

# **Wind power generation variable capacity system production**





## Overview

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What is the capacity factor of a wind turbine?

Capacity factor represents the average generation over time. Capacity factors of wind plants may vary from 20% to 50% depending on the turbine type, location, and wind regime (see Power Curve).

What is the relative capacity value of wind generation?

This relative capacity value is important. Wind generation is added to a system for its energy value, not its capacity value. Wind generation capacity value is not zero, but tends to fall more in the 10 to 15 percent of nameplate range compared to thermal units that are in the 90 to 95 percent range.

What is wind power generation?

Wind power generation is power generation that converts wind energy into electric energy. The wind generating set absorbs wind energy with a specially designed blade and converts wind energy to mechanical energy, which further drives the generator rotating and realizes conversion of wind energy to electric energy.

Is wind generation included in capacity reserve margin calculations?

Wind generation is included in capacity reserve margin calculations at 8.7 percent of nameplate capacity, based on effective load-carrying capability. In the Monte Carlo approach used by 24 Keane, Milligan, Dent, Hasche, D'Annunzio, Dragoon, Holttinen, Samaan, Soder, O'Malley, "Capacity Value of Wind Power".

Why is wind plant performance a function of aggregation?

Transactions on Power System. In Press. wind plant performance is a function of equivalent aggregation of locations, which is the ultimate driver of the wind speed diversity and resulting per-unit smoothing of wind energy.



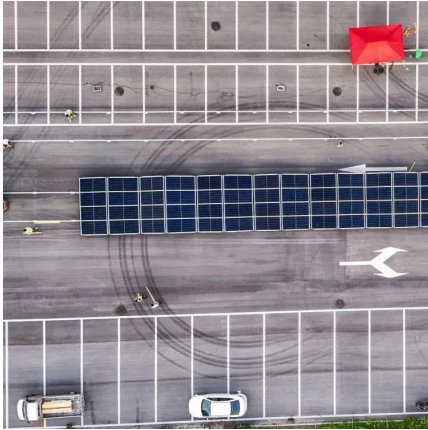
What percentage of long-term capacity is a wind plant?

With 4 or 5 years of data, the deviations are within 10 percent of the long-term capacity value. For example, a wind plant fleet with a long-term capacity value of 20 percent of rated capacity could be estimated to within +/- 2 percent of its long-term value.



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### [Variable Speed Wind Power Generation System Participating into ...](#)

This paper investigates the wind power generation system (WPGS) participating in primary frequency regulation (PFR). WPGS when working under deloaded operation or a specified off ...

### [Understanding Variable Output Characteristics of Wind Power](#)

Since wind energy is a technology of variable output, it needs to be considered as just one aspect of a variable, dynamic electricity system. At modest penetration levels, the variability of wind is ...



### [GeneratorSE: A Sizing Tool for Variable-Speed Wind Turbine ...](#)

The sizing tool mainly considers available torque, mechanical power, normal and shear stresses, material properties, and costs to customize designs of variable-speed wind turbine generators ...

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