



## 5 5 kw solar system

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Residential solar installations run from a measly 2kW to a monstrous 25kW (or even bigger). Twenty-five kilowatts (kW) is a huge solar installation (at least for residential projects), equal to about 100 solar panels.

Don't have that much space on your roof? Don't worry! Most installations, such as the 5kW solar system, are well below that size. Most of us don't even use enough electricity to warrant an installation that big! In fact, according to the National Renewable Energy Lab (p.5), the average installation is about 5.6kW.

Before we get into the details of a 5kW installation, here's a secret to help you save big bucks: before starting any solar project, take some simple steps to lower your overall energy use. Replace light bulbs with LEDs, add insulation if needed, and seal up air leaks around your doors and windows.

Believe it or not, efficiency measures are actually a cheaper way to save money than installing solar! And with your lower electricity use, you're able to install a smaller solar installation, thereby saving you even more. So if you're thinking about solar, remember efficiency first!

Don't know where to start? Have an energy audit performed on your home. During this process, a tech tours your house and notes any place where you're wasting electricity. At the end of the audit, they'll give you a prioritized list of actions that can lower your energy use.

A 5kW solar installation produces 5 kilowatts of electricity under perfect conditions. With LED light bulbs using about 9 watts (or .009 kilowatts), a 5kW installation could power 555 LEDs indefinitely - as long as perfect conditions remained 24/7 (5000 watts / 9 watts = 555 LEDs).

Over the course of an hour, one 9 watt LED uses 9 watt-hours of electricity. A 5kW solar installation, under perfect conditions, produces 5 kilowatt-hours (kWh) over the course of an hour, under perfect conditions. Over 10 hours, it produces 50 kWh.

In reality, we aren't lucky enough to have perfect conditions. The sun goes down each night. Storms come in. Rain pours down. Some places, like Washington and New York, just don't enjoy the same ultra-strong sunlight than Arizona and Nevada do.

In reality, your solar installation will produce less than its nameplate capacity. Exactly how much will depend on your location. The National Renewable Energy Lab's PVWatts solar calculator gives us a glimpse into what we can expect a 5kW installation to produce over a year in different areas of the US. Let's take a look:

A 5kW solar installation in Reno, NV, (one of the best states for solar) produces almost 2x more electricity



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annually than the same installation in Anchorage, Alaska! That's obviously a pretty extreme example - installations contained within the contiguous US are much more similar. You can see that Pittsburgh, PA, only produces about 30% less than Reno.

The average home in the US uses about 10,800 kWh of electricity each year, so a 5kW installation will cover about 40% to 80% of the average home's energy use (again, depending on location). Whether or not an installation of this size would cover your own energy use depends on how much electricity you use each year, and how much a 5kW solar installation produces in your area.

The typical residential solar panel produces about 265 watts (or .265 kilowatts). Yingli Solar, for example, produces residential solar panels in their popular YGE 60 Cell Series from 250 to 275 watts. At 265 watts, you'd need 19 solar panels to make up 5kW.

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