



**I'd put my money on the sun and solar energy.**

**What a source of power!**

**I hope we don't have to wait until oil and coal run out before we tackle that.**



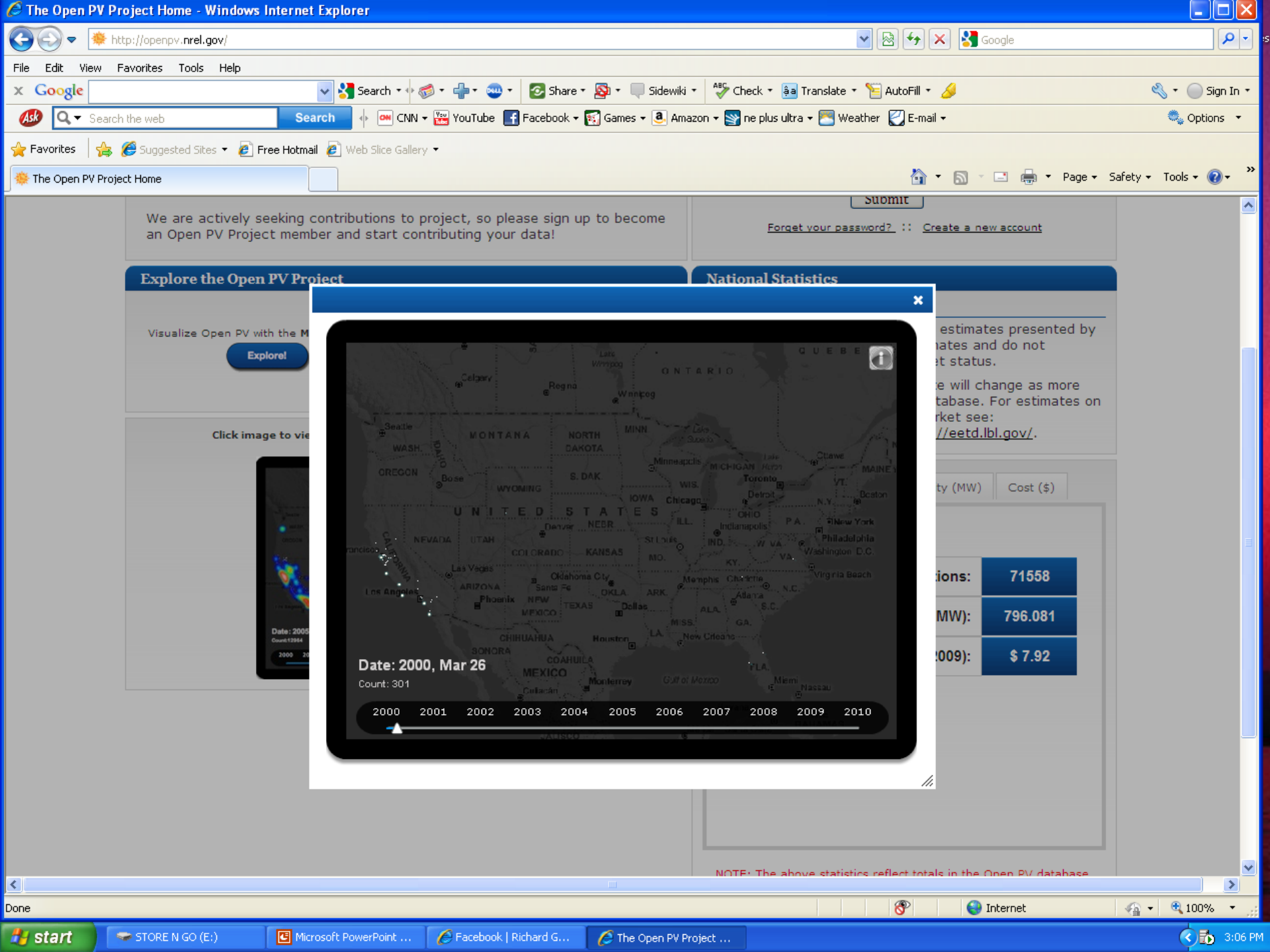
**1931**

**Thomas Alva Edison**

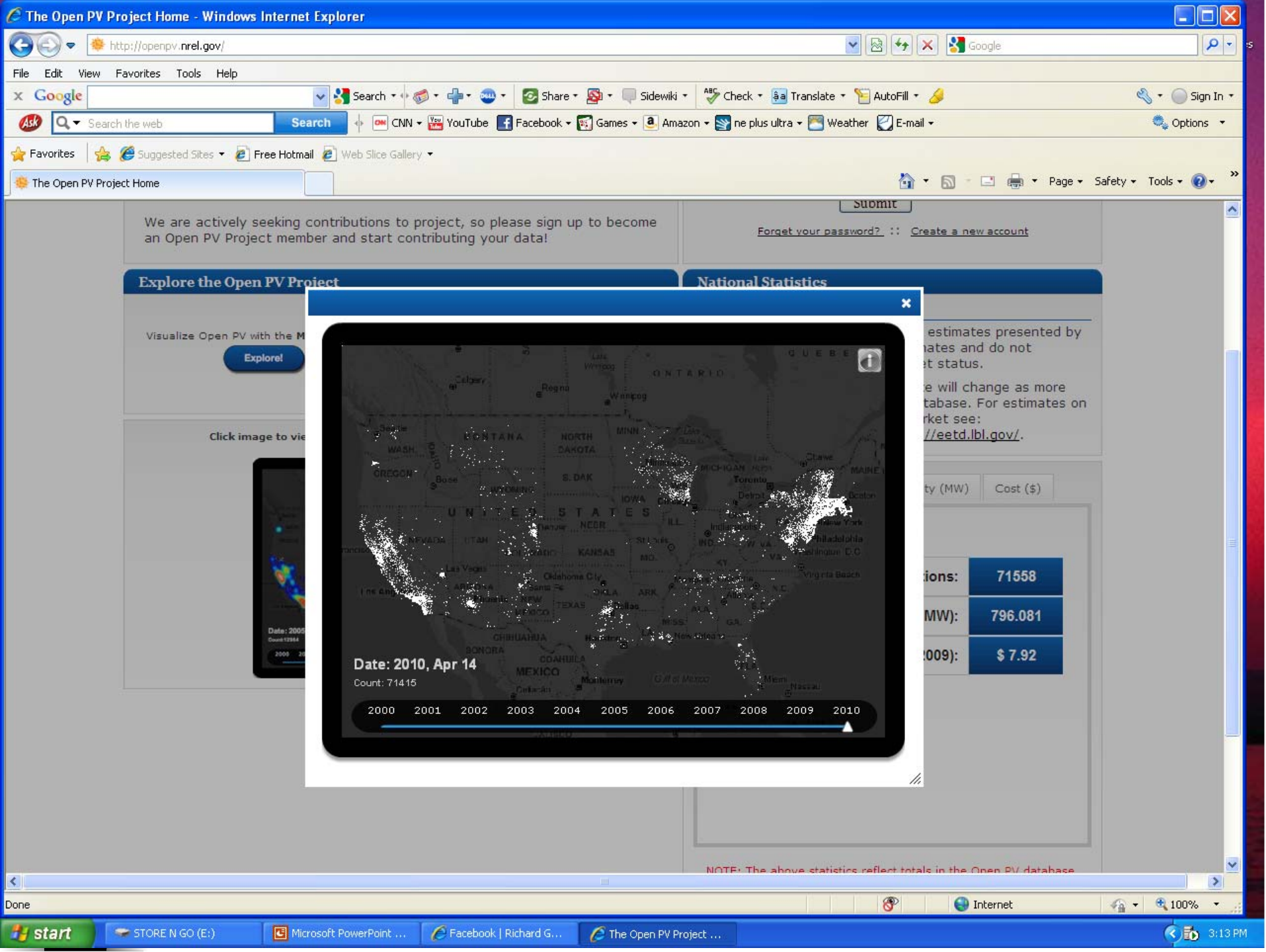
# Solar Services, Inc.



Presented by Richard Good



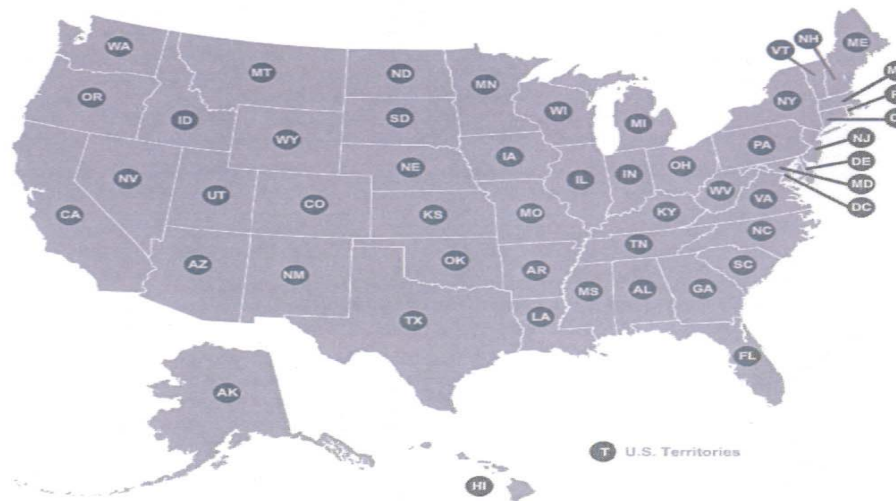




[Home](#)[Glossary](#)[Links](#)[FAQs](#)[Contacts](#)[About Us](#)**DSIRE SOLAR**

DSIRE is a comprehensive source of information on state, local, utility and federal incentives and policies that promote renewable energy and energy efficiency. Established in 1995 and funded by the U.S. Department of Energy, DSIRE is an ongoing project of the N.C. Solar Center and the Interstate Renewable Energy Council.

Choose one or both databases:

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**DSIRE**



# **SOLAR SERVICES, INC.**

## **THE PROFESSIONALS**

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A few words of warning to our prospective customers about contractors.

Many contractors are trying to get into the solar business. There is no licensing requirement for them to obtain an AES (Alternate Energy System) classification, so this is what they obtain, and then they tell you they are qualified to install solar systems.

I have enclosed here some excerpts from the board of contractor regulations for Virginia.

Only someone with an HVA or PLB (Heating/Air Conditioning or Plumbing) can install a solar water heater, obtain the permits and get inspections.

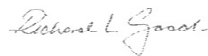
Only someone with ELE (Electrical) can obtain a permit or perform work on any equipment covered by the National Electrical Code. Section 690 of the National Electrical Code deals with solar electric systems.

Do not be fooled by an AES classification. To obtain a permit, they must have one of the listed specialty classifications or they must have a BLD (Building) classification. Having BLD on their license allows them to act as a General Contractor and hire subcontractors with the required specialty licenses.

Please feel free to explore the Virginia Department of Professional and Occupational Regulation. All this info is listed there.

We look forward to serving you. Please feel free to call us with your solar questions.

Sincerely,



Richard L. Good  
Chief Engineer  
Member ICC, NFPA, Master Plumber/Mechanic/Gas Fitter

President, Solar Services Inc.



### **18VAC50-22-30. Definitions of Specialty Services**

“Alternative Energy System contracting” (AES) means that service which provides for the installation, repair or improvement, from the customer’s meter, of alternative energy generation systems, supplemental energy systems and associated equipment annexed to real property. No other classification or specialty services provides this function. This specialty does not provide for electrical, plumbing, gas, fitting, or HVAC functions.

### **18VAC50-22-20 Definitions of License Classifications**

“Electrical Contractors” (ELE) means those individuals whose contracts include the construction, repair, maintenance, alteration, or removal of electrical systems under the National Electrical Code. This classification provides for all work covered by the National Electrical Code including electrical work covered by the alarm/security systems contracting (ALS), electronic/communication service contracting (ESC) and fire alarm systems contracting (FAS) specialties. A firm holding an electrical license is responsible for meeting all applicable tradesman licensing standards.

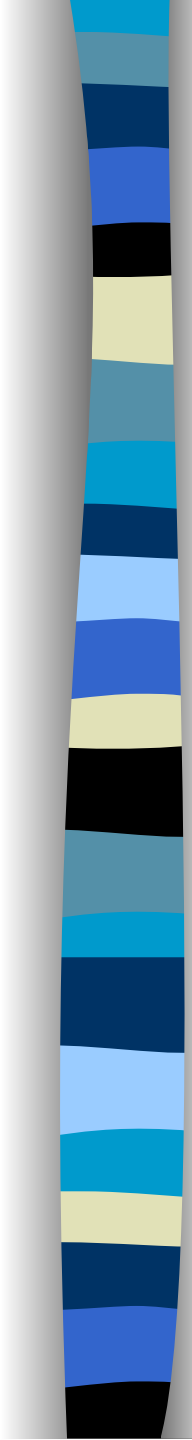
These contractors also install, maintain, or dismantle the following:

- Power systems for the generation and primary and secondary distribution of electric current ahead of the customer’ meter
- Pumping Stations and treatment plants
- Telephone, telegraph, or signal, systems for public utilities
- Water, gas, and sewer connections to residential, commercial, and industrial sites, subject to local ordinances.

“HVAC contractors” (HVA) means those individuals whose work includes the installation, alteration, repair, or maintenance of heating systems, ventilating systems, cooling systems, steam and hot water heaters, heating systems, boilers, process piping, and mechanical refrigeration systems, including tanks incidental to the system. This classification does not provide for fire suppression installations, sprinkler system installations, or gas piping. A firm holding a HVAC license is responsible for meeting all applicable tradesmen licensure standards. This classification may install backflow prevention devices incidental to work in this classification.

“Plumbing contractors” (PLB) means those individuals whose contracts include the installation, maintenance, extension, or alteration, or removal of all piping, fixtures, appliances, and appurtenances in connection with any of the following:

- Backflow prevention devices
- Boilers
- Hot water baseboard heating systems
- Hot water heaters
- Hydronic Systems

- 
- Limited area sprinklers
  - Process piping
  - Public/private water supply systems
  - Sanitary or storm drainage facilities
  - Steam heating systems
  - Storage tanks incidental to the installation of related systems

#### **18VAC50-22-60 Requirements for a Class A license**

For every classification or specialty in which the firm seeks to be licensed, the firm shall name a qualified individual who meets the following requirements:

- Is at least 18 years old
- Has a minimum of five years of experience in the classification or specialty for which he is the qualifier
- Is a full-time employee of the firm as defined in this chapter or is a member of the firm as defined in this chapter or is a member of the responsible management of the firm
- Where appropriate, has passed the trade-related examination or has completed an education and training program approved by the board and required for the classifications and specialties listed below
  - Blast/explosive contracting
  - Electrical
  - Fire Sprinkler
  - Gas Fitting
  - HVAC
  - Plumbing
  - Radon Mitigation
  - Water well drilling
- Has obtained, pursuant to the tradesman regulations, a master tradesman license as required for those classifications and specialties listed in 18VAC50-22-20 and 18VAC50-22-30.

# Rebate Program Figures

The Rebate Program Report - synopsis and figures as of June 13, 2007

Total number of rebate applications received since program began on July 1, 2006: 3,074.

Total number of rebate applications approved for payment: 2,236.

Program funds are depleted for the fiscal year and a queue for pending applications is being established for final approval and processing once new fiscal year program funds become available July 1<sup>st</sup>.

## Rebate Program Figures As of June 13, 2007

Technology	Funds Paid by Technology	Number of Rebates	Annual kWh's Deferred from Grid ( <i>estimated</i> )
Domestic Solar Water Heaters	\$636,500	1,273	4,073,600
Solar Swimming Pool Heaters	\$86,900	869	20,856,000
Photovoltaic Systems	\$1,773,088.79	89	672,600
Commercial Solar Water Heaters	\$3,508.50	5	24,230
<b>SESIP Totals:</b>	<b>\$2,500,000</b>	<b>2,236</b>	<b>25,626,430</b>

\$2.71 interest payment

Jim Tatum

Program Manager

Florida Energy Office

Department of Environmental Protection

2600 Blair Stone Road MS #19

Tallahassee, Florida 32399-2400

(850) 245-8002



# RURAL ENERGY FOR AMERICA PROGRAM

## RURAL ENERGY FOR AMERICA PROGRAM

**Section 9007** – The Rural Energy for America Program (REAP), through USDA-Rural Development, offers **grants, guaranteed loans, and combination grant/guaranteed loans** to help **agricultural producers and rural small businesses** purchase and install renewable energy systems and make energy efficiency improvements in rural areas.

### Examples of types of projects that can be funded:

- ❖ **Upgrades of poultry houses** to install more efficient lighting, heating, ventilation and insulation.
- ❖ **Replacement of inefficient grain drying bins** with more efficient facilities.
- ❖ **Conversion of a coal or petroleum fired stove or boiler** with one that utilizes corn, wood or other renewable fuel.
- ❖ **Construction of a biodiesel or ethanol facility.**
- ❖ **Installation of a wind turbine or solar panels** for electricity or heat generation
- ❖ **Anaerobic digesters.**
- ❖ **More efficient freezers** in a grocery store.
- ❖ **More efficient equipment** in a manufacturing facility.

### Who is eligible?

- ❖ An **agricultural producer** (individual or entity) **directly** engaged in the production of agricultural products and obtains at least 50% or greater of their gross income from their agriculture business.
- ❖ A **rural small business** – an entity is considered a small business in accordance with SBA's (Small Business Administration) small business size standards (by NAICS codes). SBA small size standards can be found at <http://www.sba.gov/size/index.html>
- ❖ For projects with total **eligible costs exceeding \$200,000**, agricultural producers and rural small businesses with a demonstrated financial need for a grant.
- ❖ For projects with total **eligible costs of \$200,000 or less**, applicants must provide a statement certifying their financial need for a grant.

### Important Facts:

	Renewable Energy Projects	Energy Efficiency Improvements Projects
<b>Description</b>	A system that produces or produces and delivers usable energy from a renewable energy source.	Improvements to a facility, building, or process that reduces energy consumption.
<b>Minimum grant</b> (no more than 25% of total eligible project costs)	<b>\$ 2,500</b>	<b>\$ 1,500</b>
<b>Maximum grant</b> (no more than 25% of total eligible project costs)	<b>\$ 500,000</b>	<b>\$ 250,000</b>
<b>Maximum grant per applicant per fiscal year \$ 750,000</b>		
<b>Minimum guaranteed loan</b> (no more than 75% of total eligible project costs)	<b>\$ 5,000</b>	<b>\$ 5,000</b>
<b>Maximum guaranteed loan</b> (no more than 75% of total eligible project costs)	<b>\$ 25,000,000</b>	<b>\$ 25,000,000</b>
<b>Minimum grant portion of the combined funding request</b>	<b>\$ 1,500</b>	<b>\$ 1,500</b>

### For More Information:

Please contact Laurette Tucker at 804.287.1594, e-mail: [laurette.tucker@va.usda.gov](mailto:laurette.tucker@va.usda.gov) or Kent Ware at 804.287.1557, e-mail: [kent.ware@va.usda.gov](mailto:kent.ware@va.usda.gov). Helpful information regarding the Section 9007 program can be found at: [www.rurdev.usda.gov/ia/rbs.html](http://www.rurdev.usda.gov/ia/rbs.html) - click on **Energy** program.

Rural Energy for America Program

# Wells Fargo

## Solar Electric Power (continued from page 3)

great investment. California, for instance, has aggressive subsidies that cover nearly half the cost of a system, as well as a 7.5% tax rebate. For California homeowners with electricity bills over \$100, a solar system financed with tax-advantaged\* home equity funds could even start paying for itself immediately.

Instead of paying the utility company every month you'll be paying down your home equity account and rebuilding your equity.

But that's not the only financial advantage. When it comes to home value, a solar power system may be your best "remodel" option. Based on a recent study

by ICF Consulting (funded by HUD and the EPA), energy-saving measures such as solar can add \$20 of home value for every \$1 of yearly energy cost savings. That makes an already bright idea really shine.

### How to get started

Many state, federal, and industry resources exist to help you evaluate solar providers. A good place to start is "A Consumer's Guide to Buying a Solar Electric System" by the Department of Energy's National Renewable Energy Laboratory (NREL). You can download it for free from the NREL web site (see online resources below).

Solar providers can be found under *Solar Products—Dealers and Services* in the Yellow Pages. These are licensed contractors specializing in the installation of solar electric systems. They can help you:

\*Consult your tax advisor.

Visit [wfsolar-resource.net](http://wfsolar-resource.net) for direct links to these and other solar electric power resources.

**California Energy Commission** <http://www.consumerenergycenter.org/>  
Click on the renewable energy bar to find useful consumer information guides that can be downloaded:

- Buying a PV Solar Electric System—A Consumer's Guide.
- A Guide to Photovoltaic (PV) System Design and Installation.

**National Renewable Energy Laboratory (NREL)** <http://www.nrel.gov/>  
Download "A Consumer's Guide to Buying a Solar Electric System." (PDF file at [www.nrel.gov/ncpv/pdfs/26591.pdf](http://www.nrel.gov/ncpv/pdfs/26591.pdf)) It's an excellent overview that can help you decide if solar electric is right for you.

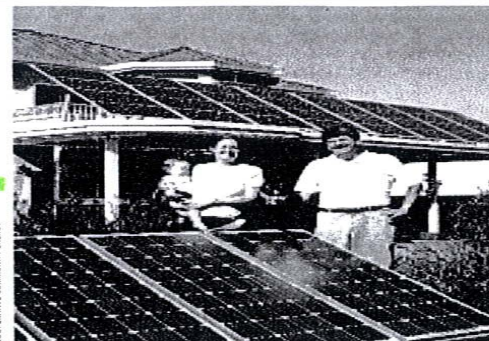
**Database of State Incentives for Renewable Energy (DSIRE)**  
<http://www.dsireusa.org/>

Find out what subsidies, tax incentives, and incentives are available for solar (and other renewable) energy systems in your state.

### PV Watts - Solar Energy Calculator

[http://rredc.nrel.gov/solar/codes\\_algs/PVWATTS/version1/](http://rredc.nrel.gov/solar/codes_algs/PVWATTS/version1/)

This online calculator allows you to estimate the potential electricity generated by a solar electric system anywhere in the U.S.



COOPERATIVE COMMUNITY ENERGY

- Evaluate whether a solar investment is right for your home.
- Perform an on-site inspection to give you an accurate recommendation of your solar needs and deliver an estimate.
- Assist you by filing required paperwork for any building permits
- Help you secure local, state, or federal tax breaks or subsidies.

### Selecting a provider

When selecting a solar provider, use the same criteria as you would for hiring any contractor:

- Try to get at least 2 or 3 estimates for comparison
- Make sure the provider is licensed and bonded
- Ask for customer references on past installations.

**Increase your line  
or convert your line  
to a fixed-rate loan.**

Call **1-800-482-3348** to speak with a Wells Fargo representative on how you could better manage the equity built up in your home. Or visit **[wellsfargo.com](http://wellsfargo.com)**.





*Renewable Energy Credits... Improving the Solar Economy*

## HOMEOWNER & BUSINESS PARTNERSHIPS

*Have you already installed a solar energy system or have plans to install one? If so, Sol Systems can help you turn your solar renewable energy credits (SRECs) into income.*

### HOW SOL SYSTEMS CAN HELP

As an owner of a solar energy system, you have the ability to generate SRECs that large energy companies are looking to buy. However, it's difficult for you to approach a large energy company and work out an agreement for the sale of your individual SRECs—most homeowners and businesses just don't produce enough SRECs on their own to make the transaction worthwhile for energy companies.

This is where Sol Systems can help. We'll purchase your SRECs, combine them with credits from other homeowners and businesses, and sell them. You will receive payment for your credits quarterly upon Sol Systems' sale of such SRECs.

Regardless of whether you're new to the idea of solar energy or have been generating SRECs for years, Sol Systems can help.

Sol Systems provides:

- education about SRECs and how they can benefit you
- information about solar system installation companies that can install a system at your home or business
- assistance in registering your solar system as a qualified renewable energy generator in your state so that you can produce SRECs
- a means for selling your SRECs to energy companies

### READY TO GET STARTED?

If you found out about Sol Systems through your installer, we ask that you work with your installer to fill out our contract. They should be able to assist you with some of the more technical questions you may have regarding your system. Once you have filled out your contract, return it to your installer, and they'll send it along to us.

If you found out about Sol Systems on your own and have already installed your system, or you have additional questions or concerns, please feel free to email us at [info@solsystemscompany.com](mailto:info@solsystemscompany.com). We will send you all the information you need and we're happy to work with you.

### ABOUT SOL SYSTEMS

Sol Systems is a Washington, D.C.-based solar energy finance and development firm committed to improving the economics of investing in solar energy. We work with homeowners, businesses, solar system installers and energy companies to make solar energy an economically viable energy solution by creating a market for solar renewable energy credits (SRECs).

To learn more, visit us at [www.solsystemscompany.com](http://www.solsystemscompany.com)

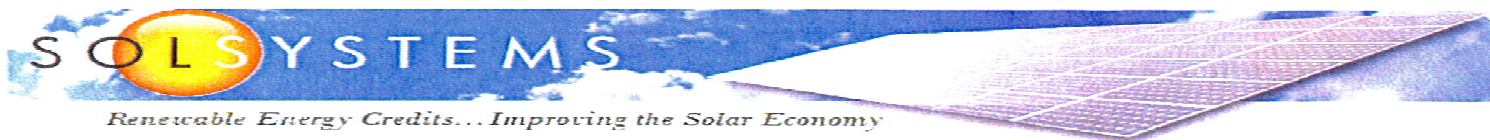
### WHAT ARE SOLAR RENEWABLE ENERGY CREDITS (SRECS)?

SRECs are the credits associated with the production of one megawatt-hour (MWh) of electricity generated from a qualified solar energy generating resource, as defined by your state's relevant statute and regulations. A megawatt-hour is the amount of electricity generated by a megawatt (MW) electric generator operating or producing electricity for one hour. On an electric bill, electricity usage is commonly reported in kilowatt-hours.

### WHY DO ENERGY COMPANIES NEED SRECS?

Large-scale electricity suppliers in many states are required to supply a certain percentage of their electricity from solar energy. They can accomplish this by building large-scale solar facilities to produce their own solar energy or by purchasing SRECs—otherwise they must pay an alternative compliance fee. Most often, energy companies choose to pay the alternative compliance fee because there isn't an established market in which they can purchase SRECs. Then, the extra cost is passed along to their customers.

We want to work with you to change this practice. By establishing a market for SRECs, we make solar systems more affordable for homeowners and businesses, and in turn make more SRECs available to energy companies.



## OUR PRICING INFORMATION

**Sol Systems offers long-term fixed pricing not subject to market volatility to ensure you earn the money you need to finance your system.** If you are comparing pricing with a broker or another aggregator, we would like to remind you that the prices we offer are for five (5) years, are guaranteed, and do not fluctuate with the market.

We believe that a long term contract is more advantageous for you, as an SREC producer, you will not have to worry about fluctuations in the market that will inevitably occur as legislation evolves and more solar power comes on to the grid. Finally, as one of the first firms to transact in the SREC market, and the largest residential SREC aggregator in the country, our ability to adapt to a changing landscape is unparalleled. Sol Systems is here to stay.

## ESTIMATING YOUR SREC INCOME

Below you will find a matrix of the estimated SREC income you can expect to receive from Sol Systems when you sell your SRECs. Depending on the size of your system, and the state in which you live, this income can vary significantly. Certain states have more vibrant SREC markets relative to other states. Your sales representative can work with you to provide a firm price for your SRECs for your specific systems.

Estimated SREC Income from 5 Year Contract with Sol Systems

SREC Price	\$200	\$2,200	\$3,300	\$4,400	\$5,500	\$6,600	\$7,700	\$8,800
		2	3	4	5	6	7	8
		System Size (kW)						

*\*Based on conservative SREC production estimates*



# Sol Systems Up Front Payment

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## Solserv

**From:** "Yuri Horwitz" <yuri@solsystemscompany.com>  
**Cc:** <george@solsystemscompany.com>; "Srini Viswanathan" <srini@solsystemscompany.com>;  
"Sean Conway" <sean@solsystemscompany.com>; <sudha@solsystemscompany.com>;  
<craig@solsystemscompany.com>  
**Sent:** Wednesday, October 28, 2009 7:00 PM  
**Subject:** New Sol Systems Offerings & Important Information



**This is a fairly important email regarding our services. Please review it carefully and print it out if you can.**

We address a number of issues that are important for both you and your customers. We will follow up with you this next week to ensure that we address any and all questions you may have and also provide more information on our online platform, described below.

### **NEW: Sol Systems Up-Front Payments**

Sol Systems now offers an up-front payment model to its exclusive Platinum Partners and their customers. The value of this up-front payment will differ from state to state, as illustrated below. We believe this model will provide you with significant leverage in the field and help you increase your sales volumes. Sol Systems will make a lump-sum payment to your customers on the date in which their system is operational. The total payment will equal the price per kW installed multiplied by the size of the system, in kW. Our current offerings are below.

State	Traditional Pay-As-You-Go Price Per SREC	New Sol Systems Up-Front
DC	\$325 per SREC for 5 Years	1450 per kW Installed for 10 Years
MD	\$240 per SREC for 5 Years	1300 per kW Installed for 15 Years
PA	\$280 per SREC for 5 Years	1300 per kW Installed for 10 Years
DE	\$220 per SREC for 5 Years	1200 per kW Installed for 10 Years
OH	\$250 per SREC for 5 Years	1200 per kW Installed for 10 Years
VA	\$200 per SREC for 5 Years	1000 per kW Installed for 10 Years

If you have customers that are interested in receiving an up-front payment, please notify us and we can send you a contract for this customer. Customers will not be able to utilize our online registration platform for up-front payments.

We will continue to offer our very popular Pay-As-You-Go payment to customers that are interested. As always, our goal is to work with you to get more solar in the ground so your input with regard to our pricing is critical. You are welcome to start offering this service to your customers. We will be deploying roughly \$1 million initially on a first come, first serve basis. We plan to expand upon this offering in the coming year.

### **NEW: Sol Systems Online Registration Portal**

Sol Systems will be launching its online registration platform for all of its customers and installer partners. This platform will enable your customers, and you, to register systems online and contract with Sol Systems in one easy step. We will be in contact with each one of our partners to walk them

10/29/2009

# Solar Services\_SREC



## SREC STATEMENT

Sol Systems LLC  
1326 Otis Place NW  
Washington DC 20010  
(202) 380-9332

Date: October 13th, 2009

TO Solar Services  
877 Seahawk Circle Suite 101  
Virginia Beach, VA 23452

SYSTEM NAME	QTY	SREC DESCRIPTION	PAYMENT
Solar Services 2 - Solar Services 2	1	Generation Date: 2009/08	290
Solar Services 2 - Solar Services 2	1	Generation Date: 2009/06	290
Solar Services 2 - Solar Services 2	1	Generation Date: 2009/07	290
-	0	-	0
-	0	-	0
-	0	-	0
-	0	-	0
-	0	-	0
-	0	-	0
-	0	-	0
-	0	-	0
-	0	-	0
-	0	-	0
-	0	-	0
-	0	-	0
-	0	-	0
TOTAL	3		870

Thank you for your business! If you have any questions or concerns regarding this statement, please do not hesitate to give us a call.

**When Should I Expect My Check?**

Your check will be mailed on the 15<sup>th</sup> of the month following quarter end. Sol Systems waits until the very end of the quarter to maximize your SREC production and then sells these SRECs. We make payment upon receipt of the funds from this sale.

The Sol Systems Team  
info@solsystemscountry.com  
Phone:(888) 235-1538

# SOL SYSTEMS

## SREC STATEMENT

Richard Good, (757) 468-3247

Wow, This is great. I didn't expect to receive \$1,450.00 for one quarter I REC. Thanks again for the Great system Martin F. F.

SYSTEM NAME	QTY	GREG DESCRIPTION	PAYMENT
Firth Residence 1 - Firth Residence 1	2	Generation Date: 2008/06	880
Firth Residence 1 - Firth Residence 1	1	Generation Date: 2009/06	290
Firth Residence 2 - Firth Residence 2	1	Generation Date: 2009/07	290
Firth Residence 2 - Firth Residence 2	1	Generation Date: 2009/06	290
	0		0
	0		0
	0		0
	0		0
	0		0
	0		0
	0		0
	0		0
	0		0
	0		0
TOTAL	5		1450

### **When Should I Expect My Check?**

**The Sol Systems Team**  
**info@solsystemscompany.com**  
**Phone: (888) 235-1538**



# SREC Trade

## SRECTrade - Auction History

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### Our Service

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- [How It Works](#)
- [Auction History](#)
- [EasyREC](#)
- [Installers](#)
- [FAQ](#)
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### SREC Auction History

The table below includes all historical auction pricing on SRECTrade:

Month	NJ '10	MD	PA	DE	NJ '09
10/2009	\$660	\$358	\$300	\$200	
09/2009	\$663	\$358	\$300	\$200	\$680
08/2009	\$663	\$308	\$300	\$245	\$680
07/2009		\$375	\$300	\$245	\$675
06/2009					\$675
05/2009					\$675
04/2009					\$675
03/2009					\$675
02/2009					\$650
01/2009					\$613
12/2008					\$600
11/2008					\$575
10/2008					\$526
09/2008					\$461

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# SHW Performance

14 = SITE CODE #

SOLAR WATER HEATER PERFORMANCE MONITORING PROGRAM - MONTHLY SUMMARY  
12:02 PM TUE., 9 MAR., 1983

## METERS

\*\*\*\*\*  
RAY SIZE = 80 sq.ft., Fr'ta = .67, Fr'UL = 1.26  
MUTH = 0deg U of S, TILT = 40 deg from horiz.  
RAGE (gal): SOLAR = 120, BACK-UP = 52  
AR EQUIP (WATT): PUMP = 170, CONTR = 2, VALVE = 0  
TEM TYPE - CLOSED LOOP, CITY CODE = 152  
TEM COST LESS TAX CREDIT = 2280, DESIGN OCCUP. = 5  
T EXCHANGER TYPE - COUNTERFLOW, EFFECTIVENESS = .85

## DEFINITIONS

\*\*\*\*\*  
PKWH - TOTAL KWH PURCHASED RELATED TO SOLAR ENERGY  
SKWH - TOTAL KWH OF PARASITICS OF SOLAR HEATER  
IU TEMP - TEMP OF INCOMING GROUND WATER  
TKWH/DAY - 3.10 KWH/DAY STAND-BY LOSS CONV. TANK  
SYS. STAT - SYSTEM STATUS, SEE TABLE A  
BACK-UP % TIME CIRCUIT BREAKERS TO ELEMENT IS ON  
SSF - % OF POSSIBLE SOLAR SUPPLYING HOT WATER

TE	GAL/ DAY	PKWH/ MONTH	SKWH/ MONTH	PUMP HR/D	IU TEMP	\$'S/ KWH	ACTUAL OCCUP.	SYS. STAT	BACK-UP % AVAIL	KWH/MO SAVED	\$'S/MO SAVED	SSF
1/82	157.	313.1	33.0	6.1	61	.0467	4.0	A	100%	592	27.65	66%
2/82	181.	221.2	37.6	7.0	66	.0522	4.4	A	100%	732	38.24	77%
3/82	126.	107.2	31.7	5.9	72	.0732	4.0	A	100%	532	38.90	84%
4/82	99.9	63.7	37.0	6.9	74	.0732	4.2	A	100%	446	32.67	88%
5/82	120.	78.5	33.6	6.2	75	.0732	5.0	A	100%	508	37.20	87%
6/82	152.	159.7	29.9	5.5	72	.0717	5.0	A	100%	588	42.17	79%
7/82	160.	301.4	24.9	4.5	63	.0500	5.0	A	100%	584	29.19	66%
8/82	147.	367.4	22.3	4.0	58	.0500	5.0	A	100%	513	25.64	59%
9/82	163.	569.5	18.0	3.2	51	.0500	5.0	A	100%	481	24.07	46%
RAGE	145.	242.4	29.8	5.5	66		4.6		100%	553	32.86	73%
TL		2182.	268.1							4976	295.73	

\*\*\*\*\*  
KILOWATT-HOURS SAVED TO DATE = 4976 \*  
\$'S SAVED TO DATE = \$295.73 \*  
SOLAR SAVINGS FRACTION (SSF) = 70% \*  
IMPLE RETURN ON INVESTMENT 17% \*  
\*\*\*\*\*

COMMENTS: TWO PUMP SYSTEM  
\*\*\*\*\* LOAD MANAGEMENT DEVICE INSTALLED BY UTILITY 7/22/82

"REVIEW COPY"

ANALYSIS OF FIELD TEST DATA  
FROM DOMESTIC SOLAR WATER HEATERS  
IN THE SOUTHERN UNITED STATES  
Covering Analysis Through May 1982

William M. Jerns  
Richard A. Jerns

July 1982

RESORC  
ATLANTA, GEORGIA

NOTE: The information contained herein is  
strictly preliminary in nature and is intended  
only for limited distribution. It should not  
be used for any other purpose without the  
express written consent of the U.S. Department of  
Energy. The work was performed under contract  
number AC22-80OR00010 with the U.S. Department of  
Energy under the Office of the Assistant  
Secretary for Conservation and Research in Energy.

U.S. Department of Energy

# Thermal Performance



## THERMAL PERFORMANCE

### Collector Temperature

Low Temperature, 35°C (95°F)  
Intermediate Temperature, 50°C (122°F)  
High Temperature, 100°C (212°F)

### Energy Output

24,400 Kilojoules/day 23,200 Btu/day  
20,400 Kilojoules/day 19,400 Btu/day  
7,300 Kilojoules/day 6,900 Btu/day

### MODEL NUMBER

**AE-21  
MSC-21**

METRIC (SI Units) / ENGLISH (Inch-Pound Units)

Kilojoules/Thousands of Btus, Per Panel Per Day			
CATE- GORY (Tl - Ta)	CLEAR DAY 2000 Btu/m <sup>2</sup> ·d	MILDLY CLOUDY DAY 1500 Btu/m <sup>2</sup> ·d	CLOUDY DAY 1000 Btu/m <sup>2</sup> ·d
A(-9°F)	32 / 30	24 / 23	16 / 15
B(9°F)	30 / 28	22 / 21	14 / 13
C(36°F)	25 / 24	18 / 17	11 / 10
D(90°F)	17 / 16	9 / 9	3 / 3
E(144°F)	—	—	—

### Collector Temperature

Low Temperature, 35°C (95°F)  
Intermediate Temperature, 50°C (122°F)  
High Temperature, 100°C (212°F)

### Energy Output

27,900 Kilojoules/day 26,500 Btu/day  
23,400 Kilojoules/day 22,200 Btu/day  
8,300 Kilojoules/day 7,900 Btu/day

**AE-24  
MSC-24**

Kilojoules/Thousands of Btus, Per Panel Per Day			
CATE- GORY (Tl - Ta)	CLEAR DAY 2000 Btu/m <sup>2</sup> ·d	MILDLY CLOUDY DAY 1500 Btu/m <sup>2</sup> ·d	CLOUDY DAY 1000 Btu/m <sup>2</sup> ·d
A(-9°F)	37 / 35	27 / 26	19 / 19
B(9°F)	34 / 32	25 / 24	16 / 15
C(36°F)	30 / 28	20 / 19	12 / 11
D(90°F)	19 / 18	12 / 11	4 / 4
E(144°F)	—	—	—

### Collector Temperature

Low Temperature, 35°C (95°F)  
Intermediate Temperature, 50°C (122°F)  
High Temperature, 100°C (212°F)

### Energy Output

30,500 Kilojoules/day 28,900 Btu/day  
24,500 Kilojoules/day 24,200 Btu/day  
9,200 Kilojoules/day 8,800 Btu/day

**AE-26  
MSC-26**

Kilojoules/Thousands of Btus, Per Panel Per Day			
CATE- GORY (Tl - Ta)	CLEAR DAY 2000 Btu/m <sup>2</sup> ·d	MILDLY CLOUDY DAY 1500 Btu/m <sup>2</sup> ·d	CLOUDY DAY 1000 Btu/m <sup>2</sup> ·d
A(-9°F)	39 / 37	30 / 28	20 / 19
B(9°F)	36 / 34	26 / 25	17 / 16
C(36°F)	32 / 30	22 / 21	13 / 12
D(90°F)	21 / 20	12 / 11	4 / 4
E(144°F)	—	—	—

### Collector Temperature

Low Temperature, 35°C (95°F)  
Intermediate Temperature, 50°C (122°F)  
High Temperature, 100°C (212°F)

### Energy Output

38,600 Kilojoules/day 36,700 Btu/day  
32,400 Kilojoules/day 30,700 Btu/day  
11,700 Kilojoules/day 11,100 Btu/day

**AE-32  
MSC-32**

Kilojoules/Thousands of Btus, Per Panel Per Day			
CATE- GORY (Tl - Ta)	CLEAR DAY 2000 Btu/m <sup>2</sup> ·d	MILDLY CLOUDY DAY 1500 Btu/m <sup>2</sup> ·d	CLOUDY DAY 1000 Btu/m <sup>2</sup> ·d
A(-9°F)	50 / 47	36 / 36	25 / 24
B(9°F)	43 / 41	32 / 30	20 / 19
C(36°F)	36 / 34	24 / 23	13 / 12
D(90°F)	22 / 21	12 / 11	2 / 2
E(144°F)	—	—	—

### Collector Temperature

Low Temperature, 35°C (95°F)  
Intermediate Temperature, 50°C (122°F)  
High Temperature, 100°C (212°F)

### Energy Output

48,000 Kilojoules/day 45,800 Btu/day  
40,200 Kilojoules/day 38,100 Btu/day  
14,400 Kilojoules/day 13,600 Btu/day

**AE-40  
MSC-40**

Kilojoules/Thousands of Btus, Per Panel Per Day			
CATE- GORY (Tl - Ta)	CLEAR DAY 2000 Btu/m <sup>2</sup> ·d	MILDLY CLOUDY DAY 1500 Btu/m <sup>2</sup> ·d	CLOUDY DAY 1000 Btu/m <sup>2</sup> ·d
A(-9°F)	61 / 58	46 / 44	32 / 30
B(9°F)	54 / 51	39 / 37	24 / 23
C(36°F)	44 / 42	30 / 28	15 / 14
D(90°F)	26 / 25	14 / 13	3 / 3
E(144°F)	—	—	—

### Collector Temperature

Low Temperature, 35°C (95°F)  
Intermediate Temperature, 50°C (122°F)  
High Temperature, 100°C (212°F)

### Energy Output

59,100 Kilojoules/day 56,000 Btu/day  
49,900 Kilojoules/day 47,300 Btu/day  
26,000 Kilojoules/day 24,700 Btu/day

**AE-50**

Kilojoules/Thousands of Btus, Per Panel Per Day			
CATE- GORY (Tl - Ta)	CLEAR DAY 2000 Btu/m <sup>2</sup> ·d	MILDLY CLOUDY DAY 1500 Btu/m <sup>2</sup> ·d	CLOUDY DAY 1000 Btu/m <sup>2</sup> ·d
A(-9°F)	79 / 75	60 / 57	41 / 39
B(9°F)	71 / 67	52 / 49	33 / 31
C(36°F)	60 / 56	41 / 39	23 / 21
D(90°F)	40 / 38	23 / 21	7 / 6
E(144°F)	—	—	—

These collectors have been rated by the Florida Solar Energy Center for energy output on measured performance and an assumed standard day. Total solar energy available for the standard day is 5045 watt-hours/m (1600Btu/ft.) distributed over a 10 hour period. Output energy ratings for this collector based on the second order efficiency curve are shown above.

These ratings were determined by the Solar Rating and Certification Corporation (SRCC).



# Virginia Power Bill

Sep 22, 2009

SOLAR SERVICES INC

## Customer Bill

877 SEAHAWK CIR  
VIRGINIA BCH, VA 23452



**Dominion®**

PJ 9-30-09  
CK # 24756  
\$ 266.20

### Billing and Payment Summary

Account # 4207988033

Due Date: Oct 14, 2009

Total Amount Due: \$ 266.20

To avoid a Late Payment Charge of 1.5% please pay by Oct 14, 2009.

Previous Amount Due: \$ 260.96  
Payments as of Sep 22: \$ 260.96CR

For Dominion Virginia Power service emergencies and power outages, please call 1-888-667-3000. Visit us at [www.dom.com](http://www.dom.com).

### Meter and Usage

Current Billing Days: 30

#### Billable Usage

Schedule GS-1 08/18-09/17  
Total kWh 2228

#### Measured Usage

Meter: 0165272388 08/18-09/17  
Current Reading 22124  
Previous Reading 19896  
Total kWh 2228

### Usage History

Mo	Yr	kWh
Sep	08	3108
Oct	08	2175
Nov	08	3577
Dec	08	3250
Jan	09	3030
Feb	09	3175
Mar	09	2074
Apr	09	2374
May	09	1603
Jun	09	1958
Jul	09	2286
Aug	09	2255
Sep	09	2228

### Explanation of Bill Detail

#### Dominion Virginia Power

1-888-667-3000

Previous Balance 260.96  
Payment Received 260.96CR  
Balance Forward 0.00

#### Non-Residential Service (Schedule GS-1) 08/18-09/17

Distribution Service  
Basic Customer Charge 16.19  
Distribution Service kWh 35.84  
Electricity Supply Svc (ESS)  
Generation 102.81  
Transmission 4.48  
Fuel 78.62  
Sales and Use Surcharge 0.83

State/Local Consumption Tax 3.30  
VIRGINIA BEACH Utility Tax 24.13  
Total Current Charges 266.20

Total Account Balance 266.20

Visit our website or call our office for rate schedule prices.

### Price to Compare

¢/kWh

Jun-Sep 8.75 ¢  
Oct-May 7.26 ¢  
Annual Average 7.82 ¢

Use these prices to compare to offers from competitive service providers.

Cost per kW = 0.115

### Important Customer Information from Dominion Virginia Power

Visit 'Manage Your Account' on [www.dom.com](http://www.dom.com) or call us to join our Budget Billing and Automatic Bank Draft Plans. They are free services.

Help EnergyShare - add \$1,2,5,10,20,25 or 35 to your payment or mail a separate check payable to EnergyShare to PO Box 11186, Richmond, VA 23230-1186.

Mailed on Sep 24, 2009

# Miller Custom Homes

## MILLER CUSTOM HOMES

Annual Utility Bills 1921 Benecia Drive, 11/08-9/09

6900 SF

### DOMINION POWER

HVAC, Lights, Appliances, Wine Cellar Pool Pump...	Date	kW	Bill	Solar Energy Credit-	Net Power Bill
November	11/2-12/3	2156	\$ 208.69	\$ 157.50	\$ 51.19
December	12/3-1/3	2226	\$ 215.03	\$ 157.50	\$ 57.53
January	1/3-2/2	2689	\$ 258.58	\$ 157.50	\$ 101.08
February	2/2-3/5	2417	\$ 235.02	\$ 157.50	\$ 77.52
March	3/5-4/1	1332	\$ 140.62	\$ 157.50	\$ (16.88)
April	4/1-5/1	1092	\$ 119.73	\$ 330.00	\$ (210.27)
May	5/1-6/3	1369	\$ 160.03	\$ 330.00	\$ (169.97)
June	6/3-7/1	1956	\$ 227.56	\$ 330.00	\$ (102.44)
July	7/1-8/3	2501	\$ 281.64	\$ 330.00	\$ (48.36)
August	8/3-9/1	2518	\$ 284.10	\$ 330.00	\$ (45.90)
September					\$ -
October					

Number of Months	10
Total Annual Cost To Date	\$ (306.50)
Average Cost / Month	\$ (30.65)

### VIRGINIA NATURAL GAS

Water Heater, Grill, Oven, Fireplace, BU Generator	Date	ccf	Bill
November	10/19-11/18	35	\$ 57.31
December	11/18-12/17	19	\$ 37.41
January	12/17-1/16	19	\$ 38.94
February	1/14-2/13	16	\$ 34.42
March	2/13-3/17	40	\$ 65.51
April	3/17-4/16	31	\$ 48.42
May	4/16-5/15	13	\$ 25.16
June	5/15-6/17	12	\$ 25.85
July	6/17-7/16	23	\$ 36.10
August	7/17-8/19	11	\$ 23.94
September			
October			

Number of Months	10
Total Annual Cost To Date	\$ 393.06
Average Cost / Month	\$ 39.31



# Solar Hot Water



# Solar Hot Water Tank





# Solar Hot Water



# Solar Hot Water





# Solar Hot Water



# Solar Hot Water, PV and Solar Pool Heat





# Solar Hot Water & Photovoltaic





# Solar Hot Water and Photovoltaic



# STRING SIZING PROGRAM

[< Back](#)[> Print](#)

Note: For best printing results, please change page format to "landscape".

## Results from String Sizing V 6.0

Selected Inverter  
SB 7000US (240 & 277)

Selected PV Manufacturer  
Sunpower

Selected PV Module  
SPR-230

### Inverter Data

Design Irradiance (W/m<sup>2</sup>)  
1000

Pacmax  
7000

Pdcmax  
7750

Idc Max  
30

Vdc Max  
600

Vmpt Max  
480

Vmpt Min  
250

Vmin  
250

### Module Data

Module Pnom  
230 W

Voc  
48,7 V

Vmp  
41,0 V

Isc  
5,99 A

Imp  
5,61 A

Temperature Coefficient of Voltage  
- 132,5 mV

Temperature Coefficient of Current  
+ 3,5 mA

Temperature Coefficient of Power  
- 0,38 %

### Mounting Method

Please select the mounting method for the array: Mounted flat against the roof

### Temperature Data

Select the **coldest** expected temperature  
when sunlight will be on the modules

23 °F

Select the **hottest** expected temperature  
when sunlight will be on the modules

95 °F

Imperial units

Metric units

### Results

[1string  
configurations](#)

8 in series  
9 in series

[2string  
configurations](#)

8 in series  
9 in series

[3string  
configurations](#)

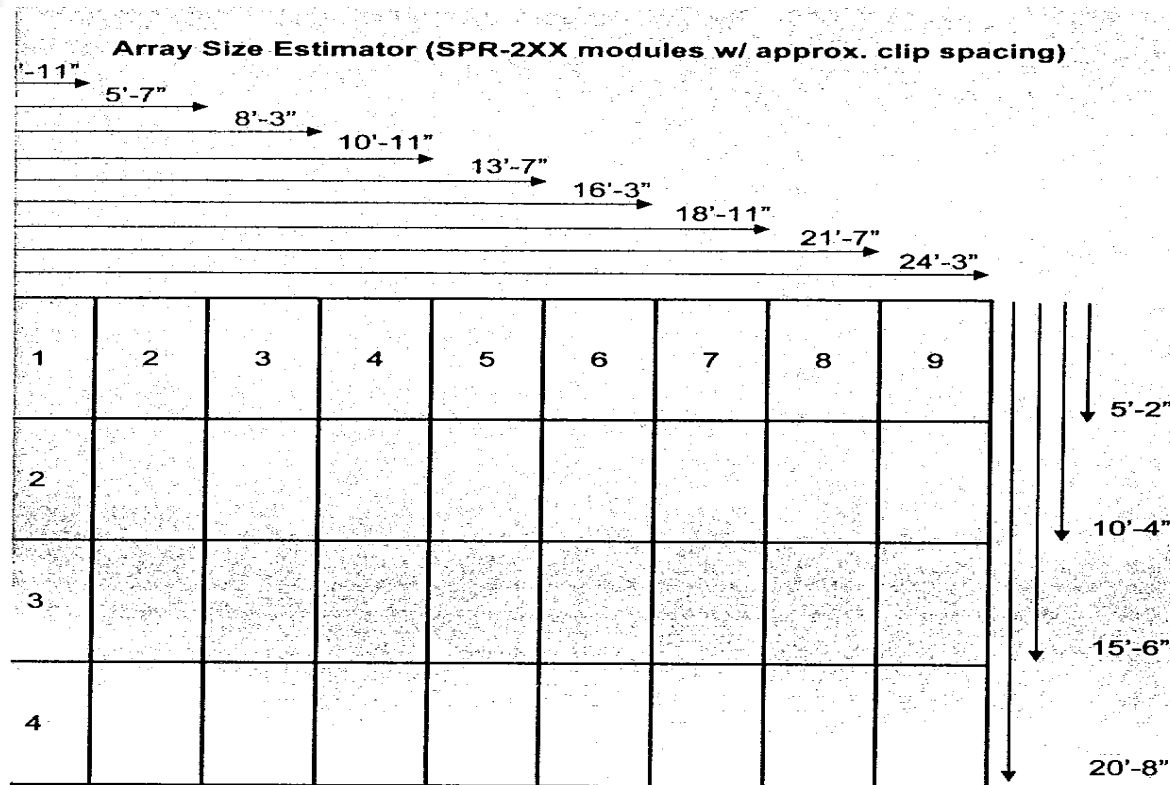
8 in series  
9 in series

[4string  
configurations](#)

8 in series  
9 in series

<http://america.sma.de/newstringsizing.aspx>

11/6/2009



ROOF PITCH TO TILT ANGLE TABLE	
Roof Pitch	Tilt Angle
Flat	0°
2:12	10°
3:12	14°
4:12	19°
5:12	23°
6:12	27°
7:12	30°
8:12	34°
9:12	37°
10:12	40°
11:12	43°
12:12	45°

**Performance Orientation Adjustment Values (Average for Continental US)**

Tilt Angle	270° (west)	255°	240°	225°	210°	195°	180° (south)	165°	150°	135°	120°	105°	90° (east)
Flat (0°)	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
12 (15°)	0.87	0.90	0.92	0.94	0.96	0.97	0.97	0.96	0.94	0.92	0.90	0.87	0.84
12 (30°)	0.83	0.88	0.92	0.96	0.99	1.00	1.00	0.98	0.96	0.92	0.88	0.84	0.78
12 (45°)	0.77	0.83	0.88	0.93	0.96	0.98	0.98	0.96	0.93	0.88	0.83	0.77	0.70
12 (60°)	0.68	0.75	0.81	0.86	0.89	0.90	0.91	0.88	0.85	0.80	0.75	0.69	0.62
12 (75°)	0.59	0.65	0.71	0.75	0.77	0.78	0.78	0.76	0.74	0.70	0.65	0.59	0.53
Vertical (90°)	0.49	0.54	0.59	0.61	0.62	0.62	0.61	0.60	0.59	0.57	0.54	0.49	0.44

**SUNPOWER®**



# Photovoltaic



# Abbott





# Amundsen





# Elber





# Faried





# Von Baeyer





# Von Baeyer Photovoltaic System





# Firth





# McElroy





# Dulay



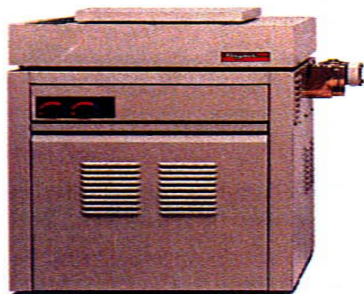
# Dr. Keverline





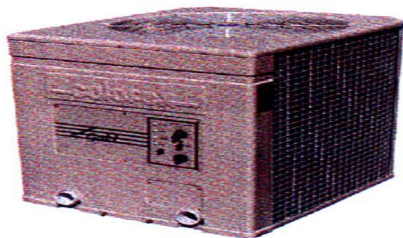
# Which Pool Heater?

## Gas Heater



- \$1500 to \$2500 to Install
- Most Expensive to Operate
- 5 - 8 Year Life Expectancy
- Requires Annual Service

## Heat Pump



- \$2500 to \$5500 to Install
- 50% to 70% Less to Operate
- 10 - 15 Year Life Expectancy
- Best Alternative After Solar

## Solar



- \$2000 to \$5000 to Install
- Zero Cost of Operation
- 20 Year Plus Life Expectancy
- No Annual Service

Which Pool Heater?

Note: Install prices based on national averages.



# **Your Choice**

**Burn The Fossil Fuel That it Takes to Make a  
Solar Pool Heating Collector...**



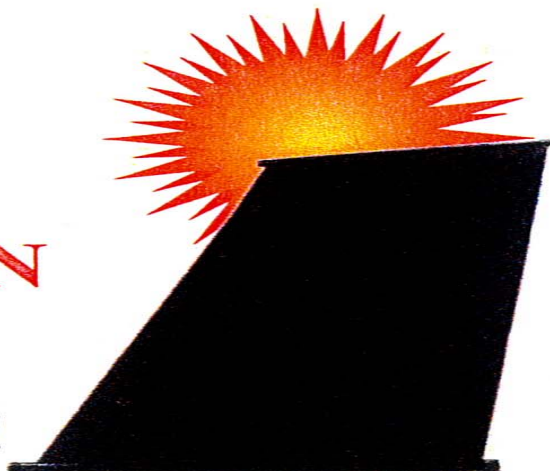
**You Would Get  
400,000 BTUs  
One Time Only!**

***OR***

**Take The Same Fuel and  
Make a Solar Collector  
That Will Produce...**

**Over 10 MILLION  
BTUs A Year**

**Year After Year After Year!**



# Solar Pool Heating System





# Solar Pool Heating System





# Solar Pool Heating System



# Solar Pool Heating

