# Wind solar hybrid

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Incorporate passive solar design concepts into your home, which include using ...

Currently, requirements for connecting distributed generation systems--like ...

Unstable electricity prices, human-induced climate change, and a greater desire to do the right thing for Planet Earth have led to much innovation in alternative power systems. One such development is wind-solar hybrid systems with two sources of natural, renewable energy: the wind and the sun. What is this hybrid power generation system, how does it work, and is it a legitimate option for homeowners? We answer all these questions and more below.

A wind-solar hybrid system is an alternative power generation system that pairs two great forces in green energy: photovoltaic (solar) panels and wind turbines. By harnessing the strengths of wind and solar power, this hybrid system maximizes energy production. It is especially useful in regions with fluctuating weather patterns.

The solar power portion of this hybrid system converts sunlight into electricity during sunny periods. When the wind picks up, the wind generators or wind turbines start spinning and generate electrical energy. Because this hybrid power system uses both renewable energy sources, it helps ensure continuous power output by reducing dependence on a single energy source. And it does so without depending on a drop of fossil fuels.

The cost of a solar-wind hybrid renewable energy system can vary depending on its power generation capacity and complexity. The system"s overall cost will include installing solar panels, wind turbines, storage batteries, and power control systems, but you"ll also need to consider other variables like site preparation, permits, and maintenance. This can make providing an exact estimate difficult without a site inspection.

The first thing that comes into play when pricing out this renewable electric system is the varying cost of solar panels. This can vary greatly depending on the type and quality of the solar panels you choose. If you opt for high-efficiency solar panels, you can expect to pay a premium to receive better power generation per panel. Opting for lower-cost panels with a lower efficiency rating will still provide a significant amount of clean energy.

For example, the most energy-efficient solar panels are monocrystalline solar panels, and you can expect to pay $1 to $1.50 per watt. The slightly less efficient polycrystalline solar panels are more budget friendly at 75 cents to $1 per watt.

Wind turbines, another key variable in a wind-solar hybrid system"s cost, also come in various sizes and prices. A wind turbine"s cost varies based on its rated capacity, rotor diameter, tower height, and the specific

wind conditions at the installation site. Opting for a larger turbine will typically result in a higher upfront cost but can generate more electricity, making them a suitable choice for areas with consistent wind patterns. But you also have to consider spatial concerns, as a larger turbine will require more real estate than a smaller roof-mounted unit.

If you plan to build an off-grid system -- or one that can continue operating in power outages or when there"s no wind or sun -- you"ll want storage batteries. These batteries store the excess power your solar cells and wind power system generate during peak times, so you can use it when the generation is low or non-existent.

Storage battery costs vary based on capacity and technology. Lithium-ion batteries are the most common choice because they have high energy density and long lifespan, but they also come at a higher cost than other battery types. Generally, these batteries will run you about $283 per kWh, not including installation, inverters, and other requirements.

So that"s a whole lot of numbers to consider, and we still have yet to get into the various inverters and other equipment you"ll need, as well as installation and site-prep costs. On average, you can expect the full cost of a 6kW wind-solar hybrid system to run about $12,654 after federal incentives. Adding in the battery packs would tack on another roughly $8,000. The average home requires a 6.62-kW system to match its power consumption, so your costs will likely vary.