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# YOUR SUNPOWER® SOLAR SYSTEM

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Homeowner's Manual



# WELCOME TO SUNPOWER®

Congratulations on the purchase of your new solar-powered home. By powering your home with a SunPower® system, you have joined a group of influential homeowners who are leading the way to cleaner air, national energy independence, and lower-cost electricity.

As you save on monthly utility bills, your SunPower system will help to reduce air pollution and demand on domestic energy resources. Solar directly offsets the need for utilities to generate electricity from gas, oil and coal-fired power plants during times of peak consumption. Some states even offer additional incentives such as Solar Renewable Energy Credits (SRECs) and Property Tax Deductions for owning a solar system.

Whenever the sun shines, and even on cloudy days, you will save money and be doing your part for the environment. And rain will help to keep your system dust-free. Every day is a good day for solar!

We are excited to welcome you to the SunPower family. Together with tens of thousands of homeowners worldwide, you are promoting the solar power movement and making a change that will benefit not only you, but the environment – for years to come.

Please do not hesitate to contact (1.877.34.HOMES) should you have any questions about your system.

A handwritten signature in black ink, enclosed within a hand-drawn oval. The signature is stylized and appears to read "Matt Brost".

Matt Brost  
General Manager, New Homes Division  
SunPower Corporation



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# GETTING STARTED

There are just a few simple steps to get started and ensure that you are getting the full benefits of your solar system right away. If you have any questions, feel free to contact us at 1.877.34.HOMES.

## 1. Set Up Your Electricity Account

Your solar home uses power from both the solar system on your roof and from your local utility. You need to establish an electricity account in your name just like you would with a non-solar home.

Some utilities require homeowners to sign interconnection agreements at escrow or during homeowner orientation. Please check with your sales agent to determine if you are required to sign an interconnection agreement. An interconnection agreement enables homeowners to credit surplus electricity with their utility. Failure to complete this form could result in disconnection of your solar system. Depending on your local utility, there may be additional steps to take so please make sure you contact your electricity company for details.

## 2. Set Up Your SunPower® Monitoring System

SunPower offers free monitoring enabling you to go online and see how much your system is producing and how much your home is using in real-time. In order for the monitoring system to display data, you must connect your solar system to a high-speed Internet connection. The steps below describe how you can do this if your home is equipped with a central structured wiring panel.

### **Homes with a Structured Wiring Hub**

To take advantage of structured wiring features you should install your Internet modem (cable or DSL) and home networking router in your home's structured wiring hub. The router sends Internet signals to your solar system and throughout your home.

If a local cable provider installs your Internet service, ask them to install your modem and router in the structured wiring hub. Some Internet Service Providers offer modem-router combinations with extra ports for connecting various devices to the Internet.

#### **A. Connect the Solar Cable**

Locate the solar cable in your home's structured wiring hub. The structured wiring hub is typically located in either your master bedroom closet or your garage. Simply plug the solar cable into an open network port on your router or modem.





**B. Record the Inverter Number**

Your inverter number is required for online registration. The number is located at the top of the SPRx inverter or on the side of the SPRm inverter.

**C. Register Online**

Visit [sunpowermonitor.com](http://sunpowermonitor.com) and follow the instructions to register your system. Each time you visit the site, simply use your email address and password to view your home's energy consumption and system performance—24 hours a day!

### 3. File For Your Federal Tax Credit

Under the Emergency Economic Stabilization Act of 2008, homeowners with solar systems may qualify for a one-time personal tax credit. The amount of the credit depends on the cost of your system. To find out the initial cost of your SunPower solar system, please contact your community sales representative. In most cases, solar home buyers in tax years 2009 through 2016 will qualify for a one-time tax credit of 30% of the system price. Only the original purchaser of the new home qualifies for the tax credit. Follow the steps below to file for your Federal Tax Credit:

A. Obtain the latest copy of IRS form 5695 (Residential Energy Credits) by visiting [sunpowermonitor.com](http://sunpowermonitor.com) or [irs.gov](http://irs.gov).

B. Check with your financial advisor to find out if this credit applies to your particular financial situation.\*

### 4. File For Your State Tax Credit

In some states there is a state tax credit for solar electric systems. Please check with your community sales representative to see if the state rebate has already been factored into the system price.

\*This information is offered for initial guidance only. Tax laws are subject to change. SunPower is not a tax advisor. Homeowners should consult with their tax consultant, referencing the H.R. Bill 1424, the Emergency Economic Stabilization Act of 2008, prior to submitting claims. In some states there is a state tax credit for solar electric systems. Please check with your sales agent to see if the state rebate has already been factored into the system price.

SUNPOWER® SIGNATURE™ BLACK SOLAR PANEL



SUNPOWER SUNTILE®



# HOW DOES YOUR SOLAR HOME WORK?

## SUNPOWER® SIGNATURE™ BLACK PANELS & SUNTILE®

Your SunPower solar system turns on automatically in the morning and turns off automatically at night. From sunrise to sunset, your system converts sunlight into electricity. While SunPower® Signature™ black solar panels and SunPower SunTile® are virtually maintenance free, we recommend taking the following precautions:

### Shading

SunPower solar panels should be kept free from shading caused by trees, plants, or other obstructions. Check for anything that could shade the panels during daylight hours and trim back any foliage if necessary.

### Cleaning

Under most circumstances, solar panels do not require cleaning because seasonal rains are usually adequate. If necessary, you can clean the panels by spraying them with your regular garden hose. We strongly recommend that you only clean panels in the early morning or late evening rather than when the sun is at its peak or when the panels are warm.

### General Safety Precautions

1. Do not clean the panels during the middle of the day. To avoid panel damage, allow the panels to cool before cleaning.
2. Do not use abrasive cleaners or anything that could scratch the surface of the panels.
3. Do not attempt to access the roof for panel cleaning or inspection.

SunPower® Signature™ Black Solar Panels



SunPower SunTile®







## YOUR INVERTER

Your SunPower® solar system produces direct current (DC) that flows to an inverter typically located on the inside wall of your garage. The inverter converts this DC into alternating current (AC), which is required for residential use and instantly delivers the converted electricity to your home's main electrical service panel. During daylight hours, the inverter displays system production data. At night, the inverter will display that it is offline.

It is not necessary to turn the inverter on and off each day. To check that your inverter is turned on, check the LCD screen on the front panel. The green LED should be lit during daylight hours. If it is not, follow the two steps below to restart the inverter:

1. Switch the solar breaker in your main electrical service panel or "breaker box" to the ON position.
2. Turn the switch on the base of the inverter to the ON position.

### Heat

During the day it is normal for the inverter to become warm to the touch – this is not something to be concerned about.

### Maintenance

Do not cover or inhibit airflow around the inverter. Doing so will prevent the inverter from adequately cooling. Keep a minimum of eight inches free all the way around the inverter, including top and bottom. Under very dusty conditions, it may be necessary to clean the inverter's air intake filter. Please contact SunPower Customer Service at 1.877.34.HOMES for instructions on this procedure or for guidance if this is necessary for your system. Do not attempt to open your inverter. Inverters should only be serviced by a trained SunPower technician.



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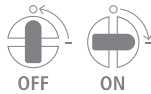
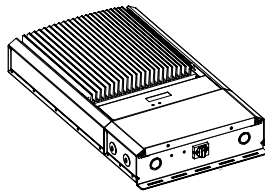
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## Power Outages

Your solar system does not provide backup power. In the event of a blackout or power outage, your solar system will shut down. This feature protects utility workers who might be working to restore power to the area. The inverter will automatically reconnect to the utility and begin normal operation shortly after utility power resumes. There will be a momentary delay as the inverter synchronizes with local utility power before returning to normal operation.

## Emergencies

Should you experience a fire, explosion, gas leak, severe damage to your SunPower solar system, or fuel spill around the system components, shut down your system immediately by turning the switch at the bottom of the inverter to the OFF position as shown in the diagram below. Use your best judgement when shutting off the inverter during an emergency. If the emergency requires that you seek safety immediately, do so first and then direct emergency personnel to the location of your inverter. Please contact SunPower for assistance in restarting your system after an emergency.



The power switch is located on the bottom of the inverter.



SPRm inverter

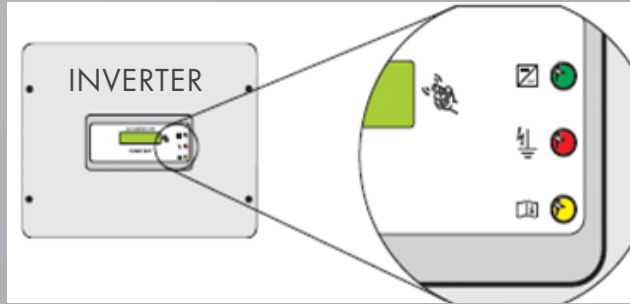


SPRx inverter

## Two Types of Inverters

Your SunPower system is connected to one of two types of inverters—an SPRm inverter or an SPRx inverter. Please see the next page for your particular inverter.

## INVERTER LED LIGHTS



### NORMAL DAYTIME OPERATION



### NORMAL NIGHTTIME OPERATION



### SIDE OF SPRM INVERTER



### TOP VIEW OF SPRX INVERTER





Your system features either an SPRm inverter or an SPRx inverter.

## Reading the SPRm Inverter

The SPRm inverter has an LCD display and three LED lights that indicate inverter status. The LED lights next to the display window indicate the status of the inverter. Normal operation is indicated by a steady green light during daylight hours. If either the red or yellow light is continuously illuminated, the unit requires inspection by a trained SunPower technician. To contact SunPower technical support, please call 1.877.34.HOMES.

The display screen continuously cycles through four operational messages during daylight hours, displaying readings that indicate the current energy production of your inverter.

Message #1: "E-Today"— total energy produced on this day measured in kilowatt hours (kWh).	E-today 3.86kWh Mode MPP
Message #2: Nominal grid voltage configuration and actual line-to-neutral voltage measurements.	Gridtype - 298V L1 120V L2 120V
Message #3: Actual AC power output and DC input voltage.	Pac 3200W Upv 380V
Message #4: Total system energy production since installation, and the total operating hours.	E-total 724.4kWh h-total 512h

## Reading the SPRx Inverter

The SPRx inverter displays solar electricity production in watts (labeled System) and total daily energy production in kilowatt-hours (labeled Today). For the example data shown below, a system production rate of 1000 W that is sustained for one hour would result in an extra 1000 watt-hours (or 1 kilowatt-hour) of energy production. This would raise the Today electricity production from 7.000 kWh to 8.000 kWh.

System	1000 W
Today	7.000 kWh

## Evening Operation

At night, the inverter will display that it is offline.



## YOUR ELECTRIC METER

Your electrical service panel uses the electricity produced by your solar system to power your home. If your home needs more power than your solar system provides, your local utility supplies the balance of that power. Similarly, if your SunPower system generates more energy than your home consumes, the surplus electricity travels through the meter and into the local power grid.

Over the course of the month, if your system produces more electricity than your home consumes, your electric meter spins backward and your electric bill is credited for the surplus electricity at the same rate that you would have been charged to purchase the electricity from your local utility. This is known as Net Metering. Every month your utility will calculate these net charges, and will bill you for difference.

### How Net Metering Works

On a particular day, your solar system may generate 15 kilowatt-hours. If your home uses 11 kilowatt-hours during this time, 4 kilowatt-hours are sent back into the grid. At night the solar system shuts off and does not generate power. If at night your home uses 10 kilowatt-hours, all of that power is supplied by the utility.

The utility will charge you only for the net amount your home uses – that is, the amount your home receives from the utility minus the surplus that your system delivers back. Using the example above, this would be:

Energy generated by system	15 kWh
Daytime energy used	- 11 kWh
Sold during the day	4 kWh
Night time energy used	- 10 kWh
Net amount billed for 24 hrs	6 kWh

Contact your utility for details on how you will be billed under their Net Metering program.







# THE SUNPOWER® MONITORING SYSTEM

Your new solar system comes equipped with web-based monitoring which enables both you and SunPower to keep track of your home's solar electricity production throughout the day. By monitoring your system you can ensure that you are getting the most energy out of your solar system. SunPower makes this production data available to you online at [sunpowermonitor.com](http://sunpowermonitor.com). You can also view this data on-the-go from your iPhone™ or iPod® Touch mobile device.

## Connect Today – No Charge

In order for the monitoring system to display data, you must connect your solar system to a high-speed Internet connection. The steps below describe how you can do this if your home is equipped with a central structured wiring panel.

## Homes with a Structured Wiring Hub

To take advantage of structured wiring features you should install your Internet modem (cable or DSL) and home networking router in your home's structured wiring hub. The router sends Internet signals to your solar system and throughout your home.

If a local cable provider installs your Internet service, ask them to install your modem and router in the structured wiring hub. Some Internet Service Providers offer modem-router combinations with extra ports for connecting various devices to the Internet.

### **Step 1: Connect the Solar Cable**

Locate the solar cable in your home's structured wiring hub. The structured wiring hub is typically located in either your master bedroom closet or your home's garage. Simply plug the solar cable into an open network port on your router or modem.

### **Step 2: Record the Inverter Number**

Your inverter number is required for online registration. The number is located at the top of the SPRx inverter or on the side of the SPRm inverter. Refer to page 12 for illustration.

### **Step 3: Register Online**

Visit [sunpowermonitor.com](http://sunpowermonitor.com) and follow the instructions to register your system. Each time you visit the site, simply use your email address and password to view your home's energy consumption and system performance, 24 hours a day!



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# ELECTRIC UTILITIES

## Your Electric Bill

Electricity rate plans and payment plans vary based on utility. Some utilities offer time-of-use rate plans, which can help you save more money when you go solar. Check with your local electric utility to understand and choose a rate plan that is best suited for your home.

## Time-of-Use Rate Plan

Time-of-use (TOU) plans vary by utility, but the basics are the same. Under a TOU plan, a unit of electricity is priced differently, depending on when it's purchased. Typically, the rates are higher in the afternoon, and lower in the evening or morning. Similarly, rates are higher in summer than in winter. In some cases, the highest peak price per unit can be three times the lowest off-peak price.

This rate structure benefits homes with solar because your system will likely produce the most amount of electricity during the time of day when rates are highest. Because your system delivers excess electricity to the grid if you do not consume all the electricity your system produces, being enrolled in a TOU plan means you get credited at the higher rate structure. In essence, you can "sell" electricity at a high price during the day and "buy" electricity at a low price at night.

While TOU metering and rates are available to many solar customers, not all utilities have a TOU option. Check with your local provider for TOU availability. In some cases, the savings from your SunPower solar system will increase if you switch to a TOU rate plan.

# FAQs

## Solar Basics

### **How do I turn my system on?**

The system turns on and off automatically every day.

### **How do I know if my system is working properly?**

Check for a green light on your inverter during daylight hours, or access the SunPower monitoring website at [sunpowermonitor.com](http://sunpowermonitor.com).

### **Will my system work at night?**

At night, your home draws electricity from the local utility and the inverter displays that it is offline. Sunlight must be present for the system to generate electricity.

### **Will my system work on cloudy days?**

Yes, SunPower systems outperform competitors in low light, including cloudy days. However, your system will produce less electricity than on clear sunny days, depending on the thickness of the cloud cover.

### **Will my system work during blackouts?**

Since there is a chance that your SunPower system could feed electricity into the electric grid, safety requirements prohibit the system from producing electricity during blackouts. The system will restart automatically when power is restored.

### **Should I limit shading from trees?**

Yes, if possible. Panels must receive full sunlight to work at their peak efficiency. If any portion of a panel is shaded, the entire electrical output of the panel—even those sections still exposed to sunlight—decreases.



### **How long will my SunPower system last?**

With our 10-year guarantee on workmanship and our 25-year guarantee on performance, your system will be protected for years to come. SunPower controls the entire production process to ensure the highest quality, best-looking product reaches your rooftop and produces the most energy.

### **Is my SunPower system good for the environment?**

Energy created by your SunPower system produces no pollutants. By offsetting peak electricity demand, SunPower systems reduce the need for fossil fuel power plants. Over a thirty-year period, a 2.3 kWp system typically offsets the same amount of greenhouse gases as 30 acres of trees.\*

### **What are solar cells and solar panels?**

A solar, or photovoltaic (PV), cell is the smallest element of a system that converts sunlight into electricity. Each cell is made of silicon, which is the same material found in computer chips. Silicon in photovoltaic cells is treated so that it generates a flow of electricity whenever it is exposed to light. A series of solar cells are wired together to form solar panels. SunPower solar cells are the most efficient on the market today thanks to our revolutionary solar cell architecture. And we use only the best, premium monocrystalline silicon with a patented treatment to optimize energy conversion.

### **Is solar a new technology?**

Modern solar cells were invented in the early 1950s and were used to power satellites. In the 1970s, they were used for remote telecommunications and navigational aids. In the 1980s, they were used for roadside emergency telephones and traffic signs. Now in the 21st century, they help power your home. Currently, tens of thousands of homeowners worldwide own a SunPower solar system.

### **Are solar systems safe?**

Yes. Solar cells are mostly silicon, the primary component of sand. Solar systems produce no exhaust.

\*Source: EPA EGRID2000 database

# Electricity

## **What is a kilowatt-hour (kWh)?**

A kilowatt-hour is a measure of energy. When you buy electricity from your utility, you are charged by the kilowatt-hour. When you use one kilowatt for one hour, that's a kilowatt-hour. For example, a 60-watt light bulb that is illuminated for one hour uses 60-watt hours of electricity, or .060 kilowatt-hours.

## **How many kWh's does my home consume?**

The average US home consumes about 31 kilowatt-hours of electricity per day, or 920 kWh per month.\* Depending on system size, time of year, and weather, a 2.3 kWp SunPower system produces approximately 10 kWh per day. When compared to other brands, SunPower produces the most electricity in a range of conditions\*\*.

## **Can I generate heat for my home with a residential solar system?**

Yes, if you have an electrical heating system. Check with your builder for more information on your home's heating unit.

## **Does my SunPower system make hot water?**

No. The system converts sunlight directly into electricity to operate appliances, light fixtures, televisions, and other electronic devices.

\*Source: Energy Information Administration

\*\*Arizona State University: 7% more than Poly-Si (Test dates: June – Aug 2008); Loughborough University (CREST): 9% more than Poly-Si (Test dates: 2007-2008); University of Stuttgart (IPE): 7% more than HIT (Sanyo), 16% more than thin film (Test dates: June 2006 – May 2009); University of Cyprus: 7% more than a-Si (Mitsubishi), 16% more than Mono-Si (BP Solar) (Test dates: June 2006 – May 2009).

## Your Local Utility and Interconnection

### **What is Net Metering?**

Net Metering is a way of measuring the difference between the electricity you buy from your utility and the electricity your home produces. Under net metering, any surplus electricity produced by your SunPower system is delivered back to the electric grid, effectively spinning your meter backward. When the system produces more electricity than your home consumes, the utility will credit your account for the surplus electricity generated – at the same rates that you would be charged to purchase the electricity!

### **Can I store my electricity?**

In many ways, the electricity grid acts as a storage unit for your solar system, accepting excess production when you do not consume all of the electricity your system produces, and providing electricity when you need more than your solar system is producing. Battery backup systems may also be available in your area for in-home storage. To find out more, please call SunPower Technical Support at 1.877.34.HOMES.

### **How do I sell my surplus electricity back to the utility?**

During the daytime, homes with solar systems will often produce more electricity than they consume. Through a Net Metering arrangement with the local utility, your surplus electricity is credited against your bill.

### **What is an interconnection agreement?**

An interconnection agreement is a contract between the homeowner and the local utility that allows the homeowner to connect their solar system to the electric grid and receive credit for their surplus electricity. Some utilities do not require agreements for new home buyers.





# YOUR SERVICE WARRANTY

Your system is protected with SunPower's industry-leading warranty for homeowners providing a 10-year guarantee on workmanship and a 25-year guarantee on performance, giving you the peace of mind that your system will be protected for years to come. SunPower stands behind all its products. As new products are released, the warranties and product manuals may be updated to reflect specific properties of current models.

For more information about product warranties, including actual terms and conditions of your warranties, please visit: <http://us.sunpowercorp.com/about/customer-support/warranty-current.php>



# CONTACT SUNPOWER

If you have any questions or need service, please do not hesitate to contact us. SunPower is committed to ensuring that your system provides superior performance, year after year.

email: [residentialservice@sunpowercorp.com](mailto:residentialservice@sunpowercorp.com)

phone: 877.34.HOMES (877.344.6637)

fax: 510.540.0552

Monday – Friday, 8AM – 5PM PST

For SunPower Monitoring: [sunpowermonitor.com](http://sunpowermonitor.com)

1.877.34.HOMES | [SUNPOWERSOLARHOME.COM](http://SUNPOWERSOLARHOME.COM)

SUNPOWER | THE WORLD'S STANDARD FOR SOLAR™

SunPower Corporation - Corporate Headquarters, 3939 North 1st Street, San Jose, California 95134

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