

Better Buildings Series

A Winning Combination—Design, Efficiency, and Solar Technology

Connecting Your Solar Electric System to the Utility Grid

In the past, most homes with solar electric systems were not connected to the local utility grid. It made sense to install solar electric systems in areas without easy access to the power grid, where the option of extending a power line from the grid might cost tens of thousands of dollars.

In recent years, however, the number of solar-powered homes connected to the local utility grid has increased dramatically. These “grid-connected” buildings have solar electric panels or “modules” that provide some or even most of their power, while still being connected to the local utility.

Owners of grid-connected homes can choose to supply a portion of their energy with solar energy, using the utility for power during the night or on cloudy days. Because of the up-front costs of installing a solar electric system, many of these homeowners initially install systems that meet about one-quarter to one-half of their energy use.

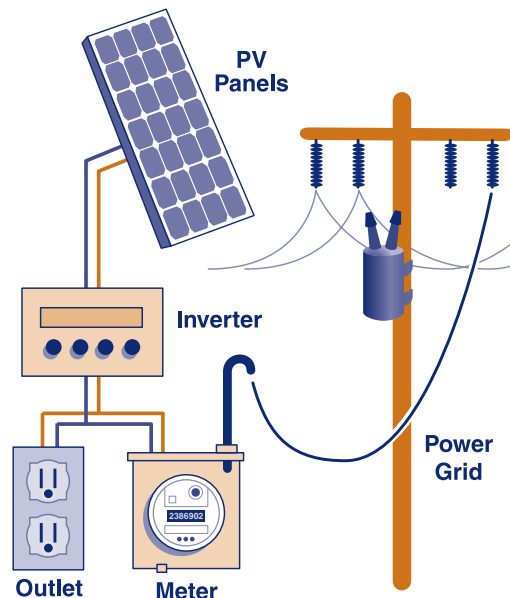
Net metering

Grid-connected systems generally use a billing process called “net metering” or “net billing.” In this process, any energy generated by the solar modules that your home does not use immediately is sent to the utility grid. However, when the solar electric system is producing less power than is needed, you can draw additional power from the grid. If your system is connected to the grid through a single electric meter, your meter can actually run backwards as you contribute excess energy to the utility. The excess electricity is being credited to you at the same retail rate as the electricity you use from the utility. Your utility may require the use of two meters—one that meters your consumption of energy from the grid and the other that meters your contribution to the grid. In this case, your solar-generated excess energy could be credited at the retail rate or possibly at a lower wholesale rate, depending on the utility.

In addition, some utilities bill their customers according to a “time-of-use” rate system. Under this system, customers are billed at a higher rate during certain times of the day, such as during the sunniest daytime hours of summer when air conditioners are working at their peak. If this is the case with your utility, you may be able to “trade” your excess energy to the utility at these same rates. You can therefore benefit from the fact that your solar electric modules produce the most power during those sunny summer days. When you need power from the utility during the off-peak periods, such as in the evening, the rate is usually lower.

If you choose to have a grid-connected solar electric system, and your system produces enough energy in any given month so that you do not have to draw from the grid, you may still receive a small monthly bill. This

Solar electric systems sometimes produce more electricity than your home needs. This extra electricity is either stored in batteries or fed into the utility grid. Homeowners can be given credit by their local power companies for the electricity produced at their homes through “net metering” programs.



is because many utilities charge monthly fees for meter reading. Again, check with your local utility.

Connecting to the grid

One of the most important steps in purchasing a grid-connected solar electric system is choosing a provider with experience. A good provider will also have a properly licensed electrical contractor, have enough years of experience to have demonstrated an ability to work with customers, and be able to compete effectively with other firms.

A good provider should be familiar with your local utility's regulations on interconnection requirements. If your provider is not familiar with these requirements, check with your local utility, state energy office, or state or local Public Utility Commission for details.

Your solar electric provider should supply you with everything you need to run your system, including a specific type of inverter for grid-connected systems, batteries (if you want backup power), and a special electric meter. As mentioned already, some utilities require you to have one electric meter that runs both forward and backward. Other utilities require two separate meters: one for incoming power you receive, and one for power you generate that goes back into the system. These meters are sometimes paid for by the utility, but may be part of your provider's price for the system.

As part of the installation of your solar electric system, you will need to sign an interconnection agreement with the utility company. Your solar electric provider may be



William Lord/PIX11023

able to handle the negotiations and paperwork with the utility, but this contractual agreement is between you and your local utility. Be sure to read the fine print in this agreement, which may differ considerably from one utility to another. It could range from a short one-page statement to a lengthy booklet. In either case, the fine print may contain references to liability issues that you will want to fully understand before signing the contract.

Also, be sure to speak with your homeowner's insurance provider, because the solar electric system itself will need to be added to your policy. In many cases, you may have to add a rider to your policy for the grid-connected system.

More information

Contact your local utility for more information about its particular practices. The general customer service representatives may not be familiar with net metering, so several phone calls may be necessary to find the correct contact person. Your solar electric provider should also have more information.

To learn about local incentives in your area, go to the national Database of State Incentives for Renewable Energy (www.dsireusa.org). This Web site also includes rules, regulations, and policies for many areas across the nation.

The U.S. Department of Energy's Energy Efficiency and Renewable Energy Network (EREN) has compiled a list of state energy contacts (see www.eren.doe.gov/state_energy). These contacts may be able to assist you with problems you may be having with your local utility.

This house in coastal Maine generates its own electricity from a 4.25-kilowatt solar electric system beautifully integrated into the rooftop. Through a net-metering agreement with Central Maine Power, excess solar electricity is sent to the utility grid, effectively spinning the utility meter backward. The homeowners get this power back in an even exchange at night and during periods of minimal sun.



Ed Hancock/PIX10299

This home in Virginia is powered by a 6-kW, grid-connected solar-electric system and is being monitored by NREL's Center for Buildings and Thermal Systems.



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