is close to termination.

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.

XI. ADDITIONAL RECOMMENDATIONS

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

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

B. Maintain all weather stripping on windows and doors.

C. Clean all light fixtures to maximize light output.

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

E. Confirm that the geothermal wells are operating properly and the heat exchangers are checked and cleaned for fouling.

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Collingswood - Zane School Office

ECM ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN (IRR)	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Svaing * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum_{n=0}^{N} \frac{C_n}{(1+IRR)^n}$	$\sum_{n=0}^{N} \frac{C_n}{(1+DR)^n}$
		($)	($)	($)	($)	($/Yr)	($/Yr)	($/Yr)	(Yr)	($)	($)	(%)	(Yr)	($)	($)
ECM #1	Lighting Upgrade - General	$0	$890	$0	$890	$796	$133	$929	15	$11,940	$1,995	1241.6%	1.0	104.38%	$9,604.05
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	Photovoltaic System	$405,720	$0	$0	$405,720	$11,186	$24,622	$35,808	25	$279,639	$615,557	-31.1%	11.3	7.31%	$217,807.41

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

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Collingswood Zane School Office

Building ID: 1946504
For 12-month Period Ending: September 30, 2009[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: December 03, 2009

Facility
Collingswood Zane School Office
756 Haddon Ave
Collingswood, NJ 08108

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1928
Gross Floor Area (ft²): 21,600

Energy Performance Rating[2] (1-100) 47

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	1,359,979
Natural Gas (kBtu)[4]	50,722
Total Energy (kBtu)	1,410,701

Energy Intensity[5]

Site (kBtu/ft²/yr)	65
Source (kBtu/ft²/yr)	213

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	210

Electric Distribution Utility
PSE&G - Public Service Elec & Gas Co

National Average Comparison

National Average Site EUI	63
National Average Source EUI	207
% Difference from National Average Source EUI	3%
Building Type	Office

Stamp of Certifying Professional

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

Certifying Professional
N/A

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

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

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. 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	Collingswood Zane School Office	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Office	Is this an accurate description of the space in question?		☐
Location	756 Haddon Ave, Collingswood, NJ 08108	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		☐
Collingswood Zane School Offices (Office)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	
Gross Floor Area	21,600 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.		☐
Weekly operating hours	40 Hours	Is this the total number of hours per week that the Office 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	80	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. The normal worker density ranges between 0.3 and 10 workers per 1000 square feet (92.8 square meters)		☐
Number of PCs	80	Is this the number of personal computers in the Office?		☐
Percent Cooled	50% or more	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	50% or more	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: PSE&G - Public Service Elec & Gas Co

Fuel Type: Electricity

Meter: Electric (kWh (thousand Watt-hours))
Space(s): Entire Facility
Generation Method: Grid Purchase

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
08/15/2009	09/14/2009	37,240.00
07/15/2009	08/14/2009	39,520.00
06/15/2009	07/14/2009	37,640.00
05/15/2009	06/14/2009	33,800.00
04/15/2009	05/14/2009	34,640.00
03/15/2009	04/14/2009	29,360.00
02/15/2009	03/14/2009	29,560.00
01/15/2009	02/14/2009	34,240.00
12/15/2008	01/14/2009	27,240.00
11/15/2008	12/14/2008	34,080.00
10/15/2008	11/14/2008	28,720.00

Electric Consumption (kWh (thousand Watt-hours))	**366,040.00**
Electric Consumption (kBtu (thousand Btu))	**1,248,928.48**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))	**1,248,928.48**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?	☐

Fuel Type: Natural Gas

Meter: Natural Gas (therms)
Space(s): Entire Facility

Start Date	End Date	Energy Use (therms)
08/15/2009	09/14/2009	46.09
07/15/2009	08/14/2009	48.18
06/15/2009	07/14/2009	12.53
05/15/2009	06/14/2009	26.06
04/15/2009	05/14/2009	36.48
03/15/2009	04/14/2009	39.65
02/15/2009	03/14/2009	43.82
01/15/2009	02/14/2009	47.95
12/15/2008	01/14/2009	50.13
11/15/2008	12/14/2008	63.77
10/15/2008	11/14/2008	49.13

Natural Gas Consumption (therms)	**463.79**
Natural Gas Consumption (kBtu (thousand Btu))	**46,379.00**
Total Natural Gas Consumption (kBtu (thousand Btu))	**46,379.00**
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
Collingswood Zane School Office
756 Haddon Ave
Collingswood, NJ 08108

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Collingswood Zane School Office	
Gross Floor Area Excluding Parking: (ft^2)	21,600
Year Built	1928
For 12-month Evaluation Period Ending Date:	September 30, 2009

Facility Space Use Summary

Collingswood Zane School Offices	
Space Type	Office
Gross Floor Area(ft^2)	21,600
Weekly operating hours	40
Workers on Main Shift	80
Number of PCs	80
Percent Cooled	50% or more
Percent Heated	50% or more

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 09/30/2009)	**Baseline** (Ending Date 09/30/2009)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	47	47	75	N/A	50
Energy Intensity					
Site (kBtu/ft^2)	65	65	47	N/A	63
Source (kBtu/ft^2)	213	213	153	N/A	207
Energy Cost					
$/year	$ 55,883.37	$ 55,883.37	$ 40,122.05	N/A	$ 54,249.05
$/$ft^2$/year	$ 2.59	$ 2.59	$ 1.86	N/A	$ 2.51
Greenhouse Gas Emissions					
$MtCO_2e$/year	210	210	151	N/A	204
$kgCO_2e/ft^2$/year	10	10	7	N/A	10

More than 50% of your building is defined as Office. Please note that your rating accounts for all of the spaces listed. The National Average column presents energy performance data your building would have if your building had an average rating of 50.

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

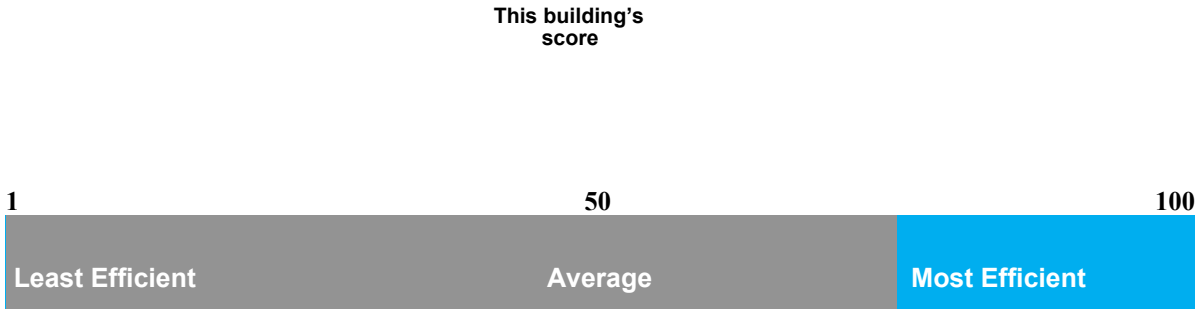
Statement of Energy Performance

2009

Collingswood Zane School Office
756 Haddon Ave
Collingswood, NJ 08108

Portfolio Manager Building ID: 1946504

The energy use of this building has been measured and compared to other similar buildings using the Environmental Protection Agency's (EPA's) Energy Performance Scale of 1–100, with 1 being the least energy efficient and 100 the most energy efficient. For more information, visit energystar.gov/benchmark.



This building uses 213 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending September 2009

Buildings with a score of 75 or higher may qualify for EPA's ENERGY STAR.

I certify that the information contained within this statement is accurate and in accordance with U.S. Environmental Protection Agency's measurement standards, found at energystar.gov

Date of certification

Date Generated: 12/03/2009

EQUIPMENT LIST									
TAG	**MAKE**	**MODEL**	**TYPE**	**CAPACITY**	**EFFICIENCY**	**SERVES**	**LOCATION**	**REMAINING USEFUL LIFE**	**NOTES**
P-1 & P-2	ARMSTRONG	3x3x8 4380	IN-LINE CIRCULATORS	5 HP, 160 GPM @ 60 FT HD	-	ENTIRE BUILDING	1ST FLOOR MECH ROOM	10 YEARS	CONDITION - VERY GOOD, 1999 INSTALL
HP-1	WATER FURNACE	SXH0360301CRS	WATER SOURCE HEAT PUMP	3 TON	12.8 EER, 4.2 COP	MENS ROOM, STUDIO 108, MARKETING	MENS ROOM CEILING	9 YEARS	CONDITION - VERY GOOD, 1999 INSTALL
HP-2	WATER FURNACE	SXH0360301CRS	WATER SOURCE HEAT PUMP	3 TON	12.8 EER, 4.2 COP	LADIES RM, FINANCE, CONF RM, ELEV MACH.	LADIES ROOM CEILING	9 YEARS	CONDITION - VERY GOOD, 1999 INSTALL
HP-3	WATER FURNACE	SXH0480301CRE	WATER SOURCE HEAT PUMP	4 TON	12.8 EER, 4.2 COP	STUDIO 101, LOWER LOBBY	1ST FLOOR MECH ROOM CEILING	9 YEARS	CONDITION - VERY GOOD, 1999 INSTALL
HP-4	WATER FURNACE	SXH580301CRE	WATER SOURCE HEAT PUMP	2-1/2 TON	12.8 EER, 4.2 COP	STUDIO 101, LOWER LOBBY	STORAGE RM 118 CEILING	9 YEARS	CONDITION - VERY GOOD, 1999 INSTALL
HP-5	WATER FURNACE	SXH58C421CRE	WATER SOURCE HEAT PUMP	3-1/2 TON	12.8 EER, 4.2 COP	2ND FLOOR MENS RM, ADMIN, COPY/MAIL	2ND FLOOR MENS RM CEILING	9 YEARS	CONDITION - VERY GOOD, 1999 INSTALL
HP-6	WATER FURNACE	SXH580481CRE	WATER SOURCE HEAT PUMP	4 TON	12.8 EER, 4.2 COP	2ND FLOOR LADIES RM, LIBRARY, CONFERENCE RM	2ND FLOOR LADIES RM CEILING	9 YEARS	CONDITION - VERY GOOD, 1999 INSTALL
HP-7	WATER FURNACE	SXH580601CRE	WATER SOURCE HEAT PUMP	5 TON	12.8 EER, 4.2 COP	CONF RM, STUDIO 201, FRONT VEST.	2ND FLOOR STORAGE RM 204	9 YEARS	CONDITION - VERY GOOD, 1999 INSTALL
HP-8	WATER FURNACE	SXH580801CRE	WATER SOURCE HEAT PUMP	6-1/2 TON	11.7 EER, 3.95 COP	2ND FLOOR LOBBY, STUDIO 201, REAR VEST	2ND FLOOR TELE RM, FLOOR MOUNT	9 YEARS	CONDITION - VERY GOOD, 1999 INSTALL
HP-9	WATER FURNACE	SXH580481CRE	WATER SOURCE HEAT PUMP	4 TON	12.3 EER, 4.03 COP	3RD FLOOR MENS, TENANT SPACE 307	3RD FLOOR MENS CEILING	9 YEARS	CONDITION - VERY GOOD, 1999 INSTALL
HP-10	WATER FURNACE	SXH580481CRE	WATER SOURCE HEAT PUMP	4 TON	12.3 EER, 4.03 COP	3RD FLOOR LADIES RM, TENANT SPACE 307,302	3RD FLOOR LADIES CEILING	9 YEARS	CONDITION - VERY GOOD, 1999 INSTALL
HP-11	WATER FURNACE	SXH580681CRE	WATER SOURCE HEAT PUMP	5-1/2 TON	11.7 EER, 3.95 COP	TENNANT SPACE 301	3RD FLOOR FRONT STORE ROOM	9 YEARS	CONDITION - VERY GOOD, 1999 INSTALL
HP-12	WATER FURNACE	SXH580801CRE	WATER SOURCE HEAT PUMP	6-1/2 TON	11.7 EER, 3.95 COP	3RD FLLOR TENNANT SPACE 301,312, 302	3RD FLOOR REAR STORE ROM CEILING	9 YEARS	CONDITION - VERY GOOD, 1999 INSTALL
WHP-1	WATER FURNACE	CS12R011CNNASSA	CONSOLE WATER SOURCE HEAT PUMP	1 TON	11 EER, 3 COP	COMPUTER ROOM	COMPUTER ROOM	9 YEARS	CONDITION - VERY GOOD, 1999 INSTALL
WHP-2	WATER FURNACE	CS12R011CNNASSA	CONSOLE WATER SOURCE HEAT PUMP	1 TON	11 EER, 3 COP	MARKETING ROOM	MARKETING ROOM	9 YEARS	CONDITION - VERY GOOD, 1999 INSTALL
WHP-3	WATER FURNACE	CS12R011CNNASSA	CONSOLE WATER SOURCE HEAT PUMP	1 TON	11 EER, 3 COP	PRINT ROOM	PRINT ROOM	9 YEARS	CONDITION - VERY GOOD, 1999 INSTALL
AC-1 (INDOOR)	CARRIER	400N13018300	DUCTLESS SPLIT SYSTEM	1-1/2 TONS	10 EER	TELE ROOM	TELE ROOM	UNKNOWN	CONDITION - GOOD
AC-1 (OUTDOOR)	CARRIER	38HDCO18310	DUCTLESS SPLIT SYSTEM	1-1/2 TONS	10 EER	ROOF	ROOF	UNKNOWN	CONDITION - GOOD
AC-2 (INDOOR)	GOODMAN	ARUF018-00A-2	DX FAN COIL VERTICAL	1-1/2 TONS	9 EER	1ST FLOOR SERVER ROOM	1ST FLOOR SERVER ROOM	UNKNOWN	CONDITION - EXCELLENT
AC-2 (OUTDOOR)	GOODMAN	CKL18-10	CONDENSING UNIT	1-1/2 TONS	9 EER	ROOF	ROOF	UNKNOWN	CONDITION - FAIR
HWH	STATE WATER HEATER	SS8 40 NAVTO	GAS-FIRED DOMESTIC HOT WATER HEATER	40 GALLON, 40,000 BTUH	80%	ENTIRE BUILDING	1ST FLOOR MECH ROOM	UNKNOWN	CONDITION - GOOD

ECM #1: Lighting Upgrade

Appendix E

Zane School Offices

CEG Project #: 9C09083
Project Name : Borough of Collingswood Energy Audit
Address: 756 Haddon Ave
City, State: Collingswood, NJ 08108

Date 12/02/09
kWh Cost $0.145

		Existing Lt Fixtures					Proposed Lt Fixtures			Proposed Ltg Savings				Proposed Ltg Installation Cost		
Room Number	**Fixture Location**	**Usage, Hrs/Yr**	**Fixt Qty**	**Lighting Fixture Description**	**Total Watts - Location**	**Annual Energy Cost**	**Fixt Qty**	**Lighting Fixture Description**	**Total Watts - Location**	**Energy Savings, Watts**	**Energy Savings, kWh/Yr**	**Savings/Yr, $**	**Simple Payback, Yrs**	**Unit Cost, Installed**	**Total Cost, Installed**	**Rebate Estimate**
	Lower Level															
101	Studio	2250	46	(2)32w T8 Lamps. Pendant Fixture w/Elec. Ballast - 55w	2530	$825.41	46	Existing to Remain	2530	0	0	$0.00		$0.00	$0.00	$0.00
102	Lower Lobby	1250	6	(1)32w CF Lamp. Hi-Hat Fixture w/Elec. Ballast - 32w	192	$34.80	6	Existing to Remain	192	0	0	$0.00		$0.00	$0.00	$0.00
103	Conference room	500	2	(2)32w T8 Lamps-Metal Cove w/ Slots	128	$9.28	2	Existing to Remain	128	0	0	$0.00		$0.00	$0.00	$0.00
104	Mechanical Room	250	5	(2)32w T8 Lamps. Surface Fixture - 55w	275	$9.97	5	Existing to Remain	275	0	0	$0.00		$0.00	$0.00	$0.00
105	Kitchen	750	1	(1)32w CF Lamp. Hi-Hat Fixture w/Elec. Ballast - 32w	32	$3.48	1	Existing to Remain	32	0	0	$0.00		$0.00	$0.00	$0.00
106	Storage Room	250	1	(2)32w T8 Lamps. Surface Fixture - 55w	55	$1.99	1	Existing to Remain	55	0	0	$0.00		$0.00	$0.00	$0.00
107	Corridor	2250	3	(2)32w T8 Lamps. Surface Fixture - 55w	165	$53.83	3	Existing to Remain	165	0	0	$0.00		$0.00	$0.00	$0.00
108	Studio	2250	11	(2)32w T8 Lamps. Pendant Fixture w/Elec. Ballast - 55w	605	$197.38	11	Existing to Remain	605	0	0	$0.00		$0.00	$0.00	$0.00
108	Marketing Department	1750	10	(2)32w T8 Lamps. Pendant Fixture w/Elec. Ballast - 55w	550	$139.56	10	Existing to Remain	550	0	0	$0.00		$0.00	$0.00	$0.00
110	Men's room	1500	2	(2)32w T8 Lamp. Wall Slot Fixture - 60w	110	$23.93	2	Existing to Remain	110	0	0	$0.00		$0.00	$0.00	$0.00
110	Men's room	1500	2	(1)60w Incan. Lamp. Wall Scounce Fixture - 60w	120	$26.10	2	(1)19w CFL Sylvania Lamp CF19EL/MINI/830 19w	36	84	126	$18.27	1.9	$17.80	$35.60	$0.00
111	Conference room	500	1	(1)32w CF Lamp. Hi-Hat Fixture w/Elec. Ballast - 32w	32	$2.32	1	Existing to Remain	32	0	0	$0.00		$0.00	$0.00	$0.00
112	Women's Room	1500	2	(2)32w T8 Lamp. Wall Slot Fixture - 60w	110	$23.93	2	Existing to Remain	110	0	0	$0.00		$0.00	$0.00	$0.00
112	Women's Room	1500	2	(1)60w Incan. Lamps. Wall Mounted Fixture - 60w	120	$26.10	2	(1)19w CFL Sylvania Lamp CF19EL/MINI/830 19w	36	84	126	$18.27	1.9	$17.80	$35.60	$0.00
113	Finance Department	2000	8	(2)32w T8 Lamps. Pendant Fixture w/ Elec. Ballast - 55w	440	$127.60	8	Existing to Remain	440	0	0	$0.00		$0.00	$0.00	$0.00
114	Entry	2250	1	(2)32w T8 Lamps. Pendant Fixture w/ Elec. Ballast - 55w	55	$17.94	1	Existing to Remain	55	0	0	$0.00		$0.00	$0.00	$0.00
115	Lobby	2000	1	(1)32w CF Lamp. Hi-Hat Fixture w/Elec. Ballast - 32w	32	$9.28	1	Existing to Remain	32	0	0	$0.00		$0.00	$0.00	$0.00

		Existing Lt Fixtures					Proposed Lt Fixtures			Proposed Ltg Savings				Proposed Ltg Installation Cost		
Room Number	**Fixture Location**	**Usage, Hrs/Yr**	**Fixt Qty**	**Lighting Fixture Description**	**Total Watts - Location**	**Annual Energy Cost**	**Fixt Qty**	**Lighting Fixture Description**	**Total Watts - Location**	**Energy Savings, Watts**	**Energy Savings, kWh/Yr**	**Savings/Yr, $**	**Simple Payback, Yrs**	**Unit Cost, Installed**	**Total Cost, Installed**	**Rebate Estimate**
116	Elevator Machine Room	250	1	(2)32w T8 Lamps. Surface Fixture - 55w	55	$1.99	1	Existing to Remain	55	0	0	$0.00		$0.00	$0.00	$0.00
117	Print Room	1500	6	(2)32w T8 Lamps. Pendant Fixture w/Elec. Ballast - 55w	330	$71.78	6	Existing to Remain	330	0	0	$0.00		$0.00	$0.00	$0.00
118	Storage Room	250	5	(2)32w T8 Lamps. Channel Fixture w/Elec. Ballast - 55w	275	$9.97	5	Existing to Remain	275	0	0	$0.00		$0.00	$0.00	$0.00
	Lower Level Summary		**116**		**6211**	**$1,617**	**116**		**6043**	**168**	**252**	**$37**	**1.9**		**$71**	**$0**
	Middle Level															
201	Studio	2250	42	(1)32w T8 Lamps. Pendant Fixture w/ Elec. Ballast - 28w	1176	$383.67	42	Existing to Remain	1176	0	0	$0.00		$0.00	$0.00	$0.00
201	Studio	2250	12	(2)32w T8 Lamps. Pendant Fixture w/ Elec. Ballast - 55w	660	$215.33	12	Existing to Remain	660	0	0	$0.00		$0.00	$0.00	$0.00
202	Lobby	2000	2	(1)60w Incan. Lamps. Wall Mounted Fixture - 60w	120	$34.80	2	(1)19w CFL Sylvania Lamp CF19EL/MINI/830 19w	36	84	168	$24.36	1.5	$17.80	$35.60	$0.00
202	Lobby	2000	4	(1)100w incan. Lamp. Hi Hat Fixture - 100w	400	$116.00	4	32w Edison-base CFL	128	272	544	$78.88	0.0	$0.00	$0.00	$0.00
202	Lobby	1750	7	(1)200w Incan. Lamp. Pendant Fixture - 200w	1400	$355.25	7	42w Edison-base CFL	294	1106	1,936	$280.65	0.4	$17.80	$124.60	$0.00
203	Conference Room	500	1	(1)75w Incan. Lamp. Pendant Fixture - 75w	75	$5.44	1	26w Edison-base CFL	26	49	25	$3.55	5.0	$17.80	$17.80	$0.00
204	Store Room	250	1	(2)32w T8 Lamps. Surface Fixture - 55w	55	$1.99	1	Existing to Remain	55	0	0	$0.00		$0.00	$0.00	$0.00
205	Front Vestubile	250	1	(1)200w Incan. Lamp. Pendant Fixture - 200w	200	$7.25	1	42w Edison-base CFL	42	158	40	$5.73	3.1	$17.80	$17.80	$0.00
206	Gallery	750	7	(1)7w LV Lamps. Cable Supported Fixture - 7w	49	$5.33	7	Existing to Remain	49	0	0	$0.00		$0.00	$0.00	$0.00
207	Coats/Storage Room	250	1	(1)75w Incan. Lamp. Pendant Fixture - 75w	75	$2.72	1	26w Edison-base CFL	26	49	12	$1.78	10.0	$17.80	$17.80	$0.00
208	Copy/Mail room	750	12	(1)32w T8 Lamps. Pendant Fixture w/ Elec. Ballast - 28w	336	$36.54	12	Existing to Remain	336	0	0	$0.00		$0.00	$0.00	$0.00
209	Adminstration Office	750	2	(2)32w T8 Lamp. Uplight Wall Bracket Fixture - 55w	110	$11.96	2	Existing to Remain	110	0	0	$0.00		$0.00	$0.00	$0.00
210	Conference Room	500	9	(2)32w T8 Lamps. Channel Fixture w/Elec. Ballast - 55w	495	$35.89	9	Existing to Remain	495	0	0	$0.00		$0.00	$0.00	$0.00
211	Men's Room	1000	2	(2)32w T8 Lamp. Wall Slot Fixture - 60w	110	$15.95	2	Existing to Remain	110	0	0	$0.00		$0.00	$0.00	$0.00
211	Men's Room	1000	2	(1)60w Incan. Lamp. Wall Scounce Fixture - 60w	120	$17.40	2	(1)19w CFL Sylvania Lamp CF19EL/MINI/830 19w	36	84	84	$12.18	2.9	$17.80	$35.60	$0.00
212	Women's Room	1000	2	(2)32w T8 Lamp. Wall Slot Fixture - 60w	110	$15.95	2	Existing to Remain	110	0	0	$0.00		$0.00	$0.00	$0.00
212	Women's Room	1000	2	(1)60w Incan. Lamp. Wall Scounce Fixture - 60w	120	$17.40	2	(1)19w CFL Sylvania Lamp CF19EL/MINI/830 19w	36	84	84	$12.18	2.9	$17.80	$35.60	$0.00
213	Samples Room	1000	1	(1) 100w Incan. Lamp. Pendant Fixture - 100w	100	$14.50	1	32w Edison-base CFL	32	68	68	$9.86	1.8	$17.80	$17.80	$0.00

		Existing Lt Fixtures					Proposed Lt Fixtures			Proposed Ltg Savings				Proposed Ltg Installation Cost		
Room Number	**Fixture Location**	**Usage, Hrs/Yr**	**Fixt Qty**	**Lighting Fixture Description**	**Total Watts - Location**	**Annual Energy Cost**	**Fixt Qty**	**Lighting Fixture Description**	**Total Watts - Location**	**Energy Savings, Watts**	**Energy Savings, kWh/Yr**	**Savings/Yr, $**	**Simple Payback, Yrs**	**Unit Cost, Installed**	**Total Cost, Installed**	**Rebate Estimate**
213	Samples Room	1000	2	(1)32w T8 Lamp. Undercabinet Fixture w/Elec. Ballast - 28w	56	$8.12	2	Existing to Remain	56	0	0	$0.00		$0.00	$0.00	$0.00
215	Library	750	4	(1) 100w Incan. Lamp. Pendant Fixture - 100w	400	$43.50	4	32w Edison-base CFL	128	272	204	$29.58	2.4	$17.80	$71.20	$0.00
215	Library	750	3	(1)200w Incan. Lamp. Pendant Fixture - 200w	600	$65.25	3	42w Edison-base CFL	126	474	356	$51.55	1.0	$17.80	$53.40	$0.00
216	Lobby	500	1	(1)200w Incan. Lamp. Pendant Fixture - 200w	200	$14.50	1	42w Edison-base CFL	42	158	79	$11.46	1.6	$17.80	$17.80	$0.00
217	Inner Vestubile	1500	1	(1)200w Incan. Lamp. Pendant Fixture - 200w	200	$43.50	1	42w Edison-base CFL	42	158	237	$34.37	0.5	$17.80	$17.80	$0.00
218	Rear Vestubile	750	1	(1)200w Incan. Lamp. Pendant Fixture - 200w	200	$21.75	1	42w Edison-base CFL	42	158	119	$17.18	1.0	$17.80	$17.80	$0.00
219	Janitor's Closet	500	1	(2)32w T8 Lamps. Surface Fixture - 55w	55	$3.99	1	Existing to Remain	55	0	0	$0.00		$0.00	$0.00	$0.00
220	Telephone Room	250	2	(2)32w T8 Lamps. Surface Fixture - 55w	110	$3.99	2	Existing to Remain	110	0	0	$0.00		$0.00	$0.00	$0.00
221	Kitchen	750	1	(1)200w Incan. Lamp. Pendant Fixture - 200w	200	$21.75	1	42w Edison-base CFL	42	158	119	$17.18	1.0	$17.80	$17.80	$0.00
221	Kitchen	750	2	(1)17w T8 Lamps. Undercabinet Fixture w/Elec. Ballast - 17w	34	$3.70	2	Existing to Remain	34	0	0	$0.00		$0.00	$0.00	$0.00
222	Front Inner Vestubile	250	1	(1)200w Incan. Lamp. Pendant Fixture - 200w	200	$7.25	1	42w Edison-base CFL	42	158	40	$5.73	3.1	$17.80	$17.80	$0.00
223	Maintenance Manager	500	1	(2)32w T8 Lamps. Surface Fixture - 55w	55	$3.99	1	Existing to Remain	55	0	0	$0.00		$0.00	$0.00	$0.00
	Front Exterior Entrance	250	1	(1)100w Inc. Lamp. Wall Mounted Fixture - 100w	100	$3.63	1	32w Edison-base CFL	32	68	17	$2.47	7.2	$17.80	$17.80	$0.00
	Rear Exterior Entrance	250	1	(1)100w Inc. Lamp. Wall Mounted Fixture - 100w	100	$3.63	1	32w Edison-base CFL	32	68	17	$2.47	7.2	$17.80	$17.80	$0.00
	Middle Level Summary		**132**		**8221**	**$1,542**	**132**		**4595**	**3626**	**4145.8**	**$601**	**0.9**		**$552**	**$0**
	Upper Level															
301	Front Two Offices 2 each office	1500	4	(4)32w T8 Lamps. 2' x 4' Lay-in Fixture w/ Elect. Ballast - 108w	432	$93.96	4	Existing to Remain	432	0	0	$0.00		$0.00	$0.00	$0.00
301	Large Front Office	1500	6	(4)32w T8 Lamps. 2' x 4' Lay-in Fixture w/ Elect. Ballast - 108w	648	$140.94	6	Existing to Remain	648	0	0	$0.00		$0.00	$0.00	$0.00
301	Three Center Offices	500	2	(4)32w T8 Lamps. 2' x 4' Lay-in Fixture w/ Elect. Ballast - 108w	216	$15.66	2	Existing to Remain	216	0	0	$0.00		$0.00	$0.00	$0.00
301	Large Center Office	750	2	(4)32w T8 Lamps. 2' x 4' Lay-in Fixture w/ Elect. Ballast - 108w	216	$23.49	2	Existing to Remain	216	0	0	$0.00		$0.00	$0.00	$0.00
301	Small Center Office	750	1	(4)32w T8 Lamps. 2' x 4' Lay-in Fixture w/ Elect. Ballast - 108w	108	$11.75	1	Existing to Remain	108	0	0	$0.00		$0.00	$0.00	$0.00
301	Large Rear Office	1000	8	(4)32w T8 Lamps. 2' x 4' Lay-in Fixture w/ Elect. Ballast - 108w	864	$125.28	8	Existing to Remain	864	0	0	$0.00		$0.00	$0.00	$0.00
301	Large Rear Office	250	4	(1)32w CF Lamp. Hi-Hat Fixture w/Elec. Ballast - 32w	128	$4.64	4	Existing to Remain	128	0	0	$0.00		$0.00	$0.00	$0.00

		Existing Lt Fixtures					Proposed Lt Fixtures			Proposed Ltg Savings				Proposed Ltg Installation Cost		
Room Number	**Fixture Location**	**Usage, Hrs/Yr**	**Fixt Qty**	**Lighting Fixture Description**	**Total Watts - Location**	**Annual Energy Cost**	**Fixt Qty**	**Lighting Fixture Description**	**Total Watts - Location**	**Energy Savings, Watts**	**Energy Savings, kWh/Yr**	**Savings/Yr, $**	**Simple Payback, Yrs**	**Unit Cost, Installed**	**Total Cost, Installed**	**Rebate Estimate**
302	Lobby - Tenant	750	6	(1)200w Incan. Lamp. Pendant Fixture - 200w	1200	$130.50	6	42w Edison-base CFL	252	948	711	$103.10	1.0	$17.80	$106.80	$0.00
302	Lobby - Tenant	750	4	(2)32w T8 Lamps. Surface Fixture - 55w	220	$23.93	4	Existing to Remain	220	0	0	$0.00		$0.00	$0.00	$0.00
303	Storage - Tenant	250	2	(2)32w T8 Lamps. Surface Fixture - 55w	110	$3.99	2	Existing to Remain	110	0	0	$0.00		$0.00	$0.00	$0.00
304	Conference Room - Tenant	500	4	(2)32w T8 Lamps. Pendant Fixture w/Elec. Ballast - 55w	220	$15.95	4	Existing to Remain	220	0	0	$0.00		$0.00	$0.00	$0.00
305	Storage - Tenant	250	2	(2)32w T8 Lamps. Surface Fixture - 55w	110	$3.99	2	Existing to Remain	110	0	0	$0.00		$0.00	$0.00	$0.00
306	Stair # 2	500	1	(1)200w Incan. Lamp. Pendant Fixture - 200w	200	$14.50	1	42w Edison-base CFL	42	158	79	$11.46	1.6	$17.80	$17.80	$0.00
307	Large Tenant Space	750	28	(4)32w T8 Lamps. 2' x 4' Lay-in Fixture w/ Elect. Ballast - 108w	3024	$328.86	28	Existing to Remain	3024	0	0	$0.00		$0.00	$0.00	$0.00
308	Men's Room	1000	1	(4)32w T8 Lamps. 2' x 4' Lay-in Fixture w/ Elect. Ballast - 108w	108	$15.66	1	Existing to Remain	108	0	0	$0.00		$0.00	$0.00	$0.00
309	Women's Room	1000	1	(4)32w T8 Lamps. 2' x 4' Lay-in Fixture w/ Elect. Ballast - 108w	108	$15.66	1	Existing to Remain	108	0	0	$0.00		$0.00	$0.00	$0.00
310	Lift Lobby	750	1	(1)200w Incan. Lamp. Pendant Fixture - 200w	200	$21.75	1	42w Edison-base CFL	42	158	119	$17.18	1.0	$17.80	$17.80	$0.00
311	Closet	250	1	(2)32w T8 Lamps. Surface Fixture - 55w	55	$1.99	1	Existing to Remain	55	0	0	$0.00		$0.00	$0.00	$0.00
312	Conference Room - Tenant	500	4	(2)32w T8 Lamps. Pendant Fixture w/Elec. Ballast - 55w	220	$15.95	4	Existing to Remain	220	0	0	$0.00		$0.00	$0.00	$0.00
313	Storage - Tenant	250	2	(2)32w T8 Lamps. Surface Fixture - 55w	110	$3.99	2	Existing to Remain	110	0	0	$0.00		$0.00	$0.00	$0.00
314	Stair #1	500	1	(1)200w Incan. Lamp. Pendant Fixture - 200w	200	$14.50	1	42w Edison-base CFL	42	158	79	$11.46	1.6	$17.80	$17.80	$0.00
	Attic	250	6	(1)100w Incan. Lamps. Porc. Keyless Socket Fixture - 100w	600	$21.75	6	32w Edison-base CFL	192	408	102	$14.79	7.2	$17.80	$106.80	$0.00
	Upper Level Summary		**91**		**9297**	**$1,049**	**91**		**7467**	**1830**	**1089.5**	**$158**	**1.7**		**$267**	**$0**
		Totals:	**339**		**23729**	**$4,207**	**339**		**18105**	**5624**	**5487.3**	**$796**	**1.1**		**$890**	**$0**
	COMMENTS:															

Project Name: LGEA Solar PV Project - Collingswood Zane School Office Building
Location: Collingswood, NJ
Description: Photovoltaic System 95% Financing - 20 year

Simple Payback Analysis

	Photovoltaic System 95% Financing - 20 year
Total Construction Cost	$405,720
Annual kWh Production	70,349
Annual Energy Cost Reduction	$11,186
Annual SREC Revenue	$24,622
First Cost Premium	**$405,720**
Simple Payback:	**11.33** Years

Life Cycle Cost Analysis

Analysis Period (years): 25
Financing Term (mths): 300
Average Energy Cost ($/kWh) **$0.159**
Financing Rate: 7.00%
Financing %: 95%
Maintenance Escalation Rate: 3.0%
Energy Cost Escalation Rate: 3.0%
SREC Value ($/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	$20,286	0	0	0	$0	0	0	(20,286)	0
1	$0	70,349	$11,186	$0	$24,622	$26,794	$5,896	$3,118	($17,168)
2	$0	69,998	$11,521	$0	$24,499	$26,367	$6,323	$3,330	($13,838)
3	$0	69,648	$11,867	$0	$24,377	$25,910	$6,780	$3,553	($10,284)
4	$0	69,299	$12,223	$0	$24,255	$25,420	$7,270	$3,788	($6,497)
5	$0	68,953	$12,589	$710	$24,134	$24,895	$7,795	$3,323	($3,174)
6	$0	68,608	$12,967	$707	$24,013	$24,331	$8,359	$3,583	$409
7	$0	68,265	$13,356	$703	$23,893	$23,727	$8,963	$3,856	$4,265
8	$0	67,924	$13,757	$700	$23,773	$23,079	$9,611	$4,141	$8,406
9	$0	67,584	$14,170	$696	$23,654	$22,384	$10,306	$4,438	$12,843
10	$0	67,246	$14,595	$693	$23,536	$21,639	$11,051	$4,748	$17,592
11	$0	66,910	$15,032	$689	$23,419	$20,840	$11,850	$5,072	$22,663
12	$0	66,575	$15,483	$686	$23,301	$19,984	$12,706	$5,409	$28,072
13	$0	66,243	$15,948	$682	$23,185	$19,065	$13,625	$5,761	$33,833
14	$0	65,911	$16,426	$679	$23,069	$18,080	$14,610	$6,126	$39,959
15	$0	65,582	$16,919	$675	$22,954	$17,024	$15,666	$6,507	$46,467
16	$0	65,254	$17,427	$672	$22,839	$15,891	$16,799	$6,903	$53,370
17	$0	64,928	$17,950	$669	$22,725	$14,677	$18,013	$7,315	$60,686
18	$0	64,603	$18,488	$665	$22,611	$13,375	$19,315	$7,744	$68,429
19	$0	64,280	$19,043	$662	$22,498	$11,979	$20,711	$8,189	$76,618
20	$0	63,959	$19,614	$659	$22,386	$10,481	$22,209	$8,651	$85,269
21	$0	63,639	$20,202	$655	$22,274	$9,549	$20,417	$11,855	$97,123
22	$0	63,321	$20,808	$652	$22,162	$7,717	$16,801	$17,801	$114,924
23	$0	63,004	$21,433	$649	$22,051	$0	$0	$42,835	$157,759
24	$0	62,689	$22,076	$646	$21,941	$0	$0	$43,371	$201,130
25	$0	62,376	$22,738	$642	$21,831	$0	$0	$43,927	$245,057
	Totals:	1,342,119	$300,560	$10,947	$469,742	$405,942	$247,858	$285,076	$1,323,915
				Net Present Value (NPV)			**$53,883**		
				Internal Rate of Return (IRR)			**20.8%**		

Project Name: LGEA Solar PV Project - Collingswood Zane School Office Building
Location: Collingswood, NJ
Description: Photovoltaic System - Direct Purchase

Simple Payback Analysis

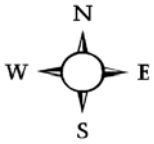
	Photovoltaic System - Direct Purchase
Total Construction Cost	$405,720
Annual kWh Production	70,349
Annual Energy Cost Reduction	$11,186
Annual SREC Revenue	$24,622
First Cost Premium	**$405,720**
Simple Payback:	**11.33** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.159**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/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	$405,720	0	0	0	$0	(405,720)	0
1	$0	70,349	$11,186	$0	$24,622	$35,808	($369,912)
2	$0	69,998	$11,521	$0	$24,499	$36,020	($333,892)
3	$0	69,648	$11,867	$0	$24,377	$36,243	($297,648)
4	$0	69,299	$12,223	$0	$24,255	$36,478	($261,171)
5	$0	68,953	$12,589	$710	$24,134	$36,013	($225,158)
6	$0	68,608	$12,967	$707	$24,013	$36,273	($188,885)
7	$0	68,265	$13,356	$703	$23,893	$36,546	($152,339)
8	$0	67,924	$13,757	$700	$23,773	$36,831	($115,508)
9	$0	67,584	$14,170	$696	$23,654	$37,128	($78,381)
10	$0	67,246	$14,595	$693	$23,536	$37,438	($40,942)
11	$0	66,910	$15,032	$689	$23,419	$37,762	($3,181)
12	$0	66,575	$15,483	$686	$23,301	$38,099	$34,919
13	$0	66,243	$15,948	$682	$23,185	$38,451	$73,369
14	$0	65,911	$16,426	$679	$23,069	$38,816	$112,186
15	$0	65,582	$16,919	$675	$22,954	$39,197	$151,383
16	$0	65,254	$17,427	$672	$22,839	$39,593	$190,976
17	$0	64,928	$17,950	$669	$22,725	$40,005	$230,982
18	$0	64,603	$18,488	$665	$22,611	$40,434	$271,416
19	$0	64,280	$19,043	$662	$22,498	$40,879	$312,294
20	$0	63,959	$19,614	$659	$22,386	$41,341	$353,635
21	$1	63,639	$20,202	$655	$22,274	$41,820	$395,455
22	$2	63,321	$20,808	$652	$22,162	$42,318	$437,774
23	$3	63,004	$21,433	$649	$22,051	$42,835	$480,609
24	$4	62,689	$22,076	$646	$21,941	$43,371	$523,980
25	$5	62,376	$22,738	$642	$21,831	$43,927	$567,907
	Totals:	1,342,119	$300,560	$10,947	$469,742	$973,627	$759,355
				Net Present Value (NPV)		**$567,932**	
				Internal Rate of Return (IRR)		**7.9%**	

Building	Roof Area (sq ft)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW_{DC}	Total Annual kWh	Panel Weight (33 lbs)	W/SQFT
Collingswood - Zane School Office Building	3200	Sunpower SPR230	196	14.7	2,882	45.08	70,349	6,468	15.64



.= Proposed PV Layout

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