ENERGY AUDIT – FINAL REPORT

SEASIDE PARK POLICE/FIRE/COURT FACILITY

6TH & CENTRAL AVE.
SEASIDE PARK, NJ 08752
ATTN: MS. JULIE L. HORNER-KEIZER
Borough Administrator

CEG PROJECT NO. 9C09030

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I. EXECUTIVE SUMMARY

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

Borough of Seaside Park
Public Works Garage
1201 Barnegat Avenue
Seaside Park, NJ 08752

Municipal Contact: Ms. Julie L. Horner-Keizer, Borough Administrator
Facility Contact: Mr. James Mackie

This audit was 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	$ 4,769
Natural Gas	$ 3,751
Total	$ 8,520

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)

ECM NO.	DESCRIPTION	COST [A]	ANNUAL SAVINGS [B]	SIMPLE PAYBACK (YEARS)	SIMPLE ROI
1	Upgrade the Lighting	$156	$35	4.5	22.5 %
2	Install Lighting Controls	$330	$224	1.47	68 %
3	Infra-red Heaters	$16,500	$1,015	16.26	6.2 %
4	16 KW PV Solar Panel System	$151,110	$13,887	10.9	9.2 %

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

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

Table 2
Estimated Energy Savings

ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECT DEMAND (KW)	ELECT CONSUMPTION (KWH)	NAT GAS (THERMS)
1	Upgrade the Lighting	7.8	72	-
2	Install Lighting Controls	-	7,000	-
3	Infra-red Heaters	-	556	527
5	16 KW PV Solar Panel System	16.79	26,202	-

Recommendations:

Concord Engineering Group recommends 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 Seaside Park Public Works Garage:

- **ECM #1:** Upgrade the Lighting
- **ECM #2:** Install Lighting Controls
- **ECM #5:** PV Solar Panel System

In addition to the ECM's, there are maintenance and operational measures that can provide significant energy savings and provide immediate benefit. The ECM's 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

This comprehensive energy audit covers the 4,590 square foot Public Works Garage building located at 1201 Barnegat Avenue.

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 Intensity (EUI) is established for the building. Energy Use Intensity (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 (ECM's). 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 ECM's.

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 ECM's. 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.

ECM's 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 SmartStart 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 costs and savings are applied and a simple payback and simple return on investment (ROI) is calculated. The simple payback is based on the years that it takes for the savings to pay back the net installation cost (Net Installation divided by Net Savings.) A simple return on investment is calculated as the percentage of the net installation cost that is saved in one year (Net Savings divided by Net Installation.)

A simple life-time calculation is shown for each ECM. The life-time for each ECM is estimated based on the typical life of the equipment being replaced or altered. The energy savings is extrapolated throughout the life-time of the ECM. The total energy savings is calculated as the total life-time multiplied by the yearly savings.

IV. HISTORIC ENERGY CONSUMPTION/COST

A. Energy Usage / Tariffs

Electric

Table 3 and Figure 1 represent the electrical usage for the surveyed facility from March-08 to February-09. JCP&L Electric Utility provides electricity to the facility under the GSS (General Service Secondary) rate. 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.

Natural Gas

Table 4 and Figure 2 show the natural gas energy usage from February-08 to January-09. New Jersey Natural Gas supplies the natural gas utilizing the GSS rate schedule and delivers the fuel to the burner under the firm transportation rate at the facility. 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	18.1¢ / kWh (5.3¢ / kBtu)
*Natural Gas	$1.42 / therm (1.4¢ / kBtu)

*Note: The Natural Gas cost per Therm includes customer service charges.

Table 3
Electricity Billing Data

Utility Provider: JCP&L, General Service Secondary - JC_GS1_01F (Meter # W80158348)

MONTH OF USE	CONSUMPTION KWH	DEMAND	TOTAL BILL
Mar-08	1,751	15.3	$293
Apr-08	2,265	13.1	$361
May-08	2,421	15.6	$456
Jun-08	2,546	12.8	$487
Jul-08	2,313	13.8	$457
Aug-08	2,364	13.9	$465
Sep-08	1,946	13.1	$340
Oct-08	1,955	13.8	$347
Nov-08	1,782	13.8	$326
Dec-08	1,745	15.6	$325
Jan-09	2,472	15.6	$432
Feb-09	2,745	14.1	$479
Totals	**26,305**	**15.6 Max**	**$4,769**

AVERAGE DEMAND 14.2 KW average
AVERAGE RATE $0.181 $/kWh

Figure 1
Electricity Usage Profile

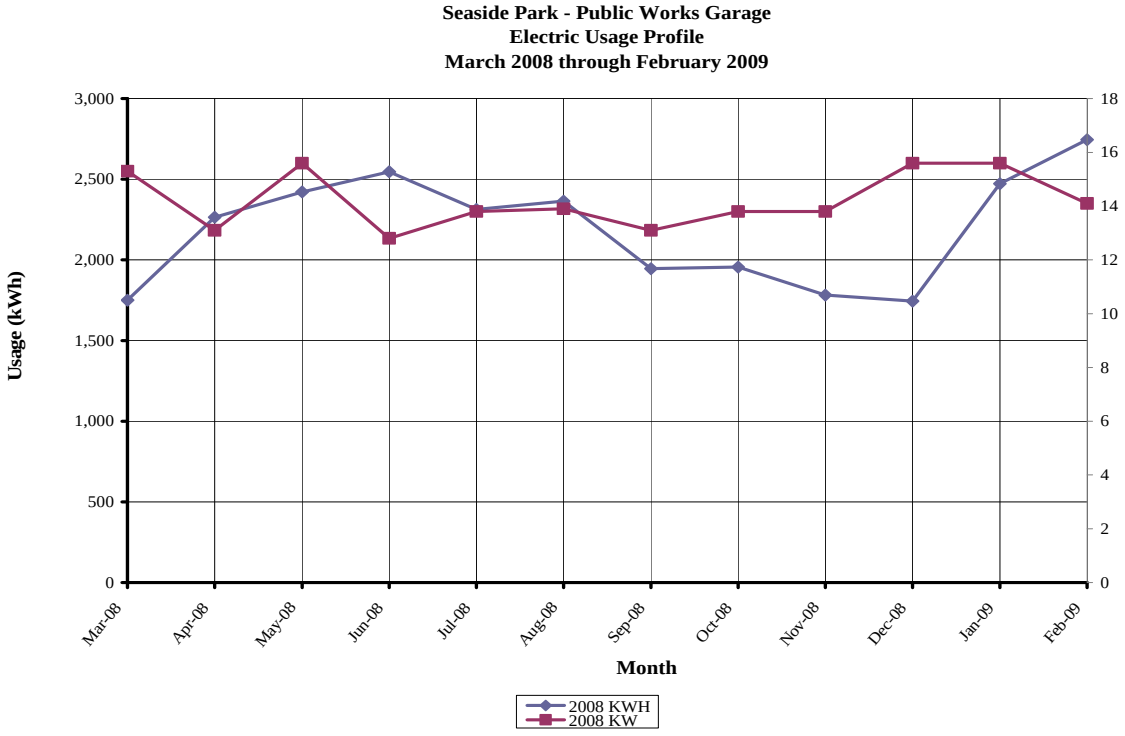
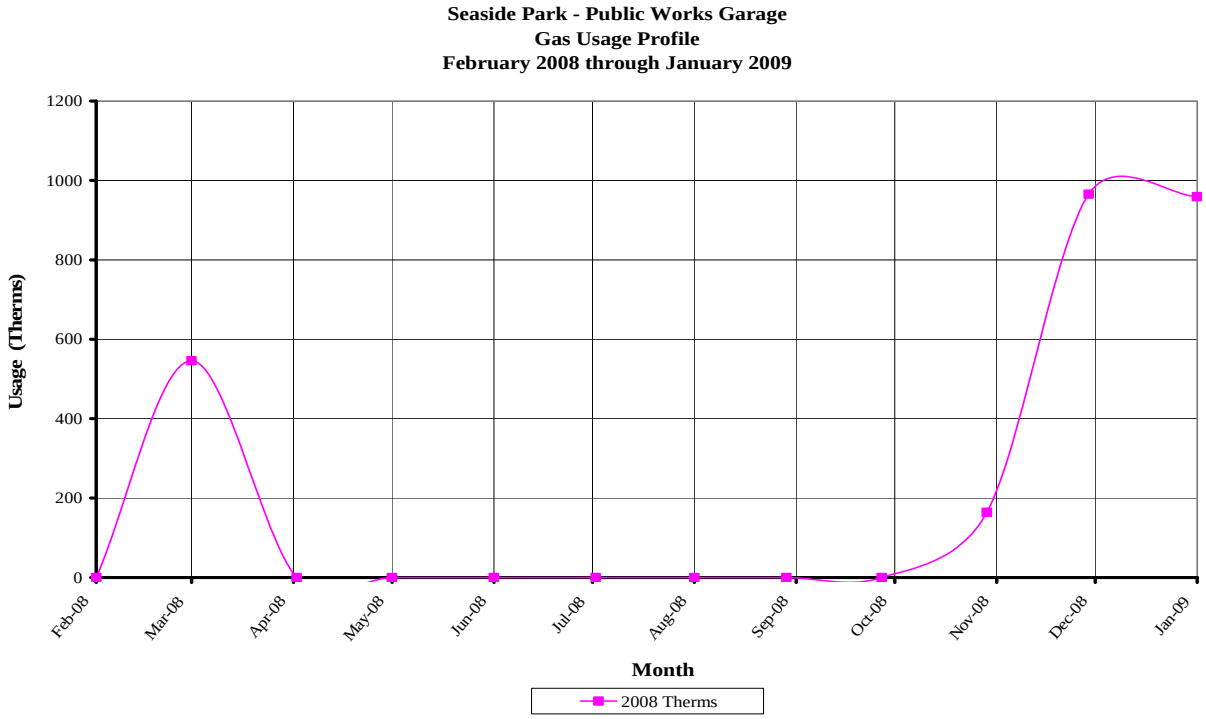


Table 4
Natural Gas Billing Data

Utility Provider: NJ Natural Gas - Rate - GSS, (Meter # 00348993)		
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Feb-08	0	$0.00
Mar-08	545.96	$869.43
Apr-08	0	$0.00
May-08	0	$0.00
Jun-08	0	$0.00
Jul-08	0	$0.00
Aug-08	0	$0.00
Sep-08	0	$0.00
Oct-08	0	$0.00
Nov-08	164.13	$321.12
Dec-08	965.32	$1,344.72
Jan-09	959.06	$1,215.67
TOTALS	**2634.47**	**$3,750.94**
AVERAGE RATE:	**$1.42**	**$/THERM**

Figure 2
Natural Gas Usage Profile



B. Energy Use Intensity (EUI)

Energy Use Intensity (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. (See Table 5 for details):

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

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

Table 5
Public Works Garage - EUI Calculations

ENERGY TYPE	BUILDING USE			SITE ENERGY	SITE-SOURCE	SOURCE ENERGY
	kWh	Therms	Gallons	kBtu	RATIO	kBtu
ELECTRIC	26,305			89,805	3.340	299,950
NATURAL GAS		2,634.47		263,447	1.047	275,829
FUEL OIL			0.00	0	1.010	0
PROPANE			0.00	0	1.010	0
TOTAL				353,252		575,779
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.						
BUILDING AREA		4,590		SQUARE FEET		
BUILDING SITE EUI		76.96		kBtu/SF/YR		
BUILDING SOURCE EUI		**125.44**		**kBtu/SF/YR**		

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 you to track and assess 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 more emphasis is being placed throughout multiple arenas 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. Therefore, it is vital that local government municipalities assess their energy usage, benchmark this usage utilizing Portfolio Manager, set priorities and goals to lessen their energy usage and move forward with these priorites and goals. Saving energy will in-turn save the environment.

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

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

User Name:	seasideparkboro
Password:	lgeaceg09014
Security Question:	What is your birth city?
Security Answer:	“Seaside Park Boro”

Utilizing the utility bills and other information gathered during the energy audit process, CEG entered the respective data into Portfolio Manager and the following is a summary of the results:

Table 6
ENERGY STAR Performance Rating

FACILITY DESCRIPTION	ENERGY PERFORMANCE RATING	NATIONAL AVERAGE
Public Works Garage	N/A	N/A

* N/A Due to building category, see below.

Specific building types are detailed on the ENERGY STAR website. Non-typical buildings are covered by an "Other" category. The "Other" category is used if your building type or a section of the building is not represented by one of the specific categories. An Energy Star Performance Rating cannot be calculated if more then 10% of a building is classified as "Other," or if the building is an office with less than 5,000 square feet of floor space.

The majority of the Public Works Garage is classified as "Other", therefore an Energy Star Performance Rating could not be calculated. Despite this, the Portfolio Manager calculates the building Energy Use Intensity (EUI).

The (EUI) is also an important tool that can be used to track the energy efficiency of the building. Baselines for improvement can be set that the municipality can strive to meet. CEG recommends that the Borough of Seaside Park keep their Portfolio Manager account up to date to monitor the performance of the building.

The EUI calculated in the previous section and in the Energy Star Portfolio Manager is a good indicator of the energy performance of the Public Works Garage in the absence of the Energy Star Performance Rating.

The Police / Fire / Court Facility has a Building Source EUI of 125.44 rating for this type of facility. The lower the EUI the less energy the facility uses per squarefoot. A low EUI indicates a more efficient building. There maybe some opportunity for improvement making the facility more energy efficient and saving more on the utility costs.

Refer to Appendix D for detailed energy benchmarking report entitled "STATEMENT OF ENERGY PERFORMANCE."

V. FACILITY DESCRIPTION

The Seaside Park Public Works Garage is a slab on grade 1-story masonry garage builing consrtucted in 1983, and expanded in 1991. Public access mens and woments restrooms exist on the street side of this building. The garage portion of the building houses seven(7) truck bays for mantenence and storage of heavy equipment, a small office and a restroom.

Heating System

The heating system for the building consists of three(3) Modine, horizontal, propellor fan, gas-fired unit heaters hung from the ceiling. Each heater has an input capacity of 150,000 btuh, 112,500 btuh output.

Domestic Hot Water

A smal electric Hot Water Heater, approx. 6 gallon capacity, provides hot water for the restroom.

Cooling System

This building does not have any air conditioning systems, it is heated only.

Lighting System

The following spaces which include garage storage room, office, loft and bathroom are lit via surface mounted fixtures containing T8 lamps with electronic ballasts. Standard switching is utilized and there are no other types of lighting controls present.

Main garage work bench lighting is lit via pendant hung 1'x8' fixture containing T12 lamps with magnetic ballast. Standard switching is utilized and there are no other types of lighting controls present.

Two main garage areas are lit via metal halide 'lowboy' type fixtures. Standard switching is utilized and there are not other types of lighting controls present.

Exit signs in this building contain incandescent lamps and consume an estimated 40 watts of electricity per sign.

The exterior lighting is mounted to the building and includes wall packs and flood lighting with metal halide lamps.

Refer to Appendix E for a detailed Investment Grade Lighting Audit

VI. MAJOR EQUIPMENT LIST

Following the completion of the field survey a detailed equipment list was created. The equipment within this list is considered major energy consuming equipment whose replacement could yield substantial savings. In addition, 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 manufacturers 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.

Equipment denoted by an asterisk indicates an estimate of the equipment ratings due to equipment inaccessibility, worn nameplates, lack of nameplates, etc.

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

VII. ENERGY CONSERVATION MEASURES (ECM)

ECM #1: Upgrade the Lighting

Description:

Upgrade the Fluorescent Lighting

Improved fluorescent lamps and ballasts are available as direct replacements for the existing lamps and ballasts. A simple retrofit of the existing fixture can provide substantial savings. A conventional drop-ceiling lay in fixture with four, 4-foot lamps has a total wattage of 154 Watts per fixture. By using the improved lamps and ballasts, the total wattage would be reduced to 96 Watts. The light levels would increase by about 15% and the light quality would increase by 35%.

CEG recommends replacement of the existing T12 lamps and ballasts with the latest technology T8 lamps and high efficiency electronic ballasts. The new energy efficient, T8 lamps will provide adequate lighting and will save the Owner on electrical costs due to the better performance of the electronic ballasts. In addition to functional cost savings, the fixture replacement will also provide operational cost savings. The operational cost savings will be realized through the decreased number of lamps that will be required to be replaced per year. The expected lamp life of the latest high efficiency T8 lamps is approximately 30,000 burn-hours, requiring fewer lamps to replace per year. Based on the operating hours of this portion of the facility, approximately 2000 hours per year, the Owner will be changing approximately 33% less lamps per year.

In addition, a single electronic ballast can operate one, two, three, or four lamps in a fixture. The existing magnetic ballasts can only operate up to two lamps. The electronic ballasts could reduce the amount of ballasts in the facility by half. This can be taken advantage of with "tandem wiring" of ballasts. Instead of using one electronic ballast for every one fixture it is sometimes feasible to use one electronic ballast for every two or more fixtures. The electrician wires a single ballast to operate the lamps in adjacent light fixtures which further reduces the amount of ballasts needed.

Energy Savings Calculations:

A detailed Investment Grade Lighting Audit can be found in Appendix E that outlines the proposed retrofits, costs, savings, and payback periods.

Maintenance Savings are calculated as follows:

Maintenance Savings = (# *of lamps* x % *reduction* x $ *per lamp*) + *Installation Labor*

Maintenance Savings = (2 x 33% *reduction* x $2.00) + ($20 x 1) = $22

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	**$166**
NJ Smart Start Equipment Incentive ($):	**($10)**
Net Installation Cost ($):	**$156**
Maintenance Savings ($ / yr):	**$22**
Energy Savings ($ / yr):	**$13**
Total Net Savings ($ / yr):	**$35**
Simple Payback (yrs):	**4.5**
Simple Return On Investment (%):	**22.5 %**
Estimated ECM Lifetime (yr):	**15**
Simple Lifetime Savings ($):	**$369**

- ECM#1 Calculations DO NOT include lighting control changes implemented in ECM#2.
- If ECM#1 and #2 are implemented together the savings will be relatively lower than shown above.

ECM #2: Install Lighting Controls

Description:

Install Lighting Controls to Reduce the Lighting Use

In some areas the lighting is left on unnecessarily. In many cases the lights are left on because of the inconvenience to manually switch lights off when a room is left or on when a room is first occupied. This is common in storage rooms that are occupied for only short periods and only a few times per day. In some instances lights are left on due to the misconception that it is better to keep the lights on rather than to continuously switch lights on and off. Although increased switching reduces lamp life, the energy savings outweigh the lamp replacement costs. The payback timeframe for when to turn the lights off is approximately two minutes. If the lights are off for at least a two minute interval, then it pays to shut them off.

Lighting controls come in many forms. Sometimes an additional switch is adequate to provide reduced lighting levels when full light output is not needed. Occupancy sensors detect motion and will switch the lights on when the room is occupied. Occupancy sensors can either be mounted in place of a current wall switch, or on the ceiling to cover large areas. Photocell control senses light levels and turn off or reduce lights when there is adequate daylight. Photocells are mostly used outside, but are becoming more popular in energy-efficient interior lighting designs as well.

The U.S. Department of Energy sponsored a study to analyze energy savings achieved through various types of building system controls. The referenced savings is based on the "Advanced Sensors and Controls for Building Applications: Market Assessment and Potential R&D Pathways," document posted for public use April 2005. The study has found that commercial buildings have the potential to achieve significant energy savings through the use of building controls. The average energy savings are as follows based on the report:

- Energy Management and Control System Savings - 5%-15%.
- Commissioning - 5%-15%.
- Automatic Fault Detection and Diagnostics - 5%-15%.
- Occupancy Sensors for Lighting Control - 20%-28%.
- Photosensor-Based Lighting Control - 20%-60%.
- Demand Controlled Ventilation (DCV) - 10%-15%.

CEG would recommend the replacement of standard wall switches with sensor wall switches for individual rooms, ceiling mount sensors for large office areas or restrooms, and fixture mount box sensors for some applications. Sensors shall be manufactured by Sensorswitch, Watt Stopper or equivalent. See the "Investment Grade Lighting Audit" Appendix E for details.

Energy Savings Calculations:

From Appendix E of this report, we calculated the annual kilowatt hours (kWh) savings for the areas where the proposed occupancy sensors will be located:

Savings = *Total kilowatts* x *Annual Average Burn Hours*

= 7,000 kWh/yr. x 20% x $0.16/kWh

Annual Savings = $224 / yr

Installation cost per dual-technology sensor is $75/unit.

The SmartStart Buildings® incentive is $20 per control which equates to an installed cost of $55/unit. Total number of rooms to be retrofitted is 6.

Total cost to install sensors is $55 x 6 units = $330.

Total ECM Lifetime Energy Savings = 15 Years (Est.) x $112 / yr. = $1,680

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	**$450**
NJ Smart Start Equipment Incentive ($):	**($120)**
Net Installation Cost ($):	**$330**
Maintenance Savings ($ / yr):	**$0**
Energy Savings ($ / yr):	**$224**
Total Net Savings ($ / yr):	**$224**
Simple Payback (yrs):	**1.47**
Simple Return On Investment (%):	**68 %**
Estimated ECM Lifetime (yr):	**15**
Simple Lifetime Savings ($):	**$3,030**

ECM #3 Shop Heater Replacements - Infrared Heaters

Description:

This ECM includes the heating systems for the Public Works Garage building.

The interior spaces of the Public Works Garage are heated by three Modine unit heaters hung from the ceiling. The remote thermostats that control these heating units are set at 60ºF. These units do not provide adequate heating because of the high ceilings and losses through garage doors when open.

Our team recommends replacing the existing unit heaters with low intensity infrared (IR) tube heaters. When compared to convective heating systems, IR heaters provide more efficient heating in large areas and warehouses for two reasons: they only heat people and objects (not air); they can be conveniently located and directed to provide heat to only a smaller section occupied by workers.

Energy Savings Calculations:

Based on the existing unit heater data and natural gas bills, the total energy consumed for heating these spaces is approximately 2634 Therms/Year. The total rated heat capacity of the IR tubes is 80% of the current load or 0.8 x 2634 Therms = 2107 Therms/Year. The total amount of IR heaters and their size can be estimated based on the current heat load and building layout. In general, a building 200 feet wide or less will require two rows of tubes. Heat output of each 20-foot section is approximately 60,000 Btu/hr.

Estimated Fan Energy Savings:

Each of the gas-fired unit heaters have an approximate 1/4 HP fan that runs each time the unit calls for heating. Assuming that these motors are 80% efficient and the total run hours is 2,800, this equates to an electrical savings of:

Existing ¼ HP Motor Operating Cost = {0.746 Watt/HP x Motor HP x Load Factor x Hours of Operation x Cost of Electricity] ÷ Motor Efficiency = [0.746 x 0.25 x 0.75 x 2,800 x 0.181] ÷ 0.80 = $89 / Year

Based on three (3) existing units, this equates to 5 x $89 = $267/Year Savings

Natural Gas Energy Savings:

20% savings x 2,634 Therms/Yr x $1.42/Therm = $748/Year

Total Energy Savings = Fan Energy Savings + Natural Gas Savings
= $267 + $748 = $1,015 per year

The total implementation cost including material and labor is estimated at approximately $12,500. It is pertinent to note, the labor cost includes installation of the infra-red heaters and required modifications of the existing natural gas piping.

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	**$16,500**
NJ Smart Start Equipment Incentive ($):	**($0)[A]**
Net Installation Cost ($):	**$16,500**
Maintenance Savings ($ / yr):	**$0**
Energy Savings ($ / yr):	**$1,015**
Total Net Savings ($ / yr):	**$1,015**
Simple Payback (yrs):	**16.26**
Simple Return On Investment (%):	**6.15%**
Estimated ECM Lifetime (yr):	**13**
Simple Lifetime Savings ($):	**(-$3,305)**

Note: A. CEG believes that a NJ Smart Start® Custom Measure incentive could be applied for in order to offset the installation cost. However, further study is required.

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 the Seaside Park – Public Works Garage, to evaluate if there is any potential for solar or wind 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). Parking lots can also be utilized for the installation of a solar array. A truss system can be installed that is high enough to park a vehicle under the array, this way no parking lot area is lost. The state of NJ has instituted a program in which one Solar Renewable Energy Certificate (SREC) is given to the Owner for every 1000 kWh of generation. SREC's can be sold anytime on the market at their current market value. The value of the credit varies upon the current need of the power companies. The average value per credit is around $350, this value was used in our financial calculations. This equates to $0.35 per kWh generated.

CEG has reviewed the existing roof area of the building being audited for the purposes of determining a potential for a roof mounted photovoltaic system. A roof area of 3,676 S.F. can be utilized for a PV system on the Public Works Garage roof. A depiction of the area utilized is shown in Renewable / Distributed Energy Measures Calculation, Appendix F following the financial calculations. Using this square footage it was determined that a system size of 16.79 kilowatts could be installed. The required square footage for a system of this size is approximately 1,100 S.F. and has an estimated kilowatt hour production of 26,202 KWh annually, reducing the overall electric consumption by approximately 99.5 %. Presently the BPU and net-zero metering laws of New Jersey limit the KWh production to the maximum KWh used at each facility through the individual building meter. A detailed financial analysis can be found in Appendix F. 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% with an inverter efficiency of 95%. This region allows for a typical range of sunlight between 4.5 and 4.9 hours per day. The calculations are based on an average 4.68 hours per day. The operating hours are calculated based on 351 days per year accounting for two weeks per year of service down time. The calculations are also based on a solar PV system which 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	SIMPLE ROI	INTERNAL RATE OF RETURN
Self-Finance	10.9 Years	9.2 %	16.4 %
Direct Purchase	10.9 Years	9.2 %	8.5 %

*The solar energy measure is shown for reference in the executive summary ECM 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.

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, and the kilowatt demand for the building is below the threshold (200 kW) for purchase of a commercial wind turbine. Therefore, wind energy is not a viable option to implement.

IX. ENERGY PURCHASING AND PROCUREMENT STRATEGY

Load Profile:

Load Profile analysis was performed to determine the seasonal energy usage of the facility. Irregularities in the load profile will indicate potential problems within the facility. Consequently based on the profile a recommendation will be made to remedy the irregularity in energy usage. For this report, the facility's energy consumption data was gathered in table format and plotted in graph form to create the load profile. Refer to Section IV, Figures 1 and 2 included within this report to reference the respective electricity and natural gas usage load profile for March 2008 through February 2009 for electricity, and February 2008 through January 2009 for natural gas.

Electricity:

Section IV, Figure 1 demonstrates a fairly flat load profile. The summer consumption is relatively flat (with some peaking in August) as compared to summer air conditioner loads only. This facility has no cooling system. The peak of the year takes place however in February. This base-load shaping is important because a flat consumption profile will yield more competitive pricing when shopping for alternative energy solutions.

Natural Gas:

Section IV, Figure 2 demonstrates an inactive natural gas profile. The data collected states that the natural gas service was shut off for most of the year, particularly the summer. Peaks are present in March and the largest one in December. It is expected that the largest consumption peak is demonstrated in the winter month. This is typical as natural gas's highest consumption peak should take place during the heating months. Heating loads carry a much higher average cost because of the higher demand for natural gas during the winter season. This facility utilizes 3 ceiling hung Modine natural gas units, thus the winter peak. This base-load shaping is important because a flat consumption profile will yield more competitive pricing when shopping for alternative energy solutions.

Tariff Analysis:

Electricity:

This facility receives electrical service through Jersey Central Power & Light (JCP&L) on a GSS (General Service Secondary) rate. Service classification GS is available for general service purposes on secondary voltages not included under Service Classifications RS, RT, RGT or GST. This 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). If they use the utility BGS then 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:

The Borough receives natural gas Delivery Service through New Jersey Natural Gas Company on a GSS (General Service Small) or GSL (General Service Large) tariff rate schedule. The Public Works Garage utilizes the GSS rate schedule, and it is available to any Customer in the entire territory served by the Company who use is *less* than 5,000 therms annually and uses gas for all purposes other than residential and interruptible service. Where the customer uses the Cooling, Air Conditioning and Pool Heating Service (CAC) under Special Provision 1 applicable to customers purchasing gas supply under Rider "A", the Company will, upon application of the Customer, meter the space heating and the "CAC" separately.

This service is considered a "firm" service, where the customer may either purchase gas from Company's Rider "A", for Basic Gas Supply Service (BGSS) or from a Marketer or Broker.

The basic charges under this tariff are for: Customer Charge, Demand Charge, Delivery Charge and if the customer elects, the BGSS Supply Charge.

The customer can elect to have the Commodity Charge serviced through the utility or by a Third Party Supplier (TPS). It is pertinent to note, should the TPS not deliver, and the customer will receive replacement service from the utility which carries an extremely high penalty cost of service.

Imbalances can 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, under delivery can occur, jeopardizing economics and scheduling.

Recommendations:

CEG recommends a global approach that will be consistent with all facilities within The Borough of Seaside Park. CEG's observations are seen in both commodities. The average price "to compare" per kWh (kilowatt hour) for all buildings is $.1387/kWh (kWh is the common unit of electric measure). The average price per decatherm for natural gas is $11.16/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. Seaside Park could realize significant savings if it were to take advantage of these current market prices quickly, before energy increases. Based on last year's historical consumption (January –December 2008) and current fixed electric rates, the Borough could see an improvement of 20%. (Note: Savings were calculated using The Borough of Seaside Parks Average Annual Consumption of 322,744 kWh and an Average fixed 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 other recommendation coincides with the natural gas cost. CEG recognized that the Borough could also see improvement in its natural gas costs by a factor of over 20%. And CEG

recommends further advisement on these prices. The Borough should consider procuring energy (natural gas) on its own. CEG recommends alternative sourcing strategies through energy advisement.

CEG recommends that the town schedule 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 are currently available. Through its meeting with the Local Distribution Company (LDC), the town will learn more about the competitive supply process. The utility can provide a list of approved Third Party Suppliers from the New Jersey Board of Public Utilities website at www.nj.gov/bpu, and 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 special attention to credit mechanisms, imbalances, balancing charges and commodity charges when meeting with their utility representative. In addition, Seaside Park 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 Seaside Park 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 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.

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 fan horsepower requirements and maintain better IAQ.

E. Confirm that outside air economizers on the rooftop units that serve the Office Areas are functioning properly to take advantage of free cooling.

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

APPENDIX

Public Works Garage

CONSTRUCTION COST AND REBATES					
ECM # 1 - UPGRADE THE LIGHTING	Qty	Unit Cost $	Material $	Labor $	Total $
New T-8 & CFL Lamps & Ballasts	1	$106	$106	$60	$166
Total Cost					$166
Utility Incentive					-$580
Total Net Cost					**-$414**
ECM # 2 - INSTALL LIGHTING CONTROLS	Qty	Unit Cost $	Material $	Labor $	Total $
Occupancy Sensors	6	$75	$450	$0	$450
Total Cost					$450
Utility Incentive					-$120
Total Net Cost					**$330**
ECM # 2 SHOP HEATER REPLACEMENT - INFRARED HEATERS	Qty	Unit Cost $	Material $	Labor $	Total $
Infrared Heaters	3	$1,500	$4,500	$9,000	$13,500
Gas Piping extend	3	$250	$750	$1,500	$2,250
Demo existing heaters	3	$250	$0	$750	$750
Total					**$16,500**

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

Public Works Garage

EQUIPMENT LIST									
TAG	**MAKE**	**MODEL**	**TYPE**	**CAPACITY**	**EFFICIENCY**	**SERVES**	**LOCATION**	**REMAINING USEFUL LIFE**	**NOTES**
-	MODINE	PDP	GAS-FIRED HORIZONTAL UNIT HEATER	150,000 BTUH INPUT	75%	EQUIPMENT GARAGE	EQUIPMENT GARAGE	0	GOOD CONDITION
-	MODINE	PDP	GAS-FIRED HORIZONTAL UNIT HEATER	150,000 BTUH INPUT	75%	EQUIPMENT GARAGE	EQUIPMENT GARAGE	0	GOOD CONDITION
-	MODINE	PDP	GAS-FIRED HORIZONTAL UNIT HEATER	150,000 BTUH INPUT	75%	HEAVY EQUIPMENT GARAGE	HEAVY EQUIPMENT GARAGE	0	GOOD CONDITION
-	AO SMITH	-	ELECTRIC WITH STORAGE	10 GALLON, 1500 W	100%	GARAGE BATHROOM	ABOVE BATHROOM	-	GOOD CONDITION

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Public Works Garage

Building ID: 1831006
For 12-month Period Ending: February 28, 2009[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: August 18, 2009

Facility
Public Works Garage
1201 Barnegat Ave.
Seaside Park, NJ 08752

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1983
Gross Floor Area (ft²): 4,590

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

Site Energy Use Summary[3]

Natural Gas (kBtu)[4]	249,746
Electricity (kBtu)	88,415
Total Energy (kBtu)	338,161

Energy Intensity[5]

Site (kBtu/ft²/yr)	74
Source (kBtu/ft²/yr)	123

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	28

Electric Distribution Utility
Jersey Central Power & Lt Co

National Average Comparison

National Average Site EUI	77
National Average Source EUI	150
% Difference from National Average Source EUI	-18%
Building Type	Service (Vehicle Repair/Service, Postal Service)

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	Public Works Garage	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Service (Vehicle Repair/Service, Postal Service)	Is this an accurate description of the space in question?		☐
Location	1201 Barnegat Ave., Seaside Park, NJ 08752	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		☐

Public Works Garage (Other)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Gross Floor Area	4,590 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	2 (Optional)	Is this the number of personal computers in the space?		☐
Weekly operating hours	45 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	3 (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 (kWh (thousand Watt-hours)) **Space(s):** Entire Facility		
Start Date	**End Date**	**Energy Use (kWh (thousand Watt-hours))**
01/05/2009	02/04/2009	2,472.00
12/05/2008	01/04/2009	1,745.00
11/05/2008	12/04/2008	1,782.00
10/05/2008	11/04/2008	1,955.00
09/05/2008	10/04/2008	1,946.00
08/05/2008	09/04/2008	2,364.00
07/05/2008	08/04/2008	2,313.00
06/05/2008	07/04/2008	2,546.00
05/05/2008	06/04/2008	2,421.00
04/05/2008	05/04/2008	2,265.00
03/05/2008	04/04/2008	1,751.00
Electric Consumption (kWh (thousand Watt-hours))		**23,560.00**
Electric Consumption (kBtu)		**80,386.72**
Total Electricity Consumption (kBtu)		**80,386.72**
Is this the total Electricity consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas		
Meter: Gas (therms) **Space(s):** Entire Facility		
Start Date	**End Date**	**Energy Use (therms)**
01/05/2009	02/04/2009	965.32
12/05/2008	01/04/2009	164.13
11/05/2008	12/04/2008	0.00
10/05/2008	11/04/2008	0.00
09/05/2008	10/04/2008	0.00
08/05/2008	09/04/2008	0.00
07/05/2008	08/04/2008	0.00
06/05/2008	07/04/2008	0.00
05/05/2008	06/04/2008	0.00
04/05/2008	05/04/2008	200.00

03/05/2008	04/04/2008	345.96
Gas Consumption (therms)		**1,675.41**
Gas Consumption (kBtu)		**167,541.00**
Total Natural Gas Consumption (kBtu)		**167,541.00**
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.	☐

Certifying Professional

(When applying for the ENERGY STAR, this must be the same 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
Public Works Garage
1201 Barnegat Ave.
Seaside Park, NJ 08752

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Public Works Garage	
Gross Floor Area Excluding Parking: (ft^2)	4,590
Year Built	1983
For 12-month Evaluation Period Ending Date:	February 28, 2009

Facility Space Use Summary

Public Works Garage	
Space Type	Other - Service (Vehicle Repair/Service, Postal Service)
Gross Floor Area(ft^2)	4,590
Number of PCs[o]	2
Weekly operating hours[o]	45
Workers on Main Shift[o]	3

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 02/28/2009)	**Baseline** (Ending Date 02/28/2009)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	N/A	N/A	75	N/A	N/A
Energy Intensity					
Site (kBtu/ft^2)	74	74	0	N/A	77
Source (kBtu/ft^2)	123	123	0	N/A	150
Energy Cost					
$/year	$ 8,277.69	$ 8,277.69	N/A	N/A	$ 8,556.61
$/$ft^2$/year	$ 1.80	$ 1.80	N/A	N/A	$ 1.86
Greenhouse Gas Emissions					
$MtCO_2e$/year	28	28	0	N/A	29
$kgCO_2e/ft^2$/year	6	6	0	N/A	6

More than 50% of your building is defined as Service (Vehicle Repair/Service, Postal Service). This building is currently ineligible for a rating. Please note the National Average column represents the CBECS national average data for Service (Vehicle Repair/Service, Postal Service). This building uses X% less energy per square foot than the CBECS national average for Service (Vehicle Repair/Service, Postal Service).

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

INVESTMENT GRADE LIGHTING AUDIT

CONCORD ENERGY SERVICES

CEG Project #: BS09-014
Project Name : Seaside Park Public Works Garage
Address: 1201 Barnegat Avenue
City, State: Seaside Park, NJ. 08752
Building SF: 4590

kWh Cost: 0.18
Burn Hrs: 8760

	Existing Fixtures							Proposed Fixtures											Fixtures Retrofitted			Unit Installation Cost								
Existing Lighting Fixture Type	Room Name	Lighting Fixture Description	Lamps per Fixture	Voltage	Watts	Qty of Fixtures	Total Watts	New Lighting Fixture Type	Existing/Replace	Description	Lamps per Fixture	Foot Candles	Watts	Qty of Fixtures	Total Watts	Wattage Reduction	Average Burn Hours	Ave $/kwh	Energy Savings, kWh	Energy Savings, $	Qty	Material Each	Labor Each	Total Each	Total Materials	Total Labor	Total All	Rebate Estimate	Simple Payback
	First Floor																												
A	Garage Area (East)	1L-400W-MH Lowboy Fixture	1	120	400	12	4800	NA	Existing to Remain	0	0		0	12	0	4800	3000	$0.18	14,400	$2,592.00	0	0	0	$0.00	$0.00	$0.00	$0.00	$0.00	0.0
B	Garage Area (work bench)	2L-T12-60W 1'x8' Surface Fixture	2	120	120	1	120	NB	Relamp, Reballast & Retrokit	32w-T8 energy saver w/ (2)electronic T8 High Efficiency ballasts	4		96	1	96	24	3000	$0.18	72	$12.96	1	105.76	60	$165.76	$105.76	$60.00	$165.76	$10.00	12.0
C	Garage Area Storage Room	4L-T8-32W 2'x4' Surface Fixture	4	120	96	2	192	NC	Existing to Remain	0	0		0	2	0	192	3000	$0.18	576	$103.68	0	0	0	$0.00	$0.00	$0.00	$0.00	$0.00	0.0
C	Garage Area Office	4L-T8-32W 2'x4' Surface Fixture	4	120	96	2	192	NC	Existing to Remain	0	0		0	2	0	192	2500	$0.18	480	$86.40	0	0	0	$0.00	$0.00	$0.00	$0.00	$0.00	0.0
D	Garage Area Loft (Storage)	2L-T8-32W 1'x4' Surface Fixture	2	120	48	2	96	ND	Existing to Remain	0	0		0	2	0	96	1000	$0.18	96	$17.28	0	0	0	$0.00	$0.00	$0.00	$0.00	$0.00	0.0
D	Garage Bathroom	2L-T8-32W 1'x4' Surface Fixture	2	120	48	1	48	ND	Existing to Remain	0	0		0	1	0	48	1000	$0.18	48	$8.64	0	0	0	$0.00	$0.00	$0.00	$0.00	$0.00	0.0
A	Garage Area (West)	1L-400W-MH Lowboy Fixture	1	120	400	4	1600	NA	Existing to Remain	0	0		0	4	0	1600	1500	$0.18	2,400	$432.00	0	0	0	$0.00	$0.00	$0.00	$0.00	$0.00	0.0
E	Exterior Lighting	1L-250W-MH Flood Light	1	120	250	3	750	NE	Existing to Remain	0	0		0	3	0	750	2000	$0.18	1,500	$270.00	0	0	0	$0.00	$0.00	$0.00	$0.00	$0.00	0.0
F	Exterior Door Lights	1L-70W-MH Wall Fixture	1	120	70	2	140	NF	Existing to Remain	0	0		0	2	0	140	1500	$0.18	210	$37.80	0	0	0	$0.00	$0.00	$0.00	$0.00	$0.00	0.0
Total First Floor						**29**	**7938**							**29**	**96**	**7842**			**19,782**	**$3,560.76**	**1**				**$106**	**$60**	**$166**	**$10**	**0.0**

Project Name: Public Works Garage
Location: Seaside Park, NJ
Description: Photovoltaic System 95% Financing - 20 year

Simple Payback Analysis

	Photovoltaic System 95% Financing - 20 year
Total Construction Cost	$151,110
Annual kWh Production	26,202
Annual Energy Cost Reduction	$4,716
Annual SREC Revenue	$9,171
First Cost Premium	**$151,110**
Simple Payback:	**10.88** Years

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	95%
Financing Term (mths):	240	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.180**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	7.00%	SREC Value ($/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	$7,556	0	0	0	$0	0	0	(7,556)	0
1	$0	26,202	$4,716	$0	$9,171	$9,941	$3,415	$531	($7,024)
2	$0	26,071	$4,858	$0	$9,125	$9,694	$3,662	$627	($6,398)
3	$0	25,940	$5,004	$0	$9,079	$9,429	$3,927	$727	($5,671)
4	$0	25,811	$5,154	$0	$9,034	$9,145	$4,211	$832	($4,839)
5	$0	25,681	$5,308	$265	$8,989	$8,841	$4,515	$676	($4,163)
6	$0	25,553	$5,467	$263	$8,944	$8,514	$4,841	$792	($3,371)
7	$0	25,425	$5,631	$262	$8,899	$8,164	$5,191	$913	($2,458)
8	$0	25,298	$5,800	$261	$8,854	$7,789	$5,567	$1,038	($1,419)
9	$0	25,172	$5,974	$259	$8,810	$7,387	$5,969	$1,170	($250)
10	$0	25,046	$6,154	$258	$8,766	$6,955	$6,400	$1,306	$1,056
11	$0	24,921	$6,338	$257	$8,722	$6,493	$6,863	$1,448	$2,504
12	$0	24,796	$6,528	$255	$8,679	$5,996	$7,359	$1,596	$4,100
13	$0	24,672	$6,724	$254	$8,635	$5,464	$7,891	$1,750	$5,850
14	$0	24,549	$6,926	$253	$8,592	$4,894	$8,462	$1,909	$7,759
15	$0	24,426	$7,134	$252	$8,549	$4,282	$9,073	$2,076	$9,835
16	$0	24,304	$7,348	$250	$8,506	$3,626	$9,729	$2,248	$12,083
17	$0	24,182	$7,568	$249	$8,464	$2,923	$10,433	$2,427	$14,510
18	$0	24,061	$7,795	$248	$8,421	$2,169	$11,187	$2,613	$17,123
19	$0	23,941	$8,029	$247	$8,379	$1,360	$11,996	$2,806	$19,930
20	$0	23,821	$8,270	$245	$8,337	$493	$12,863	$3,006	$22,936
21	$0	23,702	$8,518	$244	$8,296	$418	$11,825	$4,327	$27,263
22	$0	23,584	$8,774	$243	$8,254	$286	$9,731	$6,768	$34,031
23	$0	23,466	$9,037	$242	$8,213	$0	$0	$17,008	$51,040
24	$0	23,348	$9,308	$240	$8,172	$0	$0	$17,239	$68,279
25	$0	23,232	$9,587	$239	$8,131	$0	$0	$17,479	$85,758
	Totals:	499,871	$126,728	$4,077	$174,955	$123,560	$143,554	$165,110	$348,465
				Net Present Value (NPV)			**$16,138**		
				Internal Rate of Return (IRR)			**16.4%**		

Project Name: **Public Works Garage**
Location: **Seaside Park, NJ**
Description: **Photovoltaic System - Direct Purchase**

Simple Payback Analysis

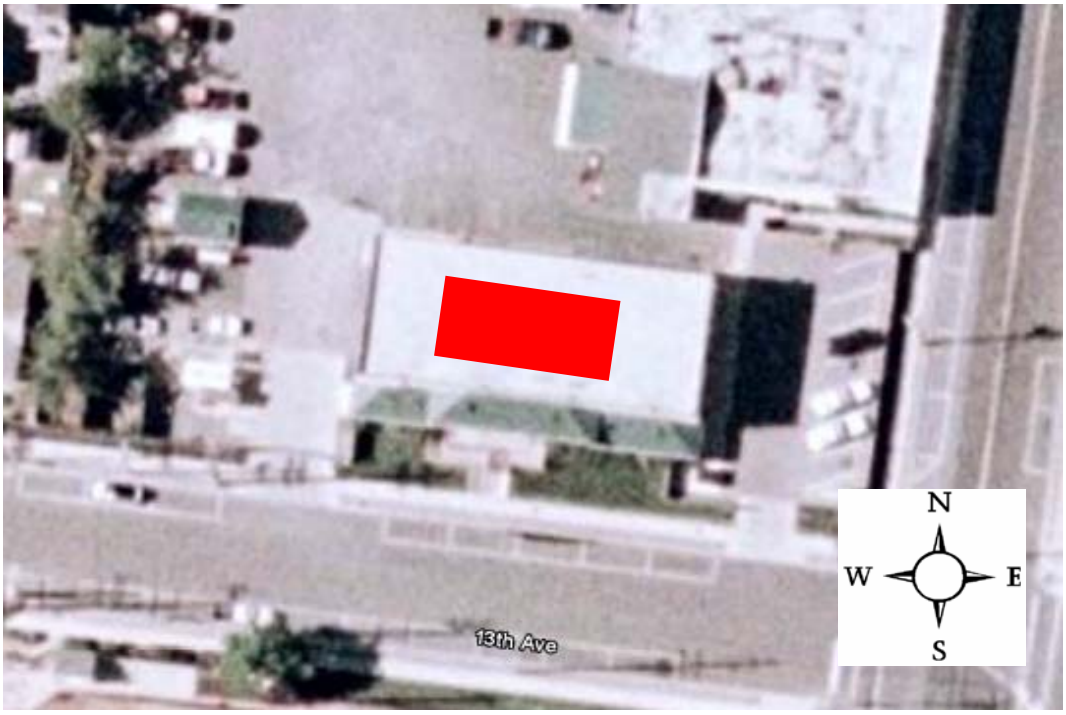
	Photovoltaic System - Direct Purchase
Total Construction Cost	$151,110
Annual kWh Production	26,202
Annual Energy Cost Reduction	$4,716
Annual SREC Revenue	$9,171
First Cost Premium	**$151,110**
Simple Payback:	**10.88** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.180**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/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	$151,110	0	0	0	$0	(151,110)	0
1	$0	26,202	$4,716	$0	$9,171	$13,887	($137,223)
2	$0	26,071	$4,858	$0	$9,125	$13,982	($123,241)
3	$0	25,940	$5,004	$0	$9,079	$14,083	($109,158)
4	$0	25,811	$5,154	$0	$9,034	$14,187	($94,971)
5	$0	25,681	$5,308	$265	$8,989	$14,032	($80,939)
6	$0	25,553	$5,467	$263	$8,944	$14,148	($66,791)
7	$0	25,425	$5,631	$262	$8,899	$14,268	($52,522)
8	$0	25,298	$5,800	$261	$8,854	$14,394	($38,128)
9	$0	25,172	$5,974	$259	$8,810	$14,525	($23,603)
10	$0	25,046	$6,154	$258	$8,766	$14,662	($8,941)
11	$0	24,921	$6,338	$257	$8,722	$14,804	$5,863
12	$0	24,796	$6,528	$255	$8,679	$14,952	$20,814
13	$0	24,672	$6,724	$254	$8,635	$15,105	$35,920
14	$0	24,549	$6,926	$253	$8,592	$15,265	$51,185
15	$0	24,426	$7,134	$252	$8,549	$15,431	$66,616
16	$0	24,304	$7,348	$250	$8,506	$15,604	$82,220
17	$0	24,182	$7,568	$249	$8,464	$15,783	$98,003
18	$0	24,061	$7,795	$248	$8,421	$15,969	$113,972
19	$0	23,941	$8,029	$247	$8,379	$16,162	$130,134
20	$0	23,821	$8,270	$245	$8,337	$16,362	$146,496
21	$1	23,702	$8,518	$244	$8,296	$16,570	$163,066
22	$2	23,584	$8,774	$243	$8,254	$16,785	$179,851
23	$3	23,466	$9,037	$242	$8,213	$17,008	$196,859
24	$4	23,348	$9,308	$240	$8,172	$17,239	$214,098
25	$5	23,232	$9,587	$239	$8,131	$17,479	$231,577
	Totals:	499,871	$126,728	$4,077	$174,955	$382,687	$297,606
				Net Present Value (NPV)		**$231,602**	
				Internal Rate of Return (IRR)		**8.5%**	

Building	Usable Roof Area (sq ft)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW	Total Annual kWh	Panel Weight (33 lbs)	W/SQFT
Public Works Garage	3676	Sunpower SPR230	73	14.7	1,073	16.79	26,202	2,409	15.64



Total Roof Area 43 x 95 = 4085 x .90 = 3676 Sq. Ft.

.= Proposed PV Layout

Notes:

1. Estimated kWH based on 4.68 hours full output per day per 365 day year. Actual kWH will vary day to day.