BERGEN COUNTY
VALLEY BROOK GOLF CLUBHOUSE

15 RIVERVALE ROAD
RIVER VALE, NJ 07675

FACILITY ENERGY REPORT

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I. HISTORIC ENERGY CONSUMPTION/COST

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.

Electric Utility Provider:	Public Service Electric & Gas
Electric Utility Rate Structure:	General Lighting & Power (GLP)
Third Party Supplier:	None

Natural Gas Utility Provider:	Public Service Electric & Gas
Utility Rate Structure:	General Service Gas (GSG)
Third Party Supplier:	None

The electric usage profile represents the actual electrical usage for the facility. 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 within each facility report shows the actual natural gas energy usage for 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.

Table 1
Electricity Billing Data

ELECTRIC USAGE SUMMARY

Utility Provider: PSE&G
Rate: GLP, GLP, N/A
Meter No: 226013151, 778002598, 9195769
Account # 66 463 340 05, 67 228 555 03 , 67 398 298 02
Third Party Utility Provider:
TPS Meter / Acct No:

MONTH OF USE	CONSUMPTION KWH	DEMAND	TOTAL BILL
Mar-10	28,024	71.6	$5,801
Apr-10	23,968	150.3	$4,734
May-10	34,568	197.4	$6,078
Jun-10	51,524	214.5	$10,435
Jul-10	47,404	212.1	$10,025
Aug-10	42,412	200.7	$9,233
Sep-10	47,022	212.5	$10,169
Oct-10	23,428	183.5	$4,724
Nov-10	19,674	86.1	$3,842
Dec-10	19,392	57.3	$3,719
Jan-11	16,274	55.7	$3,331
Feb-11	16,958	49.6	$3,575
Totals	**370,648**	**214.5 Max**	**$75,668**

AVERAGE DEMAND 140.9 KW average
AVERAGE RATE $0.204 $/kWh

Figure 1
Electricity Usage Profile

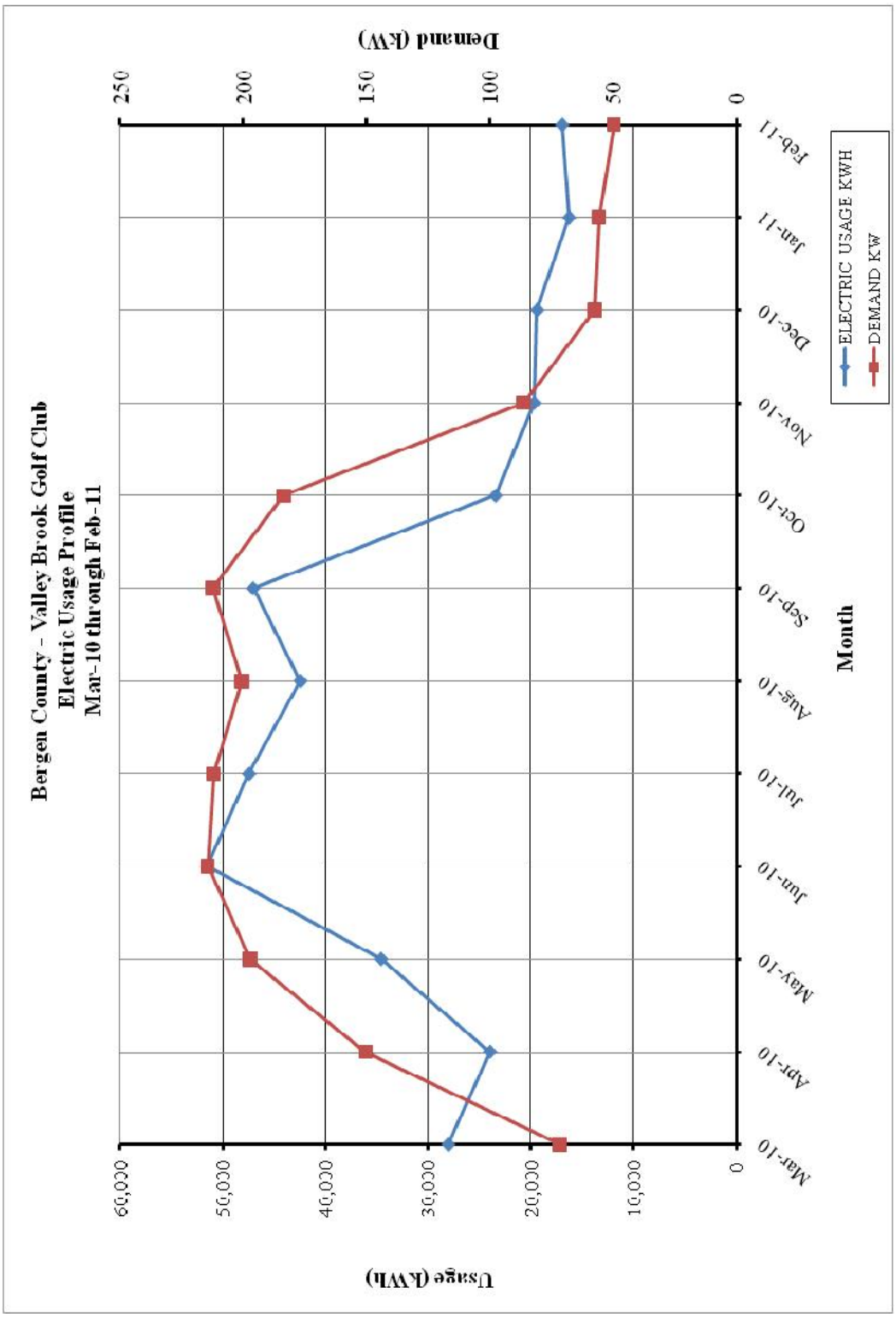
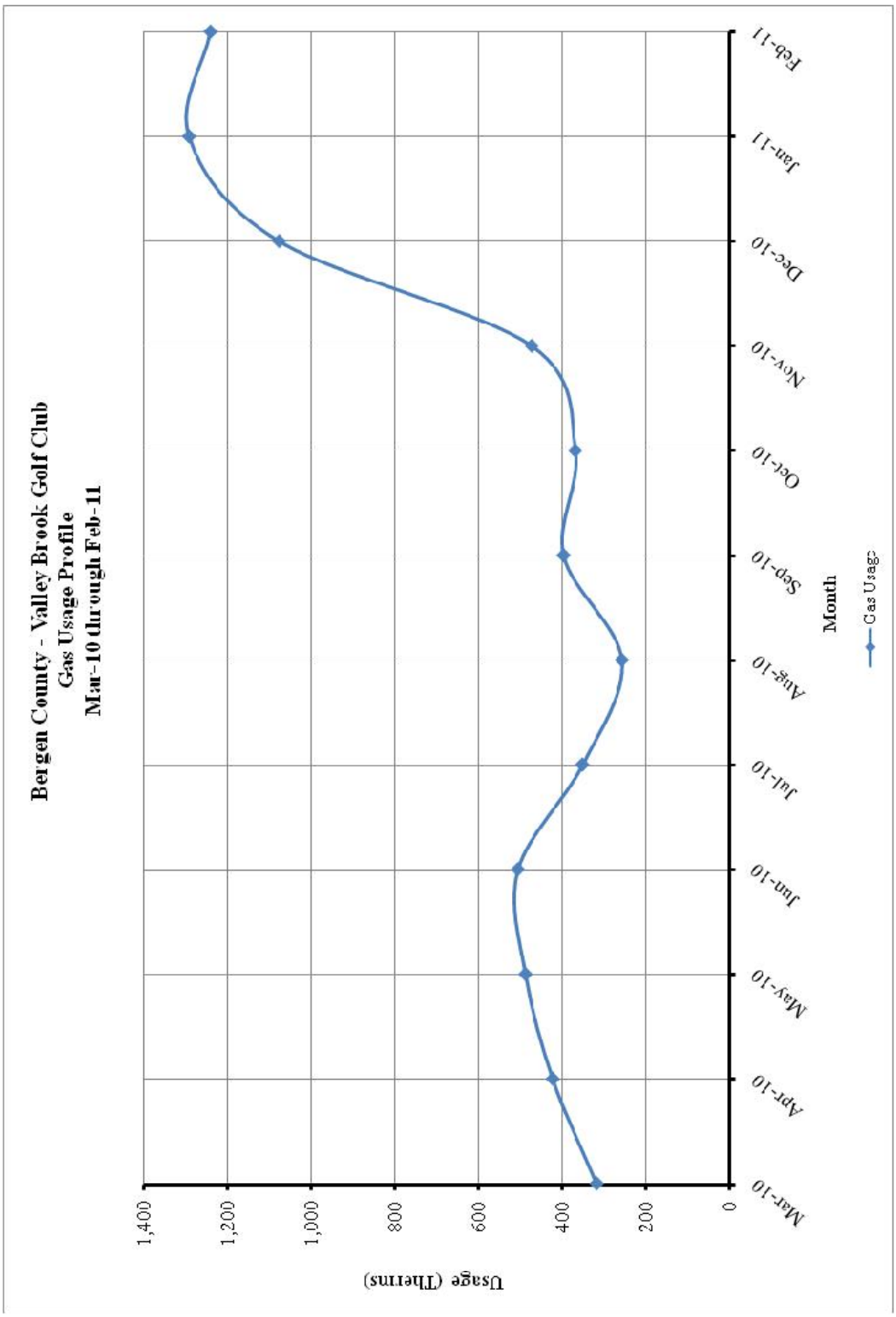


Table 2
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider: PSE&G		
Rate: GSG		
Meter No: 2916971		
Point of Delivery ID: 65 538 526 18		
Third Party Utility Provider: None		
TPS Meter No: -		
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Mar-10	316.26	$343.37
Apr-10	421.34	$409.87
May-10	486.49	$492.57
Jun-10	504.77	$507.25
Jul-10	350.61	$380.03
Aug-10	256.21	$284.59
Sep-10	395.60	$392.01
Oct-10	367.56	$364.70
Nov-10	471.51	$458.66
Dec-10	1,075.62	$1,159.99
Jan-11	1,290.76	$1,431.76
Feb-11	1,239.57	$1,384.40
TOTALS	**7,176.30**	**$7,609.20**
AVERAGE RATE:	**$1.06**	**$/THERM**

Figure 2
Natural Gas Usage Profile



II. FACILITY DESCRIPTION

The 14,639 SF Valley Brook Golf Clubhouse is a single story facility with a partial attic space comprised of office areas, pro shop, snack bar, restrooms, a full kitchen and a catering hall with 150 seating capacity. The facility operates seven (7) days per week between the hours of 7 AM and 8 PM in the summer and 7 AM and 5:30 PM in winter.

The facility has wood frame walls with insulation and wood shingle siding. The windows throughout the facility are in good condition and appear to be well maintained. Typical windows throughout the facility are double pane, ¼" glass with aluminum frames.

The roof of this building is covered with standing seam metal roof system. The majority of the Air Handling Units are located below the roof in the attic. The building was built in 1995 and went through a major in 2005.

HVAC Systems

Heating and air conditioning for the spaces in the Valley Brook Golf Clubhouse is provided with four (4) 5-Ton Carrier split air conditioning systems and one (1) packaged heating and air conditioning system.

Three (3) of the four (4) split condensing units were installed approximately 11 years ago and coupled with Carrier air handling units. The air handling units have direct expansion cooling coils for cooling and standard efficiency gas fired hot air furnaces for heating. The fourth split unit was installed four (4) years ago and it is coupled with a Goodman air handling unit, which is equipped with a high efficiency condensing furnace. All of the split systems are within ASHRAE service life of 15 years and appear to be in good conditioned. The units provide heating and air conditioning to the catering hall through ductwork to ceiling diffusers.

The packaged central heating and air conditioning system was made by Carrier and installed approximately 8 years ago. The unit has 12.5 Ton cooling capacity and 200 MBH heating capacity. The unit feeds the men's and lady's rooms as well as the lobby area.

Exhaust System

Air is exhausted from the toilet rooms and locker area through the roof exhausters. The kitchen includes an 8ft x 12ft commercial exhaust hood, which provides exhaust for cooking equipment. The kitchen hood is manually controlled with a wall switch. The exhaust hood runs occasionally for catered events.

HVAC System Controls

Each air conditioning units is controlled separately with a programmable digital thermostat in a locked box. There are two thermostats for the catering hall and three other thermostats are located in the lobby and the hallways.

Domestic Hot Water

Domestic hot water is provided to the facility by two domestic hot water heaters made by Rheem. The domestic hot water heaters appear to be recently replaced and in excellent condition.

Lighting

Majority of the lighting throughout building is provided with recessed fixtures with incandescent and compact fluorescent flood lamps. Kitchen and storage rooms are lit with recessed tube lay-in fixtures with fluorescent T8 lamps. Exterior lighting is provided with HID lamps in wall packs. Exterior lighting is controlled with a mechanical time clock.

III. MAJOR EQUIPMENT LIST

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

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

IV. ENERGY CONSERVATION MEASURES

Energy Conservation Measures are developed specifically for this facility. The energy savings and calculations are highly dependent on the information received from the site survey and interviews with operations personnel. The assumptions and calculations should be reviewed by the owner to ensure accurate representation of this facility. The following ECMs were analyzed:

Table 3
ECM Financial Summary

ENERGY CONSERVATION MEASURES (ECM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST[A]**	**ANNUAL SAVINGS[B]**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
ECM #1	Lighting Equipment Upgrade	$2,983	$5,767	0.5	2800.0%
ECM #2	Lighting Controls Upgrade	$7,985	$1,765	4.5	231.6%
ECM #3	AC Unit Upgrade	$53,798	$2,920	18.4	-18.6%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST**	**ANNUAL SAVINGS**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
REM #1	Solar Photovoltaic System	$1,521,450	$114,413	13.3	12.8%

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

Table 4
ECM Energy Summary

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
ECM #1	Lighting Equipment Upgrade	9.2	28,271	0
ECM #2	Lighting Controls Upgrade	0	8,653	0
ECM #3	AC Unit Upgrade	10.7	17,695	0
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
REM #1	Solar Photovoltaic System	169.1	206,521	0

Table 5
Facility Project Summary

ENERGY SAVINGS IMPROVEMENT PROGRAM - POTENTIAL PROJECT					
ENERGY CONSERVATION MEASURES	**ANNUAL ENERGY SAVINGS ($)**	**PROJECT COST ($)**	**SMART START INCENTIVES**	**CUSTOMER COST**	**SIMPLE PAYBACK**
Lighting Equipment Upgrade	$5,767	$2,983	$0	$2,983	0.5
Lighting Controls Upgrade	$1,765	$8,650	$665	$7,985	4.5
AC Unit Upgrade	$2,920	$56,625	$2,828	$53,798	18.4
Design / Construction Extras (15%)		*$10,239*		*$10,239*	
Total Project	**$10,452**	**$78,497**	**$0**	**$75,004**	**7.2**

Design / Construction Extras is shown as an additional cost for the facility project summary. This cost is included to estimate the costs associated with construction management fees for a larger combined project.

ECM #1: Lighting Upgrade – Interior Spaces

Description:

The majority of the interior lighting throughout Valley Brook Golf Clubhouse is provided with recessed fixtures with incandescent flood lamps and fluorescent fixtures with older generation 700 series 32W T8 lamps and electronic ballasts.

The ECM includes replacement of any incandescent lamps with compact fluorescent lamps. Compact fluorescent lamps (CFL's) were designed to be direct replacements for the standard incandescent lamps which are common to table lamps, spot lights, hi-hats, bathroom vanity lighting, etc. The light output of the CFL has been designed to resemble the incandescent lamp. The color rendering index (CRI) of the CFL is much higher than standard fluorescent lighting, and therefore provides a much "truer" light. The CFL is available in a myriad of shapes and sizes depending on the specific application. Typical replacements are: a 13-Watt CFL for a 60-Watt incandescent lamp, an 18-Watt CFL for a 75-Watt incandescent lamp, and a 26-Watt CFL for a 100-Watt incandescent lamp. The CFL is also available for a number of "brightness colors" that is indicated by the Kelvin rating. A 2700K CFL is the "warmest" color available and is closest in color to the incandescent lamp. CFL's are also available in 3000K, 3500K, and 4100K. The 4100K would be the "brightest" or "coolest" output. A CFL can be chosen to screw right into your existing fixtures, or hardwired into your existing fixtures. Where the existing fixture is controlled by a dimmer switch, the CFL bulb must be compatible with a dimmer switch. In some locations the bulb replacement will need to be tested to make sure the larger base of the CFL will fit into the existing fixture. The energy usage of an incandescent compared to a compact fluorescent approximately 3 to 4 times greater. In addition to the energy savings, compact fluorescent fixtures burn-hours are 8 to 15 times longer than incandescent fixtures ranging from 6,000 to 15,000 burn-hours compared to incandescent fixtures ranging from 750 to 1000 burn-hours. However, the maintenance savings due to reduced lamp replacement is offset by the higher cost of the CFL's compared to the incandescent lamps.

This ECM also includes re-lamping of all of the fluorescent fixtures with 28W T8 lamps. Although 32W T8 lamps are considered fairly efficient, further energy savings can be achieved by replacing the existing T8 lamps with new generation, 800 series 28W T8 lamps without compromising light output. In addition, some of the storage areas, locker room and gym areas, offices, auditorium, classrooms, restrooms and kitchen areas still have a variety of older fluorescent fixtures with magnetic ballasts and incandescent lamps. It is recommended to retrofit or replace all of the older fluorescent fixtures and the incandescent lights in these areas with high efficiency fluorescent T8 fixtures with electronic ballasts or compact fluorescent lamps. The new, energy efficient T8 fixtures will provide adequate lighting and will save on electrical costs due to better performance of the lamp and ballasts.

Energy Savings Calculations:

The **Investment Grade Lighting Audit Appendix** outlines the hours of operation, proposed retrofits, costs, savings, and payback periods for each set of fixtures in the each building.

Rebates and Incentives:

There are no incentives or maintenance savings available for the retrofits in this ECM.

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$2,983
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$2,983
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$5,767
Total Yearly Savings ($/Yr):	$5,767
Estimated ECM Lifetime (Yr):	15
Simple Payback	0.5
Simple Lifetime ROI	2800.0%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$86,508
Internal Rate of Return (IRR)	193%
Net Present Value (NPV)	$65,865.24

ECM #2: Lighting Controls Upgrade – Occupancy Sensors

Description:

Some of the lights in the Clubhouse building are 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 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 expected to be 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.

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:

- Occupancy Sensors for Lighting Control 20% - 28% energy savings.

Savings resulting from the implementation of this ECM for energy management controls are estimated to be 20% of the total light energy controlled by occupancy sensors and daylight sensors (The majority of the savings is expected to be after school hours when rooms are left with lights on)

This ECM includes installation of ceiling or switch mount sensors for individual offices, classrooms, large bathrooms, and libraries. Sensors shall be manufactured by Sensorswitch, Watt Stopper or equivalent. The **Investment Grade Lighting Audit Appendix** of this report includes the summary of lighting controls implemented in this ECM and outlines the proposed controls, costs, savings, and payback periods. The calculations adjust the lighting power usage by the applicable percent savings for each area that includes lighting controls.

Energy Savings Calculations:

$$\text{Energy Savings} = (\%\ \text{Savings} \times \text{Controlled Light Energy}\ (\text{kWh/Yr}))$$

$$\text{Savings.} = \text{Energy Savings}\,(\text{kWh}) \times \text{Ave Elec Cost}\left(\frac{\$}{\text{kWh}}\right)$$

Cost and Incentives:

Installation cost per dual-technology sensors (Basis: Sensor switch or equivalent) are as follows:

Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mount	$500 per installation
Dual Technology Occupancy Sensor - Remote Mount	$450 per installation

Cost includes material and labor.

From the **NJ Smart Start® Program Incentives Appendix**, the installation of a lighting control device warrants the following incentive:

Occupancy Sensor Fixture Mounted (existing facility only) = $20 per sensor
Occupancy Sensor Remote Mounted (existing facility only) = $35 per sensor

$$\text{SmartStart® Incentive} = (\#\text{ of wall mount} \times \$20) + (\#\text{of ceiling mount} \times \$35)$$
$$\text{SmartStart® Incentive} = (0\text{ wall mount} \times \$20) + (19\text{ ceiling mount} \times \$35) = \$665$$

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$8,650
NJ Smart Start Equipment Incentive ($):	$665
Net Installation Cost ($):	$7,985
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,765
Total Yearly Savings ($/Yr):	$1,765
Estimated ECM Lifetime (Yr):	15
Simple Payback	4.5
Simple Lifetime ROI	231.6%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$26,477
Internal Rate of Return (IRR)	21%
Net Present Value (NPV)	$13,086.77

ECM #3: Air Conditioning Unit Upgrades

Description:

Valley Brook Golf Clubhouse is air conditioned with multiple split system AC units and a packaged AC unit. The units currently installed are standard efficiency units and they can be replaced with new high efficiency units for energy savings. New air conditioners provide higher full load and part load efficiencies due to advances in inverter motor technologies, heat exchangers and refrigerants.

This ECM includes one-for-one replacement of the older air conditioning units with new higher efficiency systems. It is recommended to fully evaluate the capacity needed for all new systems prior to moving forward with this ECM. A summary of the unit replacements for this ECM can be found in the table below:

IMPLEMENTATION SUMMARY					
ECM INPUTS	**SERVICE FOR**	**NUMBER OF UNITS**	**COOLING CAPACITY, BTU/HR**	**TOTAL CAPACITY, TONS**	**REPLACE UNIT WITH**
Carrier Split AC Units - 38CK	AHU	3	60,000	15.0	Rheem 060JEC Cond. Unit R410 coil retrofit
Carrier Split AC Units - 561G	AHU	1	60,000	5.0	
Carrier Packaged AC Unit	AHU	1	150,000	12.5	Rheem RKNL-B High Efc. Packaged AC Unit
Total		**5**	**270,000**	**32.5**	

The manufacturer used for the design basis is Rheem. This ECM includes replacement of the outdoor condensing units and associated indoor air handling units or cooling coils where appropriate. All units are one for one style replacements with matching capacity of the new units to the old units.

Energy Savings Calculations:

Cooling Energy Savings:

Seasonal energy consumption of the air conditioners at the cooling mode is calculated with the equation below:

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

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

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

ENERGY SAVINGS CALCULATIONS							
ECM INPUTS	**COOLING CAPACITY, BTU/Hr**	**ANNUAL COOLING HOURS**	**EXISTING UNITS (S)EER**	**SPLIT UNITS (S)EER**	**# OF UNITS**	**ENERGY SAVINGS kWh**	**DEMAND SAVINGS kW**
Carrier Split AC Units - 38CK	60,000	1,800	10 SEER	15 SEER	3	10,800	6.0
Carrier Split AC Units - 561G	60,000	1,800	10 SEER	15 SEER	1	3,600	2.0
Carrier Packaged AC Unit	150,000	1,200	9.5 EER	11.5 EER	1	3,295	2.7
Total					5	17,695	10.7

Project Cost, Incentives and Maintenance Savings

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

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

SPLIT SYSTEM AC UNITS REBATE SUMMARY				
UNIT DESCRIPTION	**UNIT EFFICIENCY**	**REBATE $/TON**	**PROPOSED CAPACITY TONS**	**TOTAL REBATE $**
≥20 to 30 tons	10.5 EER	79	0	$0
≥ 11.25 to < 20 tons	11.5 EER	79	12.5	$988
≥ 5.4 to < 11.25 tons	11.5 EER	73	0.0	$0
5.4 tons or less Unitary AC and Split System	≥14 SEER	$92	20.0	$1,840
TOTAL			**32.5**	**$2,828**

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

COST & SAVINGS SUMMARY							
ECM INPUTS	**INSTALLED COST**	**# OF UNITS**	**TOTAL COST**	**REBATES**	**NET COST**	**ENERGY SAVING**	**PAY BACK YEARS**
Carrier Split AC Units - 38CK	$9,000	3	$27,000	$1,380	$25,620	$1,782	14.4
Carrier Split AC Units - 561G	$9,000	1	$9,000	$460	$8,540	$594	14.4
Carrier Packaged AC Unit	$20,625	1	$20,625	$988	$19,638	$544	36.1
Total		5	$56,625	$2,828	$53,798	$2,920	18.4

There is no significant maintenance savings due to implementation of this ECM.

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$56,625
NJ Smart Start Equipment Incentive ($):	$2,828
Net Installation Cost ($):	$53,798
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$2,920
Total Yearly Savings ($/Yr):	$2,920
Estimated ECM Lifetime (Yr):	15
Simple Payback	18.4
Simple Lifetime ROI	-18.6%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$43,796
Internal Rate of Return (IRR)	-2%
Net Present Value (NPV)	($18,942.23)

REM #1: 169 kW Solar Photovoltaic System

Description:

The Valley Brook Golf Clubhouse has approximately 12,000 square-foot of available parking lot space that can accommodate a 169 kilowatt parking lot canopy mounted solar array.

The array will produce approximately 206,500 kilowatt-hours annually, which will reduce the overall electric usage of the facility by 55.7%.

Energy Savings Calculations:

See **Renewable / Distributed Energy Measures Calculations Appendix** for detailed financial summary and proposed solar layout areas.

Energy Savings Summary:

REM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$1,521,450
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$1,521,450
Maintenance Savings ($/Yr):	$72,282
Energy Savings ($/Yr):	$42,130
Total Yearly Savings ($/Yr):	$114,413
Estimated ECM Lifetime (Yr):	15
Simple Payback	13.3
Simple Lifetime ROI	12.8%
Simple Lifetime Maintenance Savings	$1,084,235
Simple Lifetime Savings	$1,716,190
Internal Rate of Return (IRR)	2%
Net Present Value (NPV)	($155,599.40)

V. 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. Turn off computers when not in use. Ensure computers are not running in screen saver mode which saves the monitor screen not energy.

F. Ensure outside air dampers are functioning properly and only open during occupied mode.

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Bergen County - Valley Brook Golf Clubhouse

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 ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
ECM #1	Lighting Equipment Upgrade	$2,983	$0	$0	$2,983	$5,767	$0	$5,767	15	$86,508	$0	2800.0%	0.5	193.33%	$65,865.24
ECM #2	Lighting Controls Upgrade	$8,650	$0	$665	$7,985	$1,765	$0	$1,765	15	$26,477	$0	231.6%	4.5	20.81%	$13,086.77
ECM #3	AC Unit Upgrade	$35,625	$21,000	$2,828	$53,798	$2,920	$0	$2,920	15	$43,796	$0	-18.6%	18.4	-2.47%	($18,942.23)
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	Solar Photovoltaic System	$1,521,450	$0	$0	$1,521,450	$42,130	$72,282	$114,413	15	$1,716,190	$1,084,235	12.8%	13.3	1.54%	($155,599.40)

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

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SmartStart Building Incentives

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

Electric Chillers

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

Energy Efficiency must comply with ASHRAE 90.1-2004

Gas Cooling

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

Desiccant Systems

$1.00 per cfm – gas or electric

Electric Unitary HVAC

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

Energy Efficiency must comply with ASHRAE 90.1-2004

Ground Source Heat Pumps

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

Energy Efficiency must comply with ASHRAE 90.1-2004

Gas Heating

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

Variable Frequency Drives

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

Natural Gas Water Heating

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

Prescriptive Lighting

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

Lighting Controls – Occupancy Sensors

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

Lighting Controls – HID or Fluorescent Hi-Bay Controls

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

Premium Motors

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

Other Equipment Incentives

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

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Valley Brook Golf Clubhouse

Building ID: 2715672
For 12-month Period Ending: January 31, 2011[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: May 16, 2011

Facility
Valley Brook Golf Clubhouse
15 Rivervale Road
River Vale, NJ 07675

Facility Owner
County of Bergen
One Bergen Plaza
Hackensack, NJ 07601

Primary Contact for this Facility
Thomas Connolly
One Bergen Plaza
Hackensack, NJ 07601

Year Built: 1995
Gross Floor Area (ft²): 14,639

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

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	1,307,547
Natural Gas (kBtu)[4]	657,488
Total Energy (kBtu)	1,965,035

Energy Intensity[5]

Site (kBtu/ft²/yr)	134
Source (kBtu/ft²/yr)	345

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	220

Electric Distribution Utility
Public Service Electric & Gas Co

National Average Comparison

National Average Site EUI	65
National Average Source EUI	136
% Difference from National Average Source EUI	154%
Building Type	Recreation

Stamp of Certifying Professional

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

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

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

Certifying Professional
Michael Fischette
520 S. Burnt Mill Rd.
Voorhees, NJ 08043

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

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Valley Brook Golf Clubhouse	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Recreation	Is this an accurate description of the space in question?		☐
Location	15 Rivervale Road , River Vale, NJ 07675	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		☐
Clubhouse (Other)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	14,639 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	5(Optional)	Is this the number of personal computers in the space?		☐
Weekly operating hours	84Hours(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	5(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: Public Service Electric & Gas Co

Fuel Type: Electricity

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

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
12/26/2010	01/25/2011	16,274.00
11/26/2010	12/25/2010	19,392.00
10/26/2010	11/25/2010	19,674.00
09/26/2010	10/25/2010	23,428.00
08/26/2010	09/25/2010	47,022.00
07/26/2010	08/25/2010	42,412.00
06/26/2010	07/25/2010	47,404.00
05/26/2010	06/25/2010	51,524.00
04/26/2010	05/25/2010	34,568.00
03/26/2010	04/25/2010	23,968.00
02/26/2010	03/25/2010	28,024.00
Electricity Consumption (kWh (thousand Watt-hours))		**353,690.00**
Electricity Consumption (kBtu (thousand Btu))		**1,206,790.28**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**1,206,790.28**
Is this the total Electricity (Grid Purchase) 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)
12/26/2010	01/26/2011	1,290.76
11/26/2010	12/25/2010	1,075.62
10/26/2010	11/25/2010	471.51
09/26/2010	10/25/2010	367.56
08/26/2010	09/25/2010	395.60
07/26/2010	08/25/2010	256.21
06/26/2010	07/25/2010	350.61
05/26/2010	06/25/2010	504.77
04/26/2010	05/25/2010	486.49
03/26/2010	04/25/2010	421.34
02/26/2010	03/25/2010	316.26

Gas Consumption (therms)	**5,936.73**
Gas Consumption (kBtu (thousand Btu))	**593,673.00**
Total Natural Gas Consumption (kBtu (thousand Btu))	**593,673.00**
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 PE or RA that signed and stamped the SEP.)

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
Valley Brook Golf Clubhouse
15 Rivervale Road
River Vale, NJ 07675

Facility Owner
County of Bergen
One Bergen Plaza
Hackensack, NJ 07601

Primary Contact for this Facility
Thomas Connolly
One Bergen Plaza
Hackensack, NJ 07601

General Information

Valley Brook Golf Clubhouse	
Gross Floor Area Excluding Parking: (ft^2)	14,639
Year Built	1995
For 12-month Evaluation Period Ending Date:	January 31, 2011

Facility Space Use Summary

Clubhouse	
Space Type	Other - Recreation
Gross Floor Area(ft^2)	14,639
Number of PCs[o]	5
Weekly operating hours[o]	84
Workers on Main Shift[o]	5

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 01/31/2011)	**Baseline** (Ending Date 01/31/2011)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	N/A	N/A	75	N/A	N/A
Energy Intensity					
Site (kBtu/ft^2)	134	134	0	N/A	65
Source (kBtu/ft^2)	345	345	0	N/A	136
Energy Cost					
$/year	N/A	N/A	N/A	N/A	N/A
$/$ft^2$/year	N/A	N/A	N/A	N/A	N/A
Greenhouse Gas Emissions					
$MtCO_2e$/year	220	220	0	N/A	107
$kgCO_2e/ft^2$/year	15	15	0	N/A	7

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

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Bergen County - Valley Brook Golf Clubhouse

Packaged AC Units

Tag	-		
Unit Type	Packaged AC Unit		
Qty	1		
Location	Ground		
Area Served	Locker area		
Manufacturer	Carrier		
Model #	48TME014---501--		
Serial #	0303G50448		
Cooling Type	Direct expansion		
Cooling Capacity (Tons)	12.5		
Cooling Efficiency (SEER/EER)	9.5 EER, 9.7 IPLV		
Heating Type	Natural Gas		
Heating Input (MBH)	250 MBH		
Heating Output (MBH)	160 - 200 MBH		
Fuel	Natural Gas		
Approx Age	8		
ASHRAE Service Life	15	15	15
Remaining Life			
Comments			

MAJOR EQUIPMENT LIST

Concord Engineering Group

Bergen County - Valley Brook Golf Clubhouse

Split AC Units

Tag	-	-	-
Unit Type	Split AC Unit	Split AC Unit	Split AC
Qty	2	1	1
Location	Ground	Ground	Ground
Area Served	AHU	AHU	AHU
Manufacturer	Carrier	Carrier	Carrier
Condensing Unit Model / Serial #	38CKC060---521--1999E14342, 3199E18670	38CKC060---521--0700E23827	561GP060-L / 2807X78966
Air Handler Model / Serial #	-	-	0601708846 / GMS951155DXA
Cooling Capacity (Tons)	5	5	5
Cooling Efficiency (SEER/EER)	10 SEER	10 SEER	9 EER
Heating Type	AHU with Natural Gas Burner	AHU with Natural Gas Burner	AHU with Natural Gas Burner
Heating Input (MBH)	-	-	-
Efficiency	Standard	Standard	High
Approx Age	12	11	4
ASHRAE Service Life	15	15	15
Remaining Life	3	4	11
Comments			

MAJOR EQUIPMENT LIST

Concord Engineering Group

Bergen County - Valley Brook Golf Clubhouse

Domestic Water Heaters

Tag	HWH 1 & 2		
Unit Type	Hot water heater / tank		
Qty	2		
Location	Mechanical Room		
Area Served	Lavatories, showers, kitchen		
Manufacturer	Rheem / Ruud		
Model #	G82-156		
Serial #	URNG0708G00885, URNG0508G01057		
Size (Gallons)	82		
Input Capacity (MBH/KW)	156 MBH		
Recovery (Gal/Hr)	142		
Efficiency %	80%		
Fuel	Natural Gas		
Approx Age	3		
ASHRAE Service Life	12		
Remaining Life	9		
Comments			

Investment Grade Lighting Audit

CEG Job #: 9C10085

Project: Bergen County - Valley Brook Golf Clubhouse
15 Rivervale Road
River Vale, NJ 07675

Bldg. Sq. Ft. 14,639

Bergen County - Valley Brook Golf Clubhouse

KWH COST: $0.204

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
612.1	Attic	500	1	1	Pendant Mnt., 75w A19 Lamp	75	0.08	37.5	$7.65	1	1	(1) 18w CFL Lamp	18	0.02	9	$1.84	$20.00	$20.00	0.06	28.5	$5.81	3.44
555	Attic	500	4	1	Recessed Down Light, 65w BR30 Lamp	65	0.26	130.0	$26.52	4	1	18w CFL Flood Lamp	18	0.07	36	$7.34	$20.00	$80.00	0.19	94	$19.18	4.17
221.14	Electrical Room	500	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.12	58.0	$11.83	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
128.11	Kitchen	2000	4	2	8' Channel, 2 Lamp, 96w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	209	0.84	1,672.0	$341.09	4	4	(2) 8' Lamps to (4) 4' Lamps - FO28, T8, Elect Ballast; retrofit	98	0.39	784	$159.94	$100.00	$400.00	0.44	888	$181.15	2.21
228.11	Golf Cart Garage	3500	15	2	8' Channel, 2 Lamp, 59w T8, Elc. Ballast, Surface Mnt., Prismatic Lens	124.2	1.86	6,520.5	$1,330.18	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
555	Bar Area	3500	7	1	Recessed Down Light, 65w BR30 Lamp	65	0.46	1,592.5	$324.87	7	1	18w CFL Flood Lamp	18	0.13	441	$89.96	$20.00	$140.00	0.33	1151.5	$234.91	0.60
555	Seating Area	3500	15	1	Recessed Down Light, 65w BR30 Lamp	65	0.98	3,412.5	$696.15	15	1	18w CFL Flood Lamp	18	0.27	945	$192.78	$20.00	$300.00	0.71	2467.5	$503.37	0.60
556	Bathroom	3500	10	1	Recessed Down Light, 120w PAR Flood	120	1.20	4,200.0	$856.80	10	1	26w CFL Flood Lamp	26	0.26	910	$185.64	$20.00	$200.00	0.94	3290	$671.16	0.30
555	Men's room	3500	4	1	Recessed Down Light, 65w BR30 Lamp	65	0.26	910.0	$185.64	4	1	18w CFL Flood Lamp	18	0.07	252	$51.41	$20.00	$80.00	0.19	658	$134.23	0.60
211.11	Men's room	3500	4	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.13	462.0	$94.25	4	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.10	350	$71.40	$7.00	$28.00	0.03	112	$22.85	1.23
556	Locker Area	3500	4	1	Recessed Down Light, 120w PAR Flood	120	0.48	1,680.0	$342.72	4	1	26w CFL Flood Lamp	26	0.10	364	$74.26	$20.00	$80.00	0.38	1316	$268.46	0.30
556	Locker Area	3500	7	1	Recessed Down Light, 120w PAR Flood	120	0.84	2,940.0	$599.76	7	1	26w CFL Flood Lamp	26	0.18	637	$129.95	$20.00	$140.00	0.66	2303	$469.81	0.30
228.11	Shower	3500	1	2	8' Channel, 2 Lamp, 59w T8, Elc. Ballast, Surface Mnt., Prismatic Lens	124.2	0.12	434.7	$88.68	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
211.14	Closet	3500	1	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., No Lens	33	0.03	115.5	$23.56	1	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.03	87.5	$17.85	$7.00	$7.00	0.01	28	$5.71	1.23
555	Ladies Room Corridor	3500	5	1	Recessed Down Light, 65w BR30 Lamp	65	0.33	1,137.5	$232.05	5	1	18w CFL Flood Lamp	18	0.09	315	$64.26	$20.00	$100.00	0.24	822.5	$167.79	0.60
221.11	Ladies Room	3500	3	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.19	651.0	$132.80	3	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.15	525	$107.10	$14.00	$42.00	0.04	126	$25.70	1.63
6917	Ladies Room	3500	1	1	52 W Vanity Light A19	100	0.10	350.0	$71.40	1	1	13w CFL Lamp	13	0.01	45.5	$9.28	$10.00	$10.00	0.09	304.5	$62.12	0.16

Investment Grade Lighting Audit

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
557	Banquet Hall	2000	30	1	Recessed Down Light, 75w BR30 Lamp	75	2.25	4,500.0	$918.00	30	1	18w CFL Flood Lamp	18	0.54	1080	$220.32	$20.00	$600.00	1.71	3420	$697.68	0.86
556	Lobby	3500	12	1	Recessed Down Light, 120w PAR Flood	120	1.44	5,040.0	$1,028.16	12	1	26w CFL Flood Lamp	26	0.31	1092	$222.77	$20.00	$240.00	1.13	3948	$805.39	0.30
566	Lobby	3500	5	1	100w Spot light	100	0.50	1,750.0	$357.00	5	1	26w CFL Lamp	26	0.13	455	$92.82	$20.00	$100.00	0.37	1295	$264.18	0.38
567	Display	3500	6	1	120w Flood	120	0.72	2,520.0	$514.08	6	1	26w CFL Lamp	26	0.16	546	$111.38	$20.00	$120.00	0.56	1974	$402.70	0.30
561	Display	3500	17	1	Recessed Down Light, 23w CFL Lamp	23	0.39	1,368.5	$279.17	17	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
567	Reception	3500	12	1	120w Flood	120	1.44	5,040.0	$1,028.16	12	1	26w CFL Lamp	26	0.31	1092	$222.77	$20.00	$240.00	1.13	3948	$805.39	0.30
561	Reception	3500	6	1	Recessed Down Light, 23w CFL Lamp	23	0.14	483.0	$98.53	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Office 1	2000	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	248.0	$50.59	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	200	$40.80	$14.00	$28.00	0.02	48	$9.79	2.86
221.11	Office 2	2000	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	248.0	$50.59	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	200	$40.80	$14.00	$28.00	0.02	48	$9.79	2.86
	Totals		180					47,501	$9,690	180	27			3.5	10,366	$2,115		$2,983	9.2	28,271	$5,767	0.52

CEG Job #:
Project: Bergen County - Valley Brook Golf Clubhouse
Address: 15 Rivervale Road
River Vale, NJ 07675
Building SF: 14,639

Bergen County - Valley Brook Golf Clubhouse

KWH COST: $0.204

ECM #2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
612.1	Attic	500	1	1	Pendant Mnt., 75w A19 Lamp	75	0.08	37.5	$7.65	1	0	No Change	75	0.08	0%	37.5	$7.65	$0	$0.00	0.00	0	$0.00	0.00
555	Attic	500	4	1	Recessed Down Light, 65w BR30 Lamp	65	0.26	130	$26.52	4	0	No Change	65	0.26	0%	130	$26.52	$0	$0.00	0.00	0	$0.00	0.00
221.14	Electrical Room	500	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.12	58	$11.83	2	0	No Change	58	0.12	0%	58	$11.83	$0	$0.00	0.00	0	$0.00	0.00
128.11	Kitchen	2000	4	2	8' Channel, 2 Lamp, 96w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	209	0.84	1672	$341.09	4	0	No Change	209	0.84	0%	1672	$341.09	$0	$0.00	0.00	0	$0.00	0.00
228.11	Golf Cart Garage	3500	15	2	8' Channel, 2 Lamp, 59w T8, Elc. Ballast, Surface Mnt., Prismatic Lens	124.2	1.86	6520.5	$1,330.18	15	2	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	124.2	1.49	20%	5216.4	$1,064.15	$500	$1,000.00	0.37	1304.1	$266.04	3.76
555	Bar Area	3500	7	1	Recessed Down Light, 65w BR30 Lamp	65	0.46	1592.5	$324.87	7	1	Dual Technology Occupancy Sensor - Remote Mnt.	65	0.36	20%	1274	$259.90	$0	$0.00	0.09	318.5	$64.97	0.00
555	Seating Area	3500	15	1	Recessed Down Light, 65w BR30 Lamp	65	0.98	3412.5	$696.15	15	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	65	0.78	20%	2730	$556.92	$500	$500.00	0.20	682.5	$139.23	3.59
556	Bathroom	3500	10	1	Recessed Down Light, 120w PAR Flood	120	1.20	4200	$856.80	10	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	120	0.96	20%	3360	$685.44	$500	$500.00	0.24	840	$171.36	2.92
555	Men's room	3500	4	1	Recessed Down Light, 65w BR30 Lamp	65	0.26	910	$185.64	4	1	Dual Technology Occupancy Sensor - Remote Mnt.	65	0.21	20%	728	$148.51	$450	$450.00	0.05	182	$37.13	12.12
211.11	Men's room	3500	4	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.13	462	$94.25	4	0	No Change	33	0.13	0%	462	$94.25	$0	$0.00	0.00	0	$0.00	0.00
556	Locker Area	3500	4	1	Recessed Down Light, 120w PAR Flood	120	0.48	1680	$342.72	4	1	Dual Technology Occupancy Sensor - Remote Mnt.	120	0.38	20%	1344	$274.18	$450	$450.00	0.10	336	$68.54	6.57
556	Locker Area	3500	7	1	Recessed Down Light, 120w PAR Flood	120	0.84	2940	$599.76	7	1	Dual Technology Occupancy Sensor - Remote Mnt.	120	0.67	20%	2352	$479.81	$450	$450.00	0.17	588	$119.95	3.75
228.11	Shower	3500	1	2	8' Channel, 2 Lamp, 59w T8, Elc. Ballast, Surface Mnt., Prismatic Lens	124.2	0.12	434.7	$88.68	1	0	No Change	124.2	0.12	0%	434.7	$88.68	$0	$0.00	0.00	0	$0.00	0.00
211.14	Closet	3500	1	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., No Lens	33	0.03	115.5	$23.56	1	0	No Change	33	0.03	0%	115.5	$23.56	$0	$0.00	0.00	0	$0.00	0.00
555	Ladies Room Corridor	3500	5	1	Recessed Down Light, 65w BR30 Lamp	65	0.33	1137.5	$232.05	5	1	Dual Technology Occupancy Sensor - Remote Mnt.	65	0.26	20%	910	$185.64	$450	$450.00	0.07	227.5	$46.41	9.70

ECM #2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
221.11	Ladies Room	3500	3	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.19	651	$132.80	3	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.15	20%	520.8	$106.24	$450	$450.00	0.04	130.2	$26.56	16.94
6917	Ladies Room	3500	1	1	52 W Vanity Light A19	100	0.10	350	$71.40	1	0	No Change	100	0.10	0%	350	$71.40	$0	$0.00	0.00	0	$0.00	0.00
557	Banquet Hall	2000	30	1	Recessed Down Light, 75w BR30 Lamp	75	2.25	4500	$918.00	30	3	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	75	1.80	20%	3600	$734.40	$500	$1,500.00	0.45	900	$183.60	8.17
556	Lobby	3500	12	1	Recessed Down Light, 120w PAR Flood	120	1.44	5040	$1,028.16	12	2	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	120	1.15	20%	4032	$822.53	$500	$1,000.00	0.29	1008	$205.63	4.86
566	Lobby	3500	5	1	100w Spot light	100	0.50	1750	$357.00	5	1	Dual Technology Occupancy Sensor - Remote Mnt.	100	0.40	20%	1400	$285.60	$450	$450.00	0.10	350	$71.40	6.30
567	Display	3500	6	1	120w Flood	120	0.72	2520	$514.08	6	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	120	0.58	20%	2016	$411.26	$500	$500.00	0.14	504	$102.82	4.86
561	Display	3500	17	1	Recessed Down Light, 23w CFL Lamp	23	0.39	1368.5	$279.17	17	1	Dual Technology Occupancy Sensor - Remote Mnt.	23	0.31	20%	1094.8	$223.34	$450	$450.00	0.08	273.7	$55.83	8.06
567	Reception	3500	12	1	120w Flood	120	1.44	5040	$1,028.16	12	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	120	1.15	20%	4032	$822.53	$500	$500.00	0.29	1008	$205.63	2.43
#REF!	Reception	3500	6	1	Recessed Down Light, 23w CFL Lamp	23	0.14	483	$98.53	6	0	No Change	23	0.14	0%	483	$98.53	$0	$0.00	0.00	0	$0.00	0.00
#REF!	Office 1	2000	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	248	$50.59	2	0	No Change	62	0.12	0%	248	$50.59	$0	$0.00	0.00	0	$0.00	0.00
#REF!	Office 2	2000	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	248	$50.59	2	0	No Change	62	0.12	0%	248	$50.59	$0	$0.00	0.00	0	$0.00	0.00
	Totals		180	0			15.4	47,501.2	$9,690	180	19			12.7		38,848.7	$7,925.13		$8,650	2.67	8,653	$1,765	4.90

Project Name: LGEA Solar PV Project - Valley Brook Golf Club
Location: River Vale, NJ
Description: Photovoltaic System - Direct Purchase

Simple Payback Analysis

	Photovoltaic System - Direct Purchase
Total Construction Cost	$1,521,450
Annual kWh Production	206,521
Annual Energy Cost Reduction	$42,130
Annual SREC Revenue	$72,282
First Cost Premium	**$1,521,450**
Simple Payback:	**13.30** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.204**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/kWh)	$0.350

Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Net Cash Flow	Cumulative Cash Flow
0	$1,521,450	0	0	0	$0	(1,521,450)	0
1	$0	206,521	$42,130	$0	$72,282	$114,413	($1,407,037)
2	$0	205,488	$43,394	$0	$71,921	$115,315	($1,291,722)
3	$0	204,461	$44,696	$0	$71,561	$116,257	($1,175,465)
4	$0	203,439	$46,037	$0	$71,204	$117,240	($1,058,224)
5	$0	202,421	$47,418	$2,085	$70,848	$116,181	($942,044)
6	$0	201,409	$48,841	$2,075	$70,493	$117,259	($824,785)
7	$0	200,402	$50,306	$2,064	$70,141	$118,382	($706,402)
8	$0	199,400	$51,815	$2,054	$69,790	$119,551	($586,851)
9	$0	198,403	$53,369	$2,044	$69,441	$120,767	($466,084)
10	$0	197,411	$54,970	$2,033	$69,094	$122,031	($344,053)
11	$0	196,424	$56,620	$2,023	$68,748	$123,345	($220,708)
12	$0	195,442	$58,318	$2,013	$68,405	$124,710	($95,998)
13	$0	194,465	$60,068	$2,003	$68,063	$126,127	$30,129
14	$0	193,493	$61,870	$1,993	$67,722	$127,599	$157,728
15	$0	192,525	$63,726	$1,983	$67,384	$129,127	$286,855
16	$0	191,562	$65,638	$1,973	$67,047	$130,711	$417,566
17	$0	190,605	$67,607	$1,963	$66,712	$132,355	$549,922
18	$0	189,652	$69,635	$1,953	$66,378	$134,060	$683,981
19	$0	188,703	$71,724	$1,944	$66,046	$135,827	$819,808
20	$0	187,760	$73,876	$1,934	$65,716	$137,658	$957,465
21	$1	186,821	$76,092	$1,924	$65,387	$139,555	$1,097,021
22	$2	185,887	$78,375	$1,915	$65,060	$141,521	$1,238,541
23	$3	184,958	$80,726	$1,905	$64,735	$143,556	$1,382,097
24	$4	184,033	$83,148	$1,896	$64,411	$145,664	$1,527,761
25	$5	183,113	$85,642	$1,886	$64,089	$147,846	$1,675,606
	Totals:	4,864,799	$1,536,039	$41,662	$1,702,680	$3,197,056	$1,705,107
				Net Present Value (NPV)			**$1,675,631**
				Internal Rate of Return (IRR)			**6.4%**

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
Valley Brook Golf Clubhouse	12,000	Sunpower SPR230	735	14.7	10,808	169.05	206,521	24,255	15.64

.= Proposed PV Layout

Notes:

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

AC Energy & Cost Savings

Cautions for Interpreting the Results

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

Station Identification	
City:	Atlantic_City
State:	New_Jersey
Latitude:	39.45° N
Longitude:	74.57° W
Elevation:	20 m
PV System Specifications	
DC Rating:	169.1 kW
DC to AC Derate Factor:	0.810
AC Rating:	136.9 kW
Array Type:	Fixed Tilt
Array Tilt:	10.0°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	11.2 ¢/kWh

Results			
Month	Solar Radiation (kWh/m^2/day)	AC Energy (kWh)	Energy Value ($)
1	2.58	10981	1229.87
2	3.33	12967	1452.30
3	4.31	18109	2028.21
4	5.20	20628	2310.34
5	5.85	23559	2638.61
6	6.14	22931	2568.27
7	6.06	23165	2594.48
8	5.54	21288	2384.26
9	4.85	18304	2050.05
10	3.76	14946	1673.95
11	2.65	10472	1172.86
12	2.23	9171	1027.15
Year	4.38	206521	23130.35

Output Hourly Performance Data

About the Hourly Performance Data

Output Results as Text

Saving Text from a Browser

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

Please send questions and comments regarding PVWATTS to Webmaster

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