

## Solar Energy South Africa

# Three measures and one case for wind turbine generators



## Overview

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What are wind turbine generator technologies?

This chapter presents an overview of wind turbine generator technologies and compares their advantages and drawbacks used for wind energy utilization. Traditionally, DC machines, synchronous machines and squirrel-cage induction machines have been used for small scale power generation.

How does a wind turbine work?

Scheme of the main components of a large-scale wind turbine. The rotor transfers the kinetic energy from the wind to a revolving shaft that drives a generator to produce electric power. The generator has a magnetic field, which is created by permanent magnets or electromagnets made from rare earth materials.

What are the different types of wind turbine generators?

Other types of wind turbine generators have started to penetrate into the wind markets to a differing degree. The analysis suggests a trend moving from fixed-speed, geared and brushed generators towards variable-speed, gearless and brushless generator technologies while still reducing system weight, cost and failure rates.

How does an indirect drive wind turbine work?

As the name suggests, indirect drive wind turbines transfer the mechanical energy to the generator through a series of gears instead of a direct rotor-to-generator drive. With the aid of gears, this drive mechanism provides faster speeds at the generator end, enabling the use of relatively smaller generators.

What are the components of a wind turbine?

It consists of a wind turbine, a DC generator, an insulated gate bipolar transistor (IGBT) inverter, a controller, a transformer and a power grid.

How to optimize a wind turbine generator?

One of key components in the wind turbine is its drive train, which links aerodynamic rotor and electrical output terminals. Optimization of wind turbine generators can not be realized without considering mechanical, structural, hydraulic and magnetic performance of the drive train.

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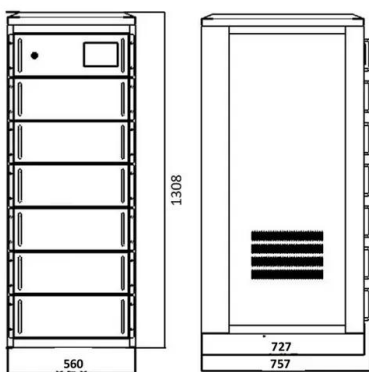


### Mechanism analysis and control measures of wind turbine generators

As long as the appearance and continual commission of the wind-thermal-bundled (WTB) high-voltage direct current (HVDC) transmission system, in order to ensure security and stability, it ...

### Preventive Maintenance and Fault Detection for ...

Vigilant fault diagnosis and preventive maintenance has the potential to significantly decrease costs associated with wind generators. As wind energy continues the upward growth in technology and continued worldwide ...



### [How a Wind Turbine Works](#)

Step-by-step look at each piece of a wind turbine from diagram above: (1) Notice from the figure that the wind direction is blowing to the right and the nose of the wind turbine faces the wind. (2) The nose of the wind turbine is constructed ...

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