Small wind power plant

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Wind speed distribution, energy distribution, and Weibull function fit (c = 5379; k = 2023) [22].

Energy production estimates based on three different wind speed data types [22].

Energy produced by a 5 kW rated turbine with different efficiency curves; the series are tied to the curves presented in Figure11 [22].

Estimated energy generated for different tower height variants (10, 20, and 30 m)—wind speed obtained with the empirical power law [22].

If you place an object like a rotor blade in the path of that wind, the wind will push on it, transferring some of its own energy of motion to the blade. This is how a wind turbine captures energy from the wind. The same thing happens with a sail boat. When moving air pushes on the barrier of the sail, it causes the boat to move. The wind has transferred its own energy of motion to the sailboat.

When you talk about modern wind turbines, you"re looking at two primary designs: horizontal-axis and vertical-axis. Vertical-axis wind turbines (VAWTs) are pretty rare. The only one currently in commercial production is the Darrieus turbine, which looks kind of like an egg beater.

VAWTs may be used for small-scale turbines and for pumping water in rural areas, but all commercially produced, utility-scale wind turbines are horizontal-axis wind turbines (HAWTs).

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