

# Should you go solar?

Shawn O'Connor/Getty Images

## 5 Questions to help you decide

There's no doubt that a solar electric system will cut your monthly utility bill. But will it save you money in the long run? That's a tricky question. The upfront costs average about \$15,000 to \$25,000 (after financial credits and rebates). For a lot of folks, the discussion ends right there. But for people who live in areas with lots of sun, high electricity rates and significant financial incentives, the payback period for a solar electric system can be less than five years. This article will pose five key questions to help you decide whether solar makes sense for you.

**"I researched a modest solar installation and elected to forgo the project. Payback was 17 years!"**

**Buzz Jones, Field Editor**

**"The cost of solar is like prepaying your electricity bills. You will no longer be susceptible to electricity price increases, and the cost of the system can effectively be recouped if you ever sell your home."**

**Rick Wood, Solar Energy Consultant, Helio Power Systems**

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## How do photovoltaic (PV) solar panels work?



**A grid-tied system** includes solar panels and an inverter (or micro-inverters) that convert the direct current (DC) produced by the panels into alternating current (AC) that can be used in the house. Excess power flows back into the utility grid. If the solar system can't keep up with demand, power from the grid flows into the home.



**An independent system** ("off the grid") provides most or all of the electricity you need and is more common in rural areas where utility connections are expensive. These always include batteries for nighttime use and cloudy weather. Many people with off-the-grid systems also have a backup generator for emergencies. See p. 66 for examples of PV systems.

## 1 Are you a good candidate for solar?

Consider a solar installation if:

- You live in the Sun Belt. Especially good areas are California, Texas, Florida, the Southeast, the desert Southwest and the Rocky Mountain states. The worst areas are the Great Lakes and Alaska. Foggy or rainy climates will require a lot more solar modules, and the system won't be cost effective.
- Your electric bill averages more than \$125 per month and your rate per kilowatt-hour (kWh) is on the high side (14¢ or more). The more money you spend each month on electricity, the more money your PV system will save you. (If you're paying only 8¢ or 10¢ per kWh, the payback period for solar panels would be unattractively long. Investing in new

energy-efficient windows might provide a quicker return.)

- You live in an area with incentive programs. Call your electric utility and visit [dsireusa.org](http://dsireusa.org) to find out which federal, state and local tax credits and rebates are available in your location. In addition to the 30 percent federal solar tax credit (in effect through 2016), states such as California, Pennsylvania, New Jersey, Massachusetts, Colorado and Arizona offer financial incentives that can cut the net cost of solar by 30 to 70 percent.

- Your utility provides "net metering." For grid-tied systems without batteries, this allows you to sell excess electricity back to your power company to further reduce your electric bills.



## Do you live in the right spot for solar?

To see how much useful sunlight your area averages, go to [nrel.gov/gis/solar.html](http://nrel.gov/gis/solar.html) and click on the photovoltaic solar resource map. Find your location and compare the color to the scale. A lower number means the financial incentives will have to be high to make your system cost-effective.

# 2

## Do you have the right kind of roof?

The optimal roof for a solar installation is south-facing (west is next best) with minimal shading from trees or other buildings. It should also be relatively new. Solar panels last for 30 years, so you want to install them on a roof that won't have to be replaced soon. You will need about 100 sq. ft. of roof area for every kilowatt of system size. Ground-mounted systems are also a possibility (but are more expensive than roof-mounted; see p. 66).

**"From what I learned in the solar training class I took and what I have seen in the real world, a skilled DIYer could definitely handle an install of a PV system. But the price of the systems themselves is the biggest cost, not the labor."**

**Gary Adams, Field Editor and Electrician**

# 3

## Will you install the system yourself?

Doing the installation yourself can save you a third or more of the cost. But you'll need to take a training course and devote a lot of time to researching a potentially confusing host of options. Most areas require a licensed electrician to hook up the inverters and do the wiring. And in many states, a solar electric system must be installed by a certified professional in order to be eligible for solar tax incentives. Research local code requirements before moving forward on this project. Great Web sites for solar DIYers include [build-itsolar.com](http://build-itsolar.com), [trainingsolar.com](http://trainingsolar.com) and [DIYsolarpower.org](http://DIYsolarpower.org).

**"I have a remote cabin in northern Michigan that the local utility quoted \$20,000 to run power to. I installed a PV solar system to run my lights and a pump, with a small generator backup. The system is quiet, and it cost me a lot less than what it would have taken to get grid power."**

**Lanse LaVoy, Field Editor**

## Great resource to see if solar makes sense for you

Go to [findsolar.com](http://findsolar.com) and use the site's solar calculators. You plug in your address and it will tell you which local, state and federal rebates and tax credits are available. You'll learn how big a system you need, the roof size necessary, the estimated cost of the system, your monthly and 25-year savings, your 25-year ROI and the number of years it will take to break even.

# 4

## What size PV system will you need?

Sizing a PV system is complex, and you should consult a certified solar electrical contractor for help in determining an appropriate system type and size as well as to get a cost estimate. Visit [eere.energy.gov](http://eere.energy.gov) for more sizing information and [find-solar.org](http://find-solar.org) to find a contractor near you.

Here are some factors to consider before doing the calculations:

**Your goals.** Do you want to reduce the amount of electricity you buy from your utility or completely replace the power you get from the grid?

**Your electricity needs.** Check your electric bills and figure out your average annual electricity usage. The more energy efficient your home and the more you can reduce household power consumption, the smaller and less expensive your solar system will be.

**“Many people enter the solar market one foot at a time, meaning they install a system that offsets half of their usage and upgrade the system as they see fit.”**

**Rick Wood, Solar Energy Consultant,  
Helio Power Systems**

### Types of PV systems



SOLARCITY

**Roof-mounted panels:** Most common installation in urban and suburban areas. For every 1 kW of power generated, you'll need 100 sq. ft. of roof.



SEIA / ALAN BLAKE

**Ground-mounted:** Used when roof-mounted panels aren't feasible. Additional racking, trenching and mounting equipment add to the cost, and neighbors may object to the appearance of the system.



INTEGRATED SOLAR DESIGN

**Integrated** into a shade structure such as an awning. This gives you active solar electricity and passive solar shading. May not generate as much electricity, and is more expensive than roof-mounted panels.



SUNSLATE/ATLANTIS ENERGY SYSTEMS

**Building-integrated PV array:** The panels are incorporated into the roofing materials, which then look like standing seam metal roofs, slate tiles and three-tab shingle strips. The most expensive but least visually intrusive installation.

# 5 How much will your PV system cost?

Costs vary widely depending on location and the specific installation. An average cost for a typical 5-kW system, at \$7 per watt, would be about \$35,000. Solar rebates could reduce this cost significantly. Prices are slowly coming down, especially in California, where state incentives have driven the cost of PV-generated electricity to below 11¢ per kWh. But in other places around the country, it's still likely to be a fairly long payback.

## Run the numbers:

- How much can you afford to spend up front? (And how much will you have to finance?)
- What financial incentives are available?
- How big a system will you need?
- What's the best system for your situation?
- How long will you live in the house?
- What will your payback be (the time it takes for the savings to equal the cost)?

**"If you live on the coasts where electrical costs are high, then solar might make sense. It usually doesn't make economic sense in the Midwest, where power is around 7 to 8 cents a kilowatt-hour."**

**Dave Youngblood, Field Editor and Senior Sales Executive for Schneider Electric**

## How to calculate your payback (a thumbnail method):

Add up the materials and labor costs and subtract any rebates. Add in any annual costs such as maintenance (minimal), additional insurance and interest payments. Then subtract any tax breaks. Now multiply the actual annual electricity generated in kWh by the cost you would normally have to pay your utility for those kWh of electricity (and the cost will undoubtedly rise each year). Subtract the savings. Continue to do this for subsequent years until the number becomes negative. This is the payback period. If you have a payback of eight years, great. The PV system should last for 30, so you will have 22 years of saving money on your electricity bill. 🏠