House wind turbine

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Homeowners considering solar as a backup for grid power or as a standalone energy source should take a second look at supplementing their photovoltaic (PV) panels with wind turbines. Wind power is technically a form of solar energy, because it’s the sun that drives the winds. Still, wind turbines produce electricity in a different way than PV panels. Crucially, they work when the sun isn’t out.

That doesn’t mean they work in every situation. My land mates and I would dearly like to install wind turbines on our off-grid property, but despite being located on a ridge overlooking the ocean, we don’t get enough wind to make them practical. They won’t generate any electricity if the wind doesn’t blow hard enough to make them spin, and even if they do spin, our average wind speed is too low to make them spin fast enough to generate significant amounts of electricity.

At least that was the situation the last time we checked, about 10 years ago. With improvements in technology, there may be new models that would work for us, so we plan to revisit the possibility of installing one or more in the near future. Windmills have been a thing since the Middle Ages, and they are a valuable resource for eco-conscious and pennywise homeowners.

Since the mid-20th century, wind farms have become common enough to the point that virtually everyone has seen a giant windmill from their car. Shrink one of those to about a quarter of its size, and you have one type of home wind turbine. Manufacturers have come up with a number of creative designs that fall into one of two categories: horizontal axis and vertical axis.

Because wind is unpredictable, you don’t normally use the energy generated by a wind turbine directly. You either store it in a battery or feed it through the panel to lower your energy costs. Some turbines come with batteries pre-installed while others are designed to tie into the battery pack for an existing PV system.

Free energy from the wind? Yes, please. It’s the obvious and most important benefit of home wind turbines, and when you compare them to PV panels, which also generate free electricity, they have these advantages:

All the above notwithstanding, wind turbines have serious drawbacks that can make them a less attractive choice than PV panels:

If your residential situation is suitable for a wind turbine, it can be a great investment. A small wind turbine can be surprisingly affordable -- as long as you don’t have to mount it on a tall tower to catch the wind and rack up astronomical installation costs in the process. Vertical-axis turbines that can pump 1.5 kW of power into your solar battery bank or feed it to the grid cost less than $500.

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A wind turbine is a bad investment if you don’t get enough wind to make it spin, but some models have very low cut-in speeds (the minimum wind speed needed to make them spin) of less than five mph, and they achieve optimal energy production at speeds around 30 mph. This is an improvement from 10 years ago, and it’s the reason why we’re rethinking our decision to put one on our property.

Some turbine manufacturers advertise DIY installation, but Energy.gov advises against doing the job yourself. Choosing site placement and physically mounting the turbine are only half the job -- the unit has to be hooked up to your electrical system. A pro has the knowledge to do the job according to code and will also handle the permits.

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