

## Using Wind and Solar Together

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Wind and solar make a great combination. Often when the sun is covered, it's windy, and vice versa. They also cover different times of the day. Wind can operate 24 hours a day, and solar doesn't do very well at night. Together, they balance the grid better and enable a home or business to have better coverage and less reliance on batteries.

In practice, with small renewable energy systems, they need to be connected separately in most cases. The reason is that wind has wider alterations in voltage, whereas solar panels produce a steady voltage. So, they need different inverters to connect to the grid.

The wind turbine produces irregular AC current from the generator, so it needs to be converted into DC current, and then the inverter converts it back to a high-quality AC that can be used by the grid, appliances, etc.

If you have solar and wind connected to a battery, then you can store the energy they both produce. To make wind work in this case, the voltage of the battery should match the voltage of the wind. A wind charge controller can do that, but to a limited extent. That is no problem with lower output wind turbines, usually 500 watts capacity or lower, which can usually connect to a 48-volt battery, as can solar. Many solar battery systems have lower voltage; in that case, a wind turbine's output may be limited by battery capacity. This is a question for your local installer or location, as there are many systems available. In general, a higher battery voltage works better for wind. If you have 12-volt batteries, you can attach them in a series to make a higher voltage. Again, this is a question for your local electrician.

The advantage of using such a batter system is that then the combined solar and wind just need one inverter at the end to connect to the grid or appliances.