

When Does A Solar Energy System Make Sense for Remote Site Power?

Can you answer “Yes” to the six questions below?



SunWize® Power Ready System in Antarctica.

At a recent SunWize industrial training, a participant asked the fundamental question, “How do you know when solar is the right power solution?” This is a key question when considering solar (photovoltaics or PV) as a power supply for off-grid, remote-site equipment. Like any advanced technology, PV is extremely effective when used properly, so every effort should be taken to see that the technology provides the best possible value to the customer.

In order to consider PV for your application, you should be able to answer “yes” to most of the following questions:

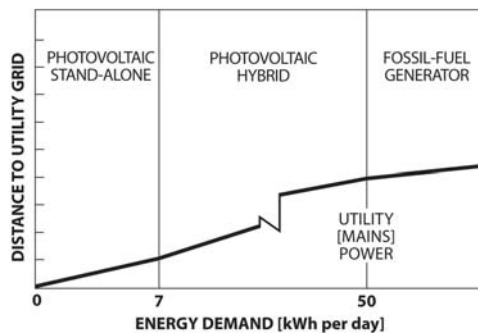
1. Is your load less than 300 watts continuous (7 kilowatt-hours/day)?
2. Is your load in a remote location with limited or no access to commercial (grid) power?
3. Is your load driven by direct current?
4. Is your site largely unattended year round?
5. Is your load operating in harsh environmental conditions?
6. Is your application critical in nature – is reliable power essential?

Let’s look more closely at each question to better understand its role in determining the value of PV for remote-site power.

1. Is your load less than 300 watts continuous (7 kWh/day)?

There is no technical barrier to the use of PV for any load. However, since the size of the PV array (the total collection of PV modules required) and the battery bank is directly proportional to the daily load requirement, at a certain size PV becomes very large and very expensive. PV systems make great economic sense when powering loads at 300 watts of continuous demand or less.

For larger loads, we can consider PV in a hybrid combination with an on-demand generator, such as a diesel or propane generator set. Doing so expands your load range up to as much as 2000 watts continuous. This is shown in the chart below with stand-alone PV serving loads up to 7 kWh/day (300 watts), PV hybrids up to 50 kWh/day (2000 watts) and stand-alone on-demand generators for loads above 50 kWh/day.



2. Is your load in a remote location with limited, or no access to commercial (grid) power?

PV is an excellent remote-site technology since it is co-located with the load equipment. It does not require long-distance trenching of power lines. The power goes where the load goes, making PV an ideal distributed power supply.

3. Is your load driven by direct current?

PV is a DC technology. PV modules and lead-acid batteries are DC devices. This by no means implies we can’t generate AC power when needed. We can, and we do, using a DC to AC inverter. However, if your load is DC you can power it directly from the DC output of a PV system, versus having to rectify an AC utility-line voltage down to DC.

4. Is your site largely unattended year round?

PV is almost a pure maintenance-free power technology. Other than annual checks a PV system will operate unattended year round. If you have a remote site you plan to operate unattended for the bulk of the year, you will find PV to be totally compatible with your equipment’s maintenance regime.

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5. Is your load operating in harsh environmental conditions?

Since a PV system is designed to operate reliably in remote, rugged sites, it is built to a very demanding set of environmental standards. PV systems operate successfully on all seven continents (yes, even Antarctica) and are exposed to every conceivable temperature and precipitation extreme.

6. Is your application critical in nature – is reliable power essential?

Well-designed PV systems have been successfully powering a huge variety of industrial load equipment for the past 30 years. When properly sized, the rugged nature of PV systems makes them the most reliable form of power on earth. No other power source, whether it be the utility mains, an on-demand or continuously operated generator set, or another form of renewable energy, can compete with the inherent reliability of a well-designed PV system.

In summary, when you are considering the use of PV as a power source, see if you answer yes to most of these six fundamental questions. If you can, you will be very well served for many years with a robust, rugged, source of power.



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