

Tips for Buying Solar

INCENTIVES

Current incentives from the State of Oregon, local utilities and the federal government are intended to remove a buyer's incentive to wait until some future date to buy solar. As consumer demand increases and manufacturing economies of scale increase, prices drop and with them so will the incentives.

Before choosing to buy solar energy equipment, make sure you understand what current incentives are available and what, if any, restrictions apply. A good place to start is visiting the Interstate Renewable Energy Council's incentives database (www.dsireusa.org) and the following sources.

Oregon Tax Credits & Loans

The State of Oregon has provided solar energy incentives since 1979. Incentives are in the form of tax credits which directly offset taxes paid and low-interest loans. Visit www.oregon.gov/energy for more information.

Utility Incentives

Several Oregon utilities offer incentives. The Energy Trust of Oregon (www.energytrust.org) provides rebates for customers of Portland General Electric (PGE) and PacifiCorp. The Eugene Water and Electric Board, City of Ashland and several other utilities offer incentives as well.

Federal Incentives

Information on federal tax credits can be found at:

http://www.energystar.gov/index.cfm?c=tax_credits.tx_index

TECHNICAL SELECTION

You are the most important link in the chain of choosing a quality solar technician and getting a quality system installed. Nothing the State of Oregon does will guarantee that your technician will provide you with the service, equipment performance and quality of work that you expect. This is true of all construction work. Do not depend on the Construction Contractors Board (CCB) or anyone else to hold your hand through this process. You are the one that gets the bill or the headaches from a substandard job.

While you can increase your chances of a successful installation, nothing is foolproof. You must educate yourself, check up on the technician, and be prepared to follow through to ensure you are satisfied with the end result. To help you in this process, we've outlined a few steps below.

Finding a solar company/technician

Solar companies or technicians with solar technology experience are not found in every community. Though the skills needed to do good work are not difficult to learn, they typically cover a broad range. A good solar company will not only have experience with solar energy technologies, it will also have one or more individuals that are familiar with incentive programs, roofing, electrical and/or plumbing, safety, tax credits, performance calculations, energy conservation, sales, service and financing. The following are a few places to contact for lists of solar companies:

- Oregon Department of Energy, 1-800-221-8035, www.oregon.gov/energy
- Energy Trust of Oregon, 1-866-ENTRUST, www.energytrust.org
- Oregon Solar Energy Industries Association, 503-853-5804, www.oseia.org

Educate yourself

- Find information on the type of system you are installing.
- Ask your friends or relatives who have installed these systems.

Talk to several technicians for information

It's crucial to sit down and talk with all prospective technicians. Your ability to communicate with them will be essential through the entire construction process. You want to ask lots of questions and let them know you are going to be actively involved with checking on, and verifying, the installation. Ask questions such as:

- How long has your company been in business? How long have you been installing these specific systems (electrical/pool/hot water)? How long does it take to complete the job? Do you belong to professional trade associations?
- Do you have photos of recent installations? These photos should include close-ups of completed, recent installations. You want to see *clean and professional* work.
- You also want these to be residences that you can verify. Several of these should be homes you can call for a reference. *Clean and professional* jobs are not always easy to spot, however, sloppy and careless work usually are. You want to see the actual electrical or plumbing work.
- Can you provide Construction Contractors Board numbers and licenses of persons doing the work? Both solar electric and solar hot water systems must be installed by licensed journeymen. These licenses can be checked at the websites listed below.
- What level of bonding and insurance do you have? Insurance and bonding levels should be adequate to protect your installation. The levels should be reflected in the price of the systems they are installing.
- Do you have any CCB complaints? If so, ask them to explain them.
- How do you handle call-backs and warranties? How fast do they respond? What does the warranty cover? What doesn't the warranty cover? How long is the warranty?

Get a written bid

In the end, you may not get several bids, but it is in your best interest to at least talk with several different technicians. Competing bids can help you decide which company to choose. Make sure you get a written bid with specific information such as system components, pay schedule, price, and timeline.

- Get as complete a picture as possible from any technician you are getting a bid from. Get specifics. Where is the system being installed? Where are the pipe/wire runs going to be? What space will the system take up?
- The lowest price is not a good measure of a technician's bid – you are not buying a toaster or a TV. Someone is going to be *working* on your house. Make sure your technician has been in business for several years (at the very least has several years of verifiable experience). You are having equipment installed that will be in use for more than 20 years.
- Bids should include details about the warranty. You want to make sure the technician will honor all warranties as well as install a high-quality system. A low-bidding technician may need to take shortcuts on the installation and may be difficult to get back to your house.

Check the information your technician has provided

- Technician's licenses and bonding. You have asked for these numbers earlier. You need to verify them. This information is readily available on the Web. Check CCB numbers, bonding, and insurance levels at: www.oregon.gov/CCB/
- Journeyman licenses: www.oregonbcd.org
- Check the references. Give them a call. Your technician chose them and these people should be happy customers expecting to be called.

Check up on your technician throughout the installation

You share responsibility for a quality installation. Ultimately, you are going to get the bill in the mail or the headache of fixing a poor installation. The homework you do prior to hiring a technician and your diligence during the job will pay off in the end. This is true of all construction work done on your home.

Let the technician know up front that you will take an active and interested role in the installation. They will do better work if they know this. You don't need to stand behind the technician every minute but you should be looking at the work they are doing on a consistent basis. If the work is on the roof, ask for pictures. You don't need to climb up there yourself. If you have questions, changes, or fixes, ask the technician about it immediately. There is no easier time to fix mistakes.

Pay wisely

How much you pay up-front depends on the size of the job. In general, you should not pay more than a third to a half up-front. Pay additional installments after specific agreed upon

milestones are met. Do not make the final payment until you are satisfied with the completed installation.

SOLAR ELECTRIC (Photovoltaic, or PV)

Solar electric systems, also called *Photovoltaic* or *PV*, generate electricity directly from the sun using photovoltaic modules. These devices produce direct current electrical power which is usually converted to alternating current (AC) using a device called an *inverter*. For homes with utility power, Oregon's Net Metering Law requires the local utility to accept energy onto their wires. The homeowner is only billed for the monthly net energy consumption of electricity. If the solar electric system produces more energy than is used by a household during a billing period, the local utility's individual net metering policy specifies the surplus energy's compensation value to the system owner.

Assess your needs and desires

For those living off-grid with only a backup generator for power, solar energy is the cheapest and most reliable way to provide electricity. For those with access to utility power, choosing solar electricity is generally done for a variety of reasons. These reasons include, but are not limited to: environmental, financial return, tax incentives, public relations value and energy security. Keep in mind that solar electric power is, and will be for the foreseeable future, more expensive than conservation or northwest electricity prices. It is, however, (with the exception of very windy sites), the cheapest energy source that you can own and generate energy on site without pollution.

Start by understanding what you want to achieve. Because incentives are generally limited, meeting 100 percent of your energy needs from solar electric is rarely the most financially advantageous. The first thing you should do is find out how much energy you use. As a rough rule of thumb, the amount of energy a solar electric system will produce in Oregon is between 1.0 and 1.4 kilowatt hours (kWh) for each watt of installed capacity. Thus, if you use 6,000 kWh of electricity each year, a 2,000-watt system will produce between 2,000 and 2,800 kWh. A second rule of thumb is that systems will generally cost between \$6 and \$8 per watt, professionally installed. Current incentives will generally cover between 50 and 70 percent of this cost.

The most common size limit for solar electric is due to financial reasons. In Oregon, residential systems are typically between 2,000 and 3,000 watts. Commercial systems range from small demonstration projects of a few thousand watts to a hundreds of thousands watts in size. Ask yourself:

- How much do you need?
- What reasons do you have for buying solar electric power?
- How much energy would you like to produce?
- Estimate the system size (measured in watts) where each watt produces 1.0 to 1.4 kWh per year

- Estimate the system cost where each watt costs between \$6 and \$8 per watt.
- Understand what are the incentive limits – state, federal, local utility. These may change from time to time. State and federal incentives are for residential systems, making systems larger than about 2,000 watts dramatically more expensive.

Site Evaluation

As with any solar energy technology, it is very important to conduct a quick assessment of your site to see if it is appropriate for solar before you call a solar company. Consider the following:

- Little or no shading strikes the site between 10 a.m. and 4 p.m.
- The site is in good condition (roof will not need to be replaced anytime soon, is structurally sound, is unlikely to be vandalized, etc.)
- Future nearby changes will not substantially reduce solar access (neighbors' trees, local construction, etc.)
- Contact your local utility and ask them to send you a copy of their *interconnection agreement* and *net metering policy*.

For utility connected systems, annual energy output is all that matters. More sunlight is available in the sunny months (May-October), and as a consequence, optimal tilt and orientation is not very critical. The solar electric array can face any direction between East and West providing the slope is between 15 than 35 degrees. Steeper sloped roofs should be facing the Southern sky.

For off-grid systems without utility power, wintertime energy is most important. As a result, it is important to have the collectors face South and with a slope between 30 and 50 degrees. Tracking systems may be used to enhance summertime performance, though such systems add cost and may require future maintenance.

Design for performance and longevity

Solar electric systems can last for decades. The technology used in silicon modules (panels) generally come with 25-year performance warranties. The first commercially sold solar modules are still producing power today. The power electronics used to change battery voltages into utility grade power typically come with 5- to 10-year warranties.

Because the payback on these solar electric systems may exceed 20 years, make sure that every component is designed for quality and longevity. Don't try to settle for low-cost mounting equipment or place the system on a roof that needs to be replaced in the near future. The cost of installation (or re-installation following re-roofing) can be thousands of dollars on even a small system.

- Ask your technician for a written statement of how much *useful delivered energy* the system will produce.
- Ask questions about component warranties and expected life.
- Don't cut corners if it will cost you more in the future.

SOLAR THERMAL SYSTEMS

Water Heating

Solar thermal systems come in a variety of types. The most common solar thermal system is the solar water heating for domestic water or pools. Less common are systems that are used for space heating or process heat. All solar thermal systems use roof mounted solar collectors to heat water by sunlight.

Determine your energy needs

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For space heating systems, the collectors will need to be tilted toward the Winter sun. This means that the slope of the collectors will generally be steeper than the roof pitch. A common collector tilt is between 45 and 60 degrees, though this will vary with the size of your system and if any of the energy is used for heating domestic water.

Passive Solar (Space Heating and Daylighting)

Solar thermal systems come in a variety of types. The most common solar thermal system is the solar water heating for domestic water or pools. Less common are systems that are used for space heating or process heat. All solar thermal systems use roof mounted solar collectors to heat water by sunlight.