

GO **solar**  
CALIFORNIA

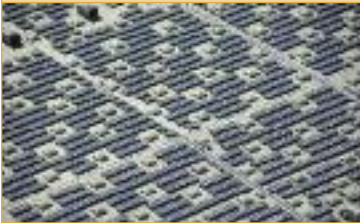


**A Consumer's Guide to the California Solar Initiative  
Statewide Incentives for Solar Energy Systems**



*“It’s a great feeling knowing that you are generating electricity without using any outside fuel source.”*

—Jack Good, Good & Roberts, Inc., California Solar Initiative Customer



*“Installation of my solar power system is an investment in the future. When is the last time your power bill went down? The answer is that power bills don’t decrease, so this is a hedge against future cost increases of electricity, while at the same time doing the right thing.”*

—Robert M. Bushman, Homeowner, Thousand Oaks





## Table of Contents

The California Solar Initiative: Saving the Planet One System at a Time .....	3
How Solar Works .....	4
How Net Energy Metering Works .....	5
How Much Solar Systems Cost.....	6
California Solar Initiative Statewide Eligibility .....	7
California Solar Initiative Application Process .....	7
Getting Started with Solar .....	8
Getting Paid: A Quick Guide to California Solar Initiative Incentives .....	11
Clean Power Estimator .....	11
More Facts You Should Know about Going Solar .....	12
Frequently Asked Questions (FAQs) .....	13
Glossary of Commonly Used Terms .....	17
How to Contact the Program Administrators .....	25

*"FedEx and its subsidiaries recognize that effective environmental management is one of its most important corporate priorities. As a global transportation industry leader, FedEx believes strongly in progressive environmental stewardship and resource sustainability. These (solar) power generation systems represent another step that FedEx companies are taking as we work collaboratively toward these objectives."*

—Mitch Jackson, Director of Environmental Affairs and Sustainability for FedEx Corporation



*"In 2006, I signed the law to create the California Solar Initiative, a world-class solar program that is transforming the energy economy and creating a sustainable solar industry with a goal of 3,000 megawatts of clean and renewable solar power, thereby reducing output of greenhouse gas emissions by 3 million tons.*

*Solar energy is a huge step toward meeting our long-term renewable energy and climate change goals, and further proof that being good to the environment is also good for the bottom line. Join the thousands of California homeowners and businesses choosing to go solar today."*

—Governor Arnold Schwarzenegger



## The California Solar Initiative: Saving the Planet One System at a Time

Sunlight powers life on our planet. When photovoltaic materials (*photo* meaning light, *voltaic* meaning voltage) were first discovered in the late 1880s, visionaries like Thomas Edison knew that this sustainable discovery would one day change the way we power our world.

The California Solar Initiative is bringing this change to life, and helping to make the clean, reliable and inexhaustible energy of the sun even more accessible in a state that has long been a national leader in environmental stewardship.

Today, it is common to power our homes and businesses with solar technologies. In fact, thousands of your friends, neighbors and businesses already rely on the state's most abundant natural resource—the sun—for their power, while taking advantage of the financial benefits of Going Solar.

The State of California and its electric utilities foster adoption of solar power by rewarding customers who Go Solar with cash incentives, a streamlined interconnection process and simplified requirements for Net Energy Metering, which allows for measuring the amount of a customer's energy production and consumption.

Solar energy is so important to our state and our energy future that the California Solar Initiative provides incentives to residents and businesses for installing solar electric systems.

Solar energy is a renewable alternative to building power plants that burn fossil fuels and emit greenhouse gases, which lead to global warming and climate change.

By Going Solar, you are reinforcing California's commitment to a healthy environment and economy that makes the future bright for California and leaves a legacy of clean energy for generations to come.

Purchasing a solar electric system is an investment in your home or business and, as with any investment, careful planning will help you make the right decisions for your home or business.

This booklet introduces customers to the California Solar Initiative and to the process of installing a solar electric system. It is neither a technical nor economic guide to designing or installing a system; for that, you should consult an experienced solar contractor.

*“The California Solar Initiative incentive from PG&E helps alleviate the up-front costs of installing solar. This makes it a more viable option for those of us who want to go green.”*

—Steve Blank, Homeowner, Pescadero

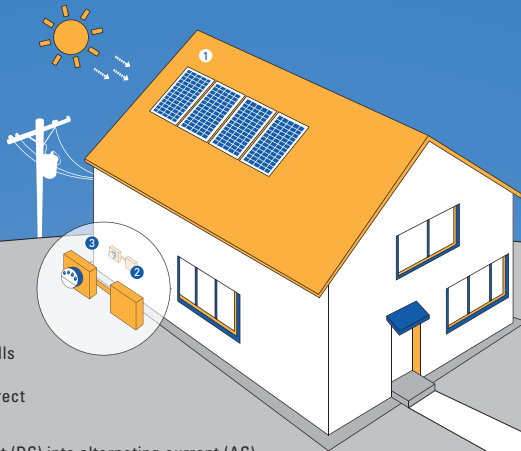
## How Solar Works

There are two major forms of solar energy: photovoltaic (PV) systems and solar thermal systems.

PV cells convert sunlight into electricity, powering everything from lamps to electronic devices and even electric cars. They work any time the sun is shining, and more electricity is produced when the sunlight is more intense and strikes the PV modules directly. Solar thermal systems use the sun's heat to make electricity or are used in water heating applications to displace gas use. Solar thermal can also be used in large-scale electric generation.

In PV systems, a flow of direct current (DC) electricity is produced when sunlight strikes an array of solar panels. Appliances and machinery, however, operate on alternating current (AC), as supplied by your utility.

The DC energy produced by the panels is fed into an inverter that converts the DC power into AC power, which then feeds into the main electrical panel that powers your home or business.



1. Individual photovoltaic (PV) cells are connected to panels. Solar panels convert sunlight into direct current (DC) electricity.
2. Inverter converts direct current (DC) into alternating current (AC) for electricity in the home.
3. The utility meter records the net amount of energy generated through the PV system. When you're creating more electricity than you're using, your meter will spin backward and the excess electricity is sent to the electric grid. This helps to offset the cost of your electricity usage at night or on cloudy days when your system is not producing electricity.

## Did You Know?

- California is #1 in cumulative installed PV capacity per person in the U.S. with 9.1 Watts per person.

## How Net Energy Metering Works

At any time of the day, your solar energy system will produce more or less electricity than your home or business needs. To allow for Net Energy Metering, a bi-directional meter measures the electricity flowing into and out of your home or business.

For example, when your solar generating system produces more electricity than your home or business uses, the “excess” electricity automatically passes through the meter and onto the utility grid. When this occurs, the meter runs backward and Net Energy Metering generates a bill credit for the full retail value of the electricity your system is producing at that time.

At times when your electricity demand is higher than your solar system produces, your home or business uses electricity supplied by your utility.

Over a 12-month period, customers on Net Energy Metering will pay for the net amount of electricity used from their utility over and above the amount of electricity their solar system generates (in addition to monthly non-generation charges incurred).



## A Decade of Solar Legislation

The California Solar Initiative Program continues a 10+ year tradition of California’s support for solar. The California Solar Initiative Program was established by Senate Bill 1 (SB 1) and in a series of decisions from the California Public Utilities Commission (CPUC) in collaboration with the California Energy Commission (CEC).

The California Solar Initiative Program replaces the solar portion of two incentive programs (the Emerging Renewables and Self-Generation Incentive programs), which started funding solar in California in the late 1990s.

In addition, the CEC administers the 10-year, \$400 million New Solar Homes Partnership (NSHP), a separate but coordinated program that offers financial incentives for solar PV systems installed on new homes.

## How Much Solar Systems Cost

No single answer applies in every case, but incentives offered through the California Solar Initiative will reduce your expenses in many cases by 20% of the system cost—plus, you could dramatically reduce your annual electric bills, saving you out-of-pocket immediately.

The cost of a PV system depends on a number of factors, including system size, equipment options and labor costs. The size of your system may be the most significant factor in any measurement of cost vs. benefits, the analysis of which may be done by your solar contractor.

It is also important to factor in the cost of capital used to finance your project. In simplest terms, prices are discussed in terms of dollars per Watt. Currently, solar industry market reports suggest roughly \$9/Watt–\$10/Watt for residential systems, and often times less for commercial systems. As more systems are installed, prices are expected to go down. Incentives are in the range of \$1.50/Watt–\$2.50/Watt, depending on your region, building type and system design. The average residential system is 4,000 Watts or 4 kilowatts (kW).





## California Solar Initiative Statewide Eligibility

Nearly all residential, commercial, government and non-profit customers of the state's three investor-owned electric utilities—Southern California Edison (SCE), Pacific Gas & Electric (PG&E) and San Diego Gas & Electric (SDG&E)—are eligible for incentives provided through the California Solar Initiative for solar systems from one kilowatt (kW) to one megawatt (MW).

Most household and small business systems are less than 10 kW; however, for those customers installing systems larger than one MW, the first megawatt is eligible for incentives.

Responsibility for administration of the program is shared by SCE and PG&E for their respective customers, and by the California Center for Sustainable Energy (CCSE), which serves as a third-party administrator for SDG&E customers.

Customers of municipal utilities may also qualify for similar incentives through their municipal service provider.

### Did You Know?

- Californians have installed 69% of all of the grid-tied PV capacity in the U.S., which is 280 MW cumulative to date through 2007. Californians have installed about 33,000 out of the nation's 48,000 solar systems. The state with the second-most is New Jersey, with 9% of total installed capacity.

## California Solar Initiative Application Process

The California Solar Initiative application process is simple. It begins by completing a quick, free energy efficiency audit. After doing so, select a solar contractor, who will then help you determine the correct system size for your premises. They also will fill out the incentive Reservation Request Form (RRF) and submit it to one of the Program Administrators—SCE, PG&E or CCSE (for SDG&E customers). The Program Administrator will then reserve the incentive amount based on the size of your solar project.

Once your system is installed, you or your solar contractor will contact the utility for permission to connect your system to its electric grid. After your system is inspected and approved, you or your solar contractor will fill out the Incentive Claim Form (ICF) package and submit it to the Program Administrator for payment. Then you or your solar contractor will receive a check from the Program Administrator for your incentive amount.

Don't forget to apply for the appropriate federal tax credit if applicable.

# Getting Started with Solar

## 1. Energy Efficiency Self-Audit: Right-Size Your System

Making your home or business energy efficient **before** you Go Solar is an essential first step. Energy-saving actions—such as changing incandescent bulbs to compact fluorescent lamps (CFLs), and replacing old, inefficient appliances—are the best way to save energy and money while providing lasting benefits to the environment.

Energy efficiency measures also help reduce the size of the solar system you will need, saving you thousands of dollars in up-front installation costs.

You will need to complete a simple energy efficiency survey or audit of your home or business prior to applying for California Solar Initiative incentives. If you will be working with a solar contractor, they may be able to assist with your energy audit and energy efficiency goals.

Your California Solar Initiative Program Administrator can provide you with an easy online audit form:

- CCSE (for SDG&E customers): [www.gosolar.energycenter.org](http://www.gosolar.energycenter.org)
- PG&E: [www.pge.com/csi](http://www.pge.com/csi)
- SCE: [www.sce.com/csi](http://www.sce.com/csi)



## 2. Select the Right Solar Contractor

Qualified solar contractors are your key to getting the most productive solar energy system for your home or business. Typically, the solar contractor will apply for the California Solar Initiative incentives on your behalf and arrange for your system to be interconnected to your utility company's power grid. The solar contractor may also apply for local permits.

The California Solar Initiative Program provides a list of eligible solar contractor available online at [www.gosolarcalifornia.ca.gov/retailers/index.html](http://www.gosolarcalifornia.ca.gov/retailers/index.html). Searching for an eligible solar contractor by zip code is the fastest way to find a solar contractor closest to you, although any eligible solar contractor may work on your project. Solar contractors typically provide free site evaluations, comprehensive quotes and payback information.

A qualified solar contractor should be able to evaluate factors that will affect your PV system performance, such as the roof size, orientation (tilt and direction) of the system, shading and other factors.

Just as if you were doing any other type of home improvement, you will want to contact at least three solar contractors to help ensure you receive the most competitive bid for your project. It is customary for a solar contractor to visit your home to help you plan the location and size of your system, as well as choose the incentive type best for you.

### Online solar contractor lists and guides:

[www.gosolarcalifornia.ca.gov/retailers](http://www.gosolarcalifornia.ca.gov/retailers) (Sponsored by California Energy Commission)

[www.cslb.ca.gov](http://www.cslb.ca.gov) (Contractors State License Board)

## 3. Apply for Incentives

Your solar contractor will submit a Reservation Request Form (RRF) to your California Solar Initiative Program Administrator.

After the Program Administrator receives your RRF, they will reserve funds based on the size of your solar project. These funds will be reserved for a specified period of time during which you must install your PV system.

Please remember that there is a deadline by which time you must interconnect your system and submit your Incentive Claim Form (ICF).

Reserving your incentive early ensures your access to the highest applicable incentive. As more solar systems are purchased and installed by California consumers, the amount of available incentive dollars decreases.

## 4. Install Your System

As part of the installation process, your solar contractor generally handles any permitting required by the city or county. Once the required permits are acquired, a typical residential installation can be completed in three to five days.

Once the system is installed, the city or county may inspect the system. After your new system passes inspection, the utility must be notified to interconnect your system to the grid. Once interconnected, the Program Administrator may also inspect your system as part of program quality control efforts.

Now that your system is interconnected, you will begin reaping the benefits of solar power generation and Net Energy Metering. Each month, electricity you produce in excess of your own consumption will be sent back to the utility grid and credited to your account. These credits are used to offset some or all of your annual electric consumption from the utility.

## 5. Claim Your Incentive

Once your system has been purchased, installed and is operational, you or your solar contractor will submit the Incentive Claim Form (ICF) along with any supporting documentation, including a verification of project cost and a calculation of the expected system output (if there are any changes from the time of your reservation request). The Program Administrator will verify that your system has been properly connected to the utility electric grid before sending your California Solar Initiative incentive payment. Don't forget to apply for any applicable federal tax credits.



# Getting Paid: A Quick Guide to California Solar Initiative Incentives

There are two types of incentives available to customers through the California Solar Initiative Program: the Expected Performance-Based Buydown (EPBB) and the Performance-Based Incentive (PBI). Both incentives reward high-performance systems—the EPBB is a one-time, up-front payment based on a system’s expected performance; PBI payments are based on a system’s actual performance and paid out over five years.

<b>Expected Performance-Based Buydown (EPBB)</b> (Paid in dollars/Watt)	<b>Performance-Based Incentive (PBI)</b> (Paid in cents/kWh)
<ul style="list-style-type: none"> <li>• Intended for residential and small business customers</li> </ul>	<ul style="list-style-type: none"> <li>• Ideal for large commercial, government and non-profit customers</li> </ul>
<ul style="list-style-type: none"> <li>• Systems less than 50 kW*</li> </ul>	<ul style="list-style-type: none"> <li>• Mandatory for all systems 50 kW* or greater</li> <li>• Systems less than 50 kW* can opt-in to PBI</li> </ul>
<ul style="list-style-type: none"> <li>• Incentive paid per Watt based on your system’s expected future performance (factors include CEC-AC system rating, location, orientation and shading)</li> </ul>	<ul style="list-style-type: none"> <li>• Incentive paid based on the actual energy produced by your solar system in kilowatt-hours</li> </ul>
<ul style="list-style-type: none"> <li>• One-time lump sum up-front payment</li> </ul>	<ul style="list-style-type: none"> <li>• Sixty payments over five years</li> </ul>

\*As of Jan. 1, 2010, this amount will change to 30 kW.

## Clean Power Estimator

The Clean Power Estimator is an online software program, available through Go Solar California, that provides California residential and commercial electric customers a personalized estimate of the cost and benefits of investing in a PV solar electric generating system.

The calculator takes into consideration customer-specific information to provide the best estimate of a given system’s cost and benefits. This information includes the estimated cost of the particular system under consideration, the customer’s location, the applicable incentive level, electric rate schedule and other customer information.

The calculator provides a variety of consumer-specific analyses based on the variables provided by the consumer. Please keep in mind that the Clean Power Estimator provides an *estimated* incentive amount.



[www.cec.cleanpowerestimator.com/cec.htm](http://www.cec.cleanpowerestimator.com/cec.htm)



## More Facts You Should Know about Going Solar

- If your roof is more than seven years old, it's probably best to postpone solar installation until you replace your roof.
- A South or Southwest facing roof is considered to be optimal for a solar installation.
- If you live in a shaded area, your solar production will be impacted.

*“As a locally elected official, I believe it is important to lead—and motivate others—by example. For me, it was an easy decision to go solar. It is part of my personal commitment to do what I can to help the environment and reduce demand on California’s electric grid. The decision to put solar panels on my home has been a good one for me, and there’s nothing better than seeing all the money I’ve saved on my electric bill!”*

—Mayor Michael T. Bennett, City of Goleta

## Frequently Asked Questions (FAQs)

### Q. Why should I Go Solar?

A. For many reasons:

- Solar finance experts suggest that every \$1,000 of annual energy savings from a PV system adds \$20,000 to the resale value of your home.
- Solar systems are extremely reliable, able to produce clean energy from the sun for up to 25 years.
- By using solar to power your home or business, you dramatically reduce your carbon footprint.
- Incentives are now at their highest in California, and will decline as more systems are installed. Get the best incentive you can—Go Solar now!

### Q. How much money will I save on my electric bill?

A. The potential savings from a solar system will depend on several factors, including your current utility rate structure, the size of the solar system you install and the amount of sunshine your system will receive. Your solar contractor should be able to provide you with an estimate based on those and other factors. You can also refer to the Clean Power Estimator for projected savings (*see page 11*).

### Q. What size solar system do I need?

A. Several factors will influence the size of the solar system you need. Determining your present electricity needs is a first step in sizing your solar system. You should conduct an energy efficiency survey of your home or business before you determine the size of the system—by installing energy efficiency measures, you'll require less energy and could save thousands of dollars on panels.



**Q. Are PV systems reliable?**

**A.** Yes. Stationary PV systems have no moving parts; there is nothing mechanical that can wear out. They operate silently, and require no fuel, filters or other costly parts or maintenance.

Solar modules are essentially silicon cells (similar to a computer chip) embedded inside a protective layer, usually a sturdy tempered glass panel. They are made to withstand hot, direct sunlight and harsh weather conditions; they will continue to work as long as sunlight falls on the surface. They do need to be cleaned periodically to ensure maximum performance—dust and dirt can reduce a system's performance.

Solar systems usually have an expected life of up to 25 years. Plus, systems receiving incentives under the California Solar Initiative are required to have at least a 10-year equipment warranty.

**Q. Which solar technologies are covered under the California Solar Initiative?**

**A.** Incentives are available for solar photovoltaic (PV) technologies (roof-mounted, ground-mounted and building-integrated PV), non-PV electric displacing systems, and non-PV solar electric generating systems. In addition, customers of SDG&E may be eligible for incentives under the Solar Water Heating Pilot Program. Contact CCSE, the Pilot Program Administrator, for more information.

**Q. How much are application fees?**

**A.** There is no application fee for residential projects and other projects up to 10 kW. For projects greater than 10 kW, please refer to the California Solar Initiative Program Handbook or ask your solar contractor about standard application fees.

**Q. How can I check on the status of my application?**

**A.** Your solar contractor can provide you with regular updates regarding the status of your application. You can also review details of your application online at <http://csi.powerclerk.com>.

**Q. How long will the application process take?**

**A.** The California Solar Initiative Program Administrators target less than 30 days to confirm both residential and non-residential reservation requests. To help ensure your application is processed quickly, please take a minute to review your documents and avoid the most frequent issues encountered with applications: listed equipment does not match the Expected Performance-Based Buydown printout; missing signature(s); and incomplete or missing documentation.

*"It has been nine months since we installed our solar PV system. It drastically reduces our energy costs, saving us hundreds of dollars each month. The best part is, we do nothing! It doesn't matter where we are or what we do, power generates whenever the sun is up!"*

—James Jen, El Dorado Hills





**Q. Are there classes offered in solar PV systems?**

**A.** Yes. Monthly solar contractor classes are held throughout the state, hosted by the California Solar Initiative Program Administrators. Introductory information sessions for homeowners are also offered in some locations. Please check the Web site of the appropriate Program Administrator for that information. Also, the California Solar Initiative monthly newsletter provides information on solar-related classes and events; subscribe at [www.gosolarcalifornia.ca.gov/csi](http://www.gosolarcalifornia.ca.gov/csi).

**Q. Must I go on a time-of-use (TOU) rate as a condition of California Solar Initiative? Will this cost me more?**

**A.** California Solar Initiative applicants are not currently required to take service on TOU rates unless otherwise required by other terms of their service. However, many customers benefit from TOU rates because solar production in the middle of the day generates electricity during peak periods, and customers receive a Net Energy Metering bill credit at the higher peak price. Customers should work with their solar contractor and utility to determine what rate is optimal for their unique situation after the installation of solar.

**Q. When I get my California Solar Initiative-funded solar system installed, will I be “off-grid”?**

**A.** No. The California Solar Initiative Program only provides incentives for grid-tied solar systems. When a system produces more power than the customer is using, the excess flows into the grid; at night or whenever site load is greater than the system’s generation, the customer draws power from the grid. Thus, consumers who install solar systems under the California Solar Initiative Program remain connected to the utility grid.

## Did You Know?

- Californians installed 81 MW in 2007, which was 58% of all grid-tied PV capacity in the U.S., making California the number one state in the country, with an increase of 38% over 2006. The next largest state was New Jersey with 11% of the market.

### **Q. Do I need a battery backup for my solar electric generating system?**

**A.** A battery backup for your solar system is unnecessary when your system is connected to your utility's electric grid. The grid serves as a backup during times when your system is not producing electricity, for example, at night and on very cloudy days.

### **Q. What happens during a power outage?**

**A.** Your solar electric system is designed to shutdown immediately for safety reasons, unless it includes a battery storage system.

### **Q. Can my city, homeowners' association or neighbor prohibit me from installing solar on my roof?**

**A.** No. The California Solar Rights Act, enacted in 1978, limits the ability of codes, covenants and restrictions to restrict solar installations.

### **Q. Is the power produced by the solar system any different from the utility power? Will it hurt my home appliances or business equipment?**

**A.** No. The electricity generated by your solar system is no different from electricity delivered by your local utility. The solar system connects directly to your utility panel or circuit breaker box, so it interfaces seamlessly with your utility power.

### **Q. Does a solar PV system have to meet local building codes?**

**A.** Yes. You will probably need to obtain a permit from the city or county building department, and may be required to purchase a building permit and/or electrical permit to legally begin installation. A solar contractor should be able to assist you with local permitting issues.

### **Q. Can I install a solar PV system myself?**

**A.** While uncommon, self-installations are allowed so long as proper building permits are obtained and local codes are followed.

### **Q. Where can I get more information?**

**A.** For additional information on Going Solar in California, visit [www.gosolarcalifornia.ca.gov](http://www.gosolarcalifornia.ca.gov), or the Web sites of the respective Program Administrators (*see page 25*).

## Want more info?

The California Solar Initiative electronic newsletter provides monthly program updates and news for California Solar Initiative participants. Please visit [www.gosolarcalifornia.ca.gov/news](http://www.gosolarcalifornia.ca.gov/news) to subscribe.

## Glossary of Commonly Used Terms

*(Refer to the California Solar Initiative Program Handbook for more details.)*

### **Alternating Current (AC):**

Alternating current (AC) is an electric current whose direction reverses cyclically, as opposed to direct current (DC), whose direction remains constant. AC is the form of electricity that is delivered to your home or business. Solar photovoltaic (PV) systems produce DC power, which must be converted to AC by an inverter. Under the California Solar Initiative Program, PV electric output is converted to a value called CEC-AC Rating. *(See CEC-AC Rating).*

### **Applicant:**

The entity (the Host Customer, System Owner or a third-party designated by the Host Customer) responsible for filling out and submitting the California Solar Initiative application and all related materials. The applicant serves as the main point of contact with the California Solar Initiative Program Administrator.

### **Array:**

Any number of electrically connected photovoltaic (PV) panels providing a single electrical output.

### **Azimuth:**

Azimuth is the horizontal angular distance between the vertical plane containing a point in the sky and true south. All references to azimuth within the California Solar Initiative Program, unless expressly stated otherwise, refer to true, not magnetic, azimuth.

### **Building Integrated Photovoltaic (BIPV):**

BIPV technologies form part of the structure to which they are affixed. Typically integrated into the roofing system, BIPV products can provide architectural interest and/or a very unobtrusive installation.

### **Capacity Factor:**

The capacity factor for an electricity generating unit is the ratio of the energy produced during a given time period, measured in kilowatt-hours (kWh), to the energy the unit could have produced if it had been operating at its rated capacity during that period, expressed in kilowatts (kW):

$$\text{Capacity factor} = \frac{\text{kWh of electricity generated}}{\text{Rated generating capacity (kW) x period (in hours)}}$$

## **Did You Know?**

- Ninety percent of grid-connected installations in 2007 were in just five states: California, New Jersey, Nevada, Colorado and New York.

**Capacity Rating:**

The rating given to a PV system by its manufacturer denoting the load the system is able to meet or supply when operating at full capacity. For a solar system, this will occur when the system is in direct sunlight with no shade. The Program Administrator will verify system capacity rating to confirm the final incentive amount.

**CEC-AC Rating:**

The calculation that provides a total estimated energy output of a solar system, factoring in the efficiency of the inverter. The California Solar Initiative Program Administrators use the California Energy Commission's CEC-AC method to measure nominal output power of PV cells or modules to determine the system's rating in order to calculate the appropriate incentive level.

**Conversion Efficiency:**

The amount of the sun's energy that a solar cell can convert into electricity; the balance is lost as heat or reflected light.

**Design Factor:**

The design factor is a California Solar Initiative Program term that compares a proposed system's expected generation output with that of a baseline system. The design factor allows the California Solar Initiative Program Administrators to pay a higher EPBB incentive to optimally-designed systems. The design factor is calculated using a few key inputs and the EPBB calculator available at [www.csi-epbb.com](http://www.csi-epbb.com).

**Direct Current (DC):**

Solar PV systems produce electricity in direct current (DC), which is defined as the continuous flow of electricity through a conductor. In DC, electricity always flows in the same direction, which distinguishes it from alternating current (AC). Solar PV systems produce DC power, which must be converted to AC by an inverter in order to power household appliances. Under the California Solar Initiative Program, PV electric output is converted to a value called CEC-AC Rating. (*See CEC-AC Rating.*)



**Electrical Distribution Grid:**

This is the system that provides electricity to most homes and businesses. A network of power stations, transmission circuits and substations conduct electricity to consumers for their use. Under the California Solar Initiative Program, eligible renewable energy systems must be permanently interconnected and operating parallel to the electrical distribution grid of the utility serving the customer's electrical load.

**Expected Performance-Based Buydown (EPBB):**

The EPBB incentive methodology pays an up-front incentive to participants installing systems less than 50 kW in size that is based on a system's expected future performance. EPBB incentives combine the performance benefits of PBI with the administrative simplicity of a one-time incentive paid at the time of project installation. The EPBB incentive is calculated by multiplying the incentive rate by the system rating by the design factor.

**Greenhouse Gases (GHG):**

The gases responsible for trapping heat from the sun within the Earth's atmosphere (i.e., water vapor, carbon dioxide, methane, ozone, chlorofluorocarbons and nitrogen oxides). GHGs are released from many sources, including industrial processes such as power generation from fossil fuels.

**Grid:**

Term used to describe an electrical utility distribution network.

**Grid-Connected or Grid-Tied PV System:**

A PV system in which the PV array is wired into buildings or residences that are connected to the utility grid. To receive incentives under the California Solar Initiative Program, PV systems must be connected to the utility's grid, allowing excess solar energy to flow back onto the grid, which produces a bill credit.

**Host Customer:**

An individual or entity that meets all of the following criteria:

- 1) has legal rights to occupy the site;
- 2) receives retail level electric service from PG&E, SCE or SDG&E;
- 3) is the utility customer of record at the site;
- 4) is connected to the electric grid; and
- 5) is the recipient of the net electricity generated from the solar equipment.

**Incentive Adjustment Mechanism:**

The manner in which solar incentives decline when prescribed megawatt targets are reached throughout the 10-year duration of the program. The California Solar Initiative Program Administrators use the sum of the total megawatts of approved reservations to determine when to adjust the incentive amounts. The current status of incentive levels and remaining eligible capacity is shown on the Trigger Tracker at [www.csi-trigger.com](http://www.csi-trigger.com).

**Insolation:**

The amount of solar energy that shines on a building or area, equivalent to energy and usually expressed in annual kilowatt-hours per square meter.

**Interconnection Agreement:**

A legal document between the Host Customer and their electric utility authorizing the connection of the customer's solar system to the utility's grid. This agreement is required prior to receiving a California Solar Initiative incentive payment.

**Interval Data Recorder (IDR):**

An Interval Data Recorder is a metering device that stores data on energy production, usually in hourly or 15-minute intervals.

**Inverter:**

A device that converts direct current (DC) electricity produced by a solar system into the alternating current (AC) electricity that can be used in a home or building. Some energy is lost when this conversion takes place. *(See CEC-AC rating.)*

**Inverter Efficiency:**

The AC power output of the inverter divided by the DC power input. Inverter efficiency is lowest when operating at low loads; thus, it is important to select inverter(s) of the proper size relative to the PV array.

**Kilowatt (kW):**

A unit of electrical power equal to 1,000 Watts, which constitutes the basic unit of electrical demand. The Watt is a metric measurement of power (not energy) and is the rate (not the duration) at which electricity is used. 1,000 kW is equal to one megawatt (MW).

**Kilowatt-Hour (kWh):**

A unit of electrical energy, equivalent to the use of one kilowatt of electricity for one full hour. Utilities measure customers' electric energy usage on the basis of kilowatt-hours, and electricity rates are most commonly expressed in cents per kilowatt-hour. The California Solar Initiative Program's PBI incentive is paid based on the kilowatt-hours of energy produced by a solar system.



*“Long Beach is at the forefront of harnessing solar power, and our success with this reliable alternative energy source is an example of forward-thinking solutions that promise a brighter tomorrow.”*

—Mayor Bob Foster, City of Long Beach

The Long Beach Convention Center has a 700-kW solar panel array on its roof. This is one of the largest public facility solar panel installations on the West Coast and generates more than 1 million kWh of pollution-free electricity annually.

**Load:**

The amount of power carried by a utility system or the amount of power consumed by an electric customer at a specific time. Base load is the minimum constant level of electricity required by utility customers; peak load is the amount of electricity required at the time of greatest demand.

**Megawatt (MW):**

Unit of electric power equal to 1,000 kW, or one million Watts.

**Meter:**

A device used to measure and record the amount of electricity used or generated by a consumer. Solar systems receiving an EPBB incentive require a meter accurate to within  $\pm 5\%$ , while systems receiving PBI payments require a more precise meter accurate to within  $\pm 2\%$ .

**Modules:**

Under the California Solar Initiative Program, a module is the smallest protected assembly of interconnected PV cells. Modules are typically rated between 40 Watts and 200 Watts.

**Net Energy Metering (NEM) Agreement:**

An agreement with the local utility that allows customers to receive a credit at the retail price of electricity for surplus electricity generated by certain renewable energy systems, such as those covered under the California Solar Initiative Program. Under net metering, the electric meter runs backward as a customer’s solar system generates surplus electricity.

**New Construction:**

New construction is defined as the construction of new buildings that have not yet received a permit for occupancy from the local jurisdictional authority. Solar systems installed on residential new construction should apply to the California Energy Commission’s New Solar Homes Partnership Program. Solar systems installed on new non-residential construction should apply for the California Solar Initiative Program.

**New Solar Homes Partnership (NSHP):**

A statewide program that is managed by the California Energy Commission and works with homebuilders to accelerate PV installation on new residential construction.

**Orientation:**

A term used to describe the direction that the surface of a solar module faces. The two components of orientation are the tilt angle (the angle of inclination a module makes from the horizontal) and the azimuth (the compass angle that the module faces, with north equal to 0 degrees and south equal to 180 degrees).

**Performance-Based Incentives (PBI):**

The California Solar Initiative Program will pay PBI incentives in monthly payments based on recorded kilowatt-hours of solar power produced over a five-year period. Solar projects receiving PBI incentives will be paid a flat per kWh payment monthly for PV system output that is serving on-site load. The monthly PBI incentive payment is calculated by multiplying the incentive rate by the measured kWh output.

**Performance Data Provider (PDP):**

For California Solar Initiative customers who take a performance-based incentive (PBI), the PDP monitors and reports solar system production data to the California Solar Initiative Program Administrator, who then pays a PBI incentive based upon the data submitted by the PDP.

**Photovoltaic (PV):**

The technology that uses a semiconductor to convert light directly into electricity.

**Power Conversion Efficiency:**

The ratio of output power to input power of the inverter. Efficiency of stand-alone inverters will vary significantly with the load. Values found in manufacturers' specifications are the maximum that can be expected.

**Power Purchase Agreements (PPA):**

A contract to purchase energy. PPAs are usually established between a power plant and a purchaser of electrical energy, such as a utility. In the context of the California Solar Initiative Program, a PPA may be a contract written between a building owner that wants to use solar energy and a third-party developer who will install, maintain and own the PV system used to generate the electricity on the building's structure, then sell the solar energy produced by the system to the building owner at a pre-determined rate. PPAs are not a requirement of the California Solar Initiative Program, but they are a growing financial instrument that may facilitate solar installations.

**Program Administrator (PA):**

Program Administrator refers to PG&E, SCE and CCSE, who perform administration of the California Solar Initiative Program under the auspices of the CPUC.



**Renewable Energy Credits (RECs):**

Renewable energy certificates (RECs)—also known as green certificates, green tags or tradable renewable certificates—represent the environmental attributes of the power produced from renewable energy projects. By installing a renewable energy system (such as solar), you become the owner of these environmental attributes, or RECs.

**Silicon:**

A chemical element (Si) that is the most common semiconductor material used in making solar PV cells.

**Site:**

The Host Customer's premises. Each individual site must be able to substantiate sufficient electrical load to support the proposed system size. Ask your solar contractor about requirements specific to your site.

**Solar Contractor:**

The solar contractor is the professional responsible for installing the California Solar Initiative incentive-eligible PV system for the Host Customer.

**Solar Irradiance:**

Radiant energy emitted by the sun, particularly electromagnetic energy.

**Solar Pathfinder:**

A device used in PV site assessment for charting the sun's path through the sky for all months of the year, calibrated by the hours of the day. Also provides other critical, detailed site data.

**Solar Thermal:**

The process of concentrating sunlight on a relatively small area to create the high temperatures needed to vaporize water or other fluids to drive a turbine for generation of electric power, heat water for domestic or industrial hot water, or space conditioning (heating or cooling). California Solar Initiative does not currently fund solar hot water systems, but it does fund some other non-PV systems.

**Stand-Alone PV System:**

An autonomous or hybrid photovoltaic system not connected to a grid (as opposed to grid-connected). The California Solar Initiative Program does not currently offer incentives for stand-alone PV systems.

**System Owner:**

The owner of the PV system at the time the incentive is paid. For example, in the case when a vendor sells a system to a Host Customer, the Host Customer is the System Owner. In the case of a leased system, the lessor is the System Owner.

**System Size:**

System size is the electricity generating capacity of a given photovoltaic system based upon CEC-AC rating standards. In the California Solar Initiative Program, the system size is limited to no greater than the amount of energy used at a site during the prior 12 months.

**Time-of-Use (TOU) Meter:**

An electric meter that measures and records the times during which a customer consumes or generates electricity. This type of meter is used for customers who are on time-of-use rates.

**Time-of-Use (TOU) Rates:**

Electricity prices that vary depending on the time period in which the energy is consumed or produced. In a time-of-use rate structure, higher prices are charged during utility peak-load times. Such rates can provide an incentive for consumers to curb power use during peak times. Solar PV panels tend to produce power during peak times, so they have high value when used in conjunction with time-of-use rates.

**Tracker or Tracking Array:**

A number of PV modules mounted such that they track the movement of the sun across the sky to maximize energy production, either with a single-axis or dual-axis mechanism.

**Warranty:**

In the California Solar Initiative Program, inverters and modules must each carry a 10-year warranty, and meters a one-year warranty. Meters that are integrated in the inverter must carry a 10-year warranty. The warranty may be provided in combination by the manufacturer and solar contractor.

**Watt:**

A unit of measurement of electric power, named after physics pioneer James Watt.

**Watt-hour (Wh):**

A unit of energy measurement, equal to one Watt of power used for one hour.



## How to Contact the Program Administrators

California Center for Sustainable Energy  
Attn: California Solar Initiative Program Manager  
8690 Balboa Avenue, Ste. 100  
San Diego, CA 92123

Email: [csi@energycenter.org](mailto:csi@energycenter.org)  
Phone: 858-244-1177  
(866) SDENERGY  
Fax: 858-244-1178

[www.gosolar.energycenter.org](http://www.gosolar.energycenter.org)



Pacific Gas and Electric Company  
PG&E Integrated Processing Center  
California Solar Initiative  
P.O. Box 7265  
San Francisco, CA 94120-7265

Email: [Solar@pge.com](mailto:Solar@pge.com)  
Phone (general): 877-743-4112  
Phone (CSI projects): 415-973-3480

[www.pge.com/csi](http://www.pge.com/csi)



Southern California Edison  
Attn: California Solar Initiative Program Administrator  
6042A N. Irwindale Ave.  
Irwindale, CA 91702-3702

Email: [CSIGroup@sce.com](mailto:CSIGroup@sce.com)  
Phone (general): 800-799-4177  
Phone (technical): 866-584-7436  
Fax: 626-633-3402

[www.sce.com/csi](http://www.sce.com/csi)



[www.gosolarcalifornia.ca.gov](http://www.gosolarcalifornia.ca.gov)



[www.cpuc.ca.gov](http://www.cpuc.ca.gov)

