

Grid-Tie System Design

Budget, roof dimensions and other site-specific factors often are determining factors in system design. If you are planning to mount your array on a roof, decide which panel best fits into the available roof space, taking into consideration obstructions such as chimneys, plumbing vents and skylights. A grid-connected solar system consists of solar panels, output cables, IronRidge roof or ground racks, inverter(s), and a AC disconnect.

This worksheet will help you decide what size solar package would be required to off-set your electric bill. This will be the largest system that would be cost-effective to install. A smaller system can reduce part of your bill, or eliminate higher cost electricity in locations that have progressively increasing rates as consumption increases. Use this information and the amount of available space to get a rough idea of your solar kit size.

Solar Array Worksheet – Determine the array size for your grid-connected package.

Step 1 Find your most current 12 month kWh from your electric bill.

This will be in kilowatt-hours (kWh). Due to air conditioning, heating and other seasonal usage, it is a good idea to look at a 12 month total / 365 days.

Step 2 Find your daily average electricity use.

Divide the yearly total of kWh use by 365 (days)

Step 3 Find your location's average peak sun hours per day.

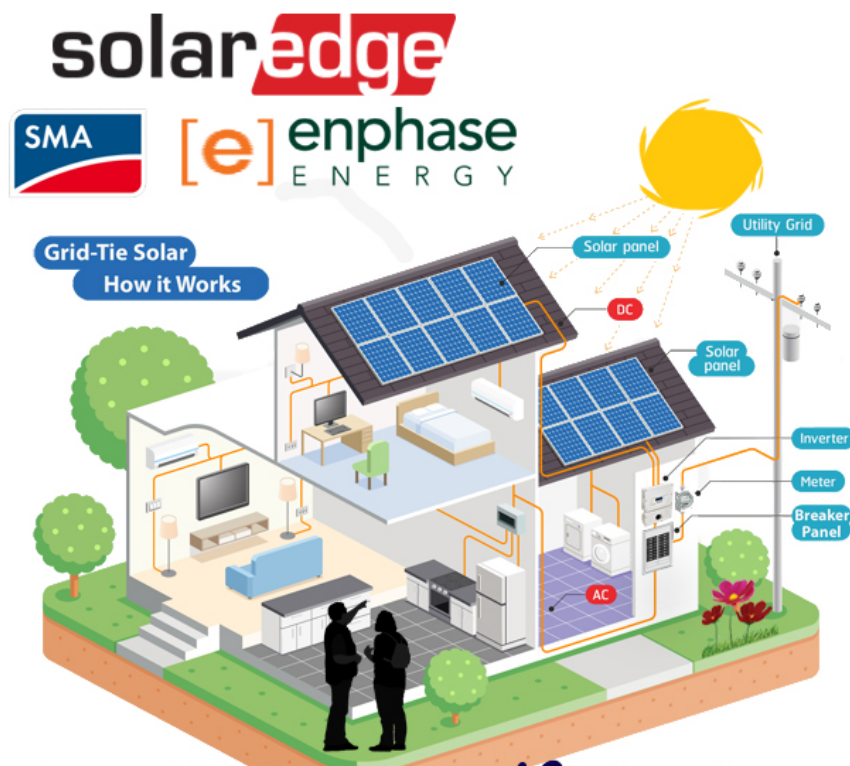
See the solar insolation maps by clicking here: [Sun Hours Used in Solar Calculations](#)

Step 4 Calculate the system size (AC watts) to provide 100% of your electricity.

Divide your daily average electricity use by average sun hours per day. For example, if the daily average electricity use is 30 kWh, and the site is in California, system size would be: $30 \text{ kWh} / 5 \text{ h} = 6 \text{ kW AC}$. (Multiply kWh by 1000 to get AC watts.)

Step 5 Calculate the number of solar panels required for your home or commercial system.

Divide the system AC watts in Step 4 by the watt rating of the solar panels to be used, then divide by the inverter efficiency, usually 0.98, and you get the total number of modules required. (Round this number up)



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