

SOLAR ENERGY FREQUENTLY ASKED QUESTIONS

Solar energy has grown significantly in popularity over the past 5 to 10 years. As a result, the technology becomes increasingly compelling for homeowners and business owners alike. Here, we've compiled a list of the most frequently asked questions we get related to solar panels and solar energy generally.

1. HOW DO SOLAR PANEL SYSTEMS WORK?

When sunlight hits a solar photovoltaic module (solar panel or PV panel) it causes electric current to flow. The current produced from the PV panels is controlled and regulated by an inverter, which converts direct current (DC) to alternating current (AC), needed for use by household appliances. The electrical panel is where the power gets distributed throughout your house; any excess electricity generated by your solar panel system may be sent from the panel back to your cooperative's power grid. For those with residential, grid-tied solar systems with storage, any excess electricity produced by your system is stored in batteries.

2. HOW MUCH POWER CAN A SOLAR PANEL SYSTEM PRODUCE?

As you might imagine, the amount of power a solar panel system can generate depends on several factors. 1) The size of your system. You can determine how much electricity you want to produce; then size your solar panel system accordingly. Note that you can start out with a small array of panels and add on. A system that will generate 100% of your energy needs is expensive, so most systems are sized to generate only a portion of your home's needs. 2) Your site. If you have a shade-free area from 9 a.m. to 3 p.m., you'll be able to collect more sun and produce more energy than if your site is shaded. 3) Your region. The more sunny days in your area, the more electricity you'll be able to generate from your solar panel system. For example, systems in the Southwest produce more electricity per year than in the northeast. You can find online calculators to help answer this question in more detail; PV Watts is a good one: pvwatts.nrel.gov. Your co-op and reputable installers can also help.

3. HOW DOES SOLAR POWER WORK AT NIGHT OR ON CLOUDY DAYS?

Your system will not generate the power you need at night or on cloudy days, so you need an alternative energy source. Battery-backed or grid-independent solar panel systems use on-site energy storage to store excess energy produced during the day for use when the sun is not producing enough power, whether that's at night or when it's cloudy. Choosing this option will add significant cost and maintenance to your system. Most people opt for grid-connected solar energy systems for reduced cost, maintenance, and high reliability. With this type of system, your cooperative continues to provide energy to you when you need it 24-7. Your solar panel system will produce energy, and even excess energy, on sunny days. Your system will not collect sunlight at night and on cloudy days. That means, you will continue to draw electricity from your cooperative during these times.

4. WILL SOLAR PANELS WORK DURING A POWER OUTAGE?

No, unless they have batteries and are isolated from the grid. All grid-connected solar panel systems must shut down to prevent back-feeding electricity into de-energized power lines that may have fallen or that line crew members may be working on. It's important to have this shut-down feature built into your solar power system to prevent injuries—and even death—to those working on the line.

5. WHAT IS NET METERING AND HOW DOES IT WORK?

Grid connected solar and other distributed energy resources are connected to the cooperative's power lines. That means electricity can flow both ways (to your home from your electric company or cooperative, and from your solar energy system back to the electrical grid). Particularly on sunny days when energy goes unused, your system may generate excess energy that can flow back to the grid and may be sold back to your cooperative. This is known as "net-metering". Many cooperatives and electric companies purchase energy generated by a solar panel system above what the homeowner

uses. Check with your cooperative or utility provider to get specific details for your area, including requirements for interconnection, safety, metering, and applicable rates.

6. HOW MUCH DOES A SOLAR ENERGY SYSTEM COST?

The price of solar energy system components varies depending on the size of the system (generating capacity), type and quality of the components purchased, and complexity of the system selected. The good news for members is that the cost of solar panels and their corresponding components has declined dramatically, while the technology has improved, equally dramatically. Installation costs depend on the size and complexity of the system, but also on the home layout and construction. For example, a simple, south-facing roof allows for an easier install than a roof with hips and valleys. In addition, some homes require structural or wiring upgrades to accommodate a solar panel system. An average 4 kW system may cost between \$10,000 and \$20,000, before credits and incentives. This is based on a typical installed cost of \$2.50 to \$5 per Watt of distributed generation capacity. To determine your costs, look for online calculators to help you estimate your pricing, and also get bids from reputable installers.

7. WHAT INCENTIVES, REBATES, AND TAX CREDITS ARE AVAILABLE FOR INSTALLING A SOLAR PANEL SYSTEM?

State and federal governments and some utility companies offer certain incentives, rebates, and tax credits to those who install solar panel systems. In addition, there may be state or local income tax credits, property tax exemptions, and rebate programs from government agencies. These vary by state, city and utility, and may also depend on whether the solar energy system is purchased or leased. Be sure to consult with your financial and tax advisor.

8. HOW LONG IS THE PAYBACK PERIOD ON A SOLAR PANEL SYSTEM?

One of the most common questions surrounding solar energy is, "How long is it going to take to pay off the solar panels I just installed?" On average, the payback period can range from fewer than 10 years to more than 20 years, depending on the system cost, available rebates and incentives, operation and maintenance costs for the system, insurance, the amount of electricity produced and the retail price of electricity you purchase from your cooperative. Check with your cooperative for more information.

9. HOW LONG DO SOLAR PANEL SYSTEMS LAST?

Certified PV products and solar panel systems generally are reliable, and good for about 30 years, on average. Manufacturers test solar panels for hail impact, high wind, and freeze-thaw cycles to represent real-life situations. Most manufacturers offer 20- to 25-year warranties for panels; extended warranties may be available at an extra cost. Maintenance is required, and you should talk with your system provider on proper care. On average, solar panels degrade at a rate of 1 percent each year. Additionally, make sure your roof is in good shape before installation. Other components like inverters may have a shorter life. Solar panels may outlast the roof they are attached to. Make sure your roof is in good shape or budget for replacement during the life of the system.

10. IS MY HOUSE A GOOD CANDIDATE FOR SOLAR?

To determine if solar is right for your house, you can look at factors such as which direction your home faces, the condition of your roof, and obstructions such as trees and other buildings that may block the sun during the peak generation period of 9:00 a.m. to 3:00 p.m. Solar contractors can provide a more detailed analysis on whether or not your home is suitable for a solar panel system, and your cooperative can offer advice, too.