Solution to high generator wind temperature

Which generator is best for a wind turbine?
Small wind turbine applications are therefore better using a gearbox or an oversized direct-drive generatorthat can be naturally cooled. The direct-drive generator is therefore more suitable for medium to large wind turbines.

How can wind turbines be cooled?
For example,the industry standard for cooling offshore large wind turbines adopted by many OEMs is forced air coolingin a closed loop configuration. This solution is bulky and furthermore increases in size and weight with the wind turbine output power.

How to improve wind power generation reliability and reduce maintenance?
The wind power generation industry often prefers less performant conservative solutions against more performant but riskier ones. The steps that can be taken to increase reliability and reduce maintenance are as follows: Adopt a safe cooling fluidinside the generator like air or an inert gas.

What types of generators are used in offshore wind farms?
Generators Totally five types of generators are used in offshore wind farms, and they are: Doubly-Fed Induction Generator (DFIG), Squirrel-Cage Induction Generator (SCIG), Wound-Rotor Induction Generator (WRIG), Permanent Magnet Synchronous Generator (PMSG), and Electrically-Excited Synchronous Generator (EESG).

Should a generator be connected to a wind turbine?
One major design decision is whether to directly connect the generator's shaft to the wind turbine or to use a gearbox[10,11,12,13,14,15,16]. Both designs have pros and cons. The gearbox option allows the generator to operate at a higher speed than the one provided by the wind turbine blades.

Are direct-drive permanent magnet generators suitable for high-power wind turbines?
Direct-drive permanent magnet generators for high-power wind turbines: benefits and limiting factors Promising direct-drive generator system for large wind turbines Experimental study of the cooling of a closed type electric motor Convective heat transfer in the entry region of an annular channel with slotted rotating inner cylinder

This paper describes a concept design for a 25 MW partially superconducting wind power generator intended for self-contained offshore production of green hydrogen. The ...

This paper investigates the technological challenges related to generators for offshore wind turbines, and is organized like this: Section 2 reviews the generators in global ...

Solution to high generator wind temperature

At present, wind engineering for high-rise buildings mainly focuses on the following four issues: wind excitation and response, aerodynamic damping, aerodynamic modifications and proximity effect.

This paper will give review about the design of superconducting generator which has power generation rating more than 10MW for offshore wind turbine. Nowadays conventional generators become more bulky and inefficient to increase their power generation rating. Superconductors may be the possible solution to construct wind turbine generator especially for offshore wind ...

High temperature is one of the limiting criteria of machine operation, and for the generator it is the main drive for insulation aging (Shipurkar et al., 2016). Possible cooling ...

A full-size stationary experimental setup, which is a pole pair segment of a 2 MW high-temperature superconducting (HTS) wind turbine generator, has been built and tested under the HTS-GEN project ...

This paper is one in a series intended to report on the development of a new type of generator for wind energy; a compact, high-power, direct-drive permanent magnet synchronous generator (DD-PMSG) that uses direct liquid cooling (LC) of the stator windings to manage Joule heating losses. ... The transient temperature solution for the copper ...

A solution is proposed to substantially reduce generator winding and bearing temperature (Singh et al., 2018). In this paper Issue of bearing temperature difference at drive end (DE) and non-drive end (NDE) in IC6A1A6 ...

The article presents a solution to improve the performance of the wind turbine system and at the same time making it a commercially attractive choice. This can be achieved by reducing generator windings and bearings operating temperature, and also reducing its cost and weight at the same time.

o High current density in SC winding, high flux density o Reduction of both volume and ... SC wind generator according to TECNALIA concept (PTC/ES2009/070639) o 10 MW, 8.5 rpm, 11.2 MNm ... DAQ (pressure, temperature, magnetic field, voltage). Temperature controller MgB2 coils satisfactorily tested .

In this study, the operating current and torque of surface-mounted permanent magnet (SPM) wind power generators with high temperature superconducting (HTS) armature windings are analyzed.

This paper presents analysis, design, and optimization of a high-power permanent-magnet synchronous generator (PMSG). This generator is introduced in a large-scale wind turbine which can be used ...

On most generators by Welland Power and other manufacturers you will find two different water/coolant temperature detection devices fitted, a switch and a sender. The Switch, often supplied by the engine

manufacturer is used to shut down the engine in the event of the coolant becoming too hot. On fault, it closes to earth.

A direct-drive solution couples the generator shaft directly to the wind turbine propeller. Assuming the same mechanical output power from the wind turbine blades, without ...

This section provides a detailed discussion of the impact of wakes generated by 15 MW and 5 MW wind turbines on 10 m wind speed, turbulent kinetic energy, 2 m temperature, 2 m specific humidity ...

The cost and mass of an offshore wind turbine power-train can be reduced by using high-temperature superconducting generators, but for a successful commercial design the superconducting generator ...

The solution to the problem of reducing the weight of wind turbines can be implemented with the introduction of HTS technologies. The article presents an overview of the foreign developments of wind generators based on high-temperature superconducting (HTS) materials, describes of the design first of Russia 1 MVA superconducting synchronous ...

Increasing the capacity of offshore wind turbines, improve reliability, reduce the weight of the generator, direct drive high temperature superconducting generators feasible than DFIG and PMSG. Removing the gear box has been considered to be the largest benefit by reducing the weight and volume of the wind turbine system [3].

Wind movement, weather extremes, and temperature cycling are all potential causes of generator failure. When relative humidity surpasses 60%, condensation occurs on cold surfaces inside the tower and nacelle.

High temperature superconducting wind turbine genera tors (HTSWTGs) The ability of superconductors to increase current density allows for high magnetic fields, leading to a ...

High temperature superconducting (HTS) wind turbine generators (WTGs) are expected to offer a compact and lightweight direct drive train for large offshore wind turbines.

PDF | On Jan 1, 2024, A. Jabbari and others published Design Optimization of a Permanent Magnet Generator for Direct Drive Wind Turbine | Find, read and cite all the research you need on ResearchGate

To reduce maintenance costs of wind turbines (WTs), WT health monitoring has attracted wide attention, and different methods have been proposed. However, most existing WT temperature monitoring methods ignore the fact that various wind conditions can directly affect internal temperature of WT, such as main bearing temperature. This paper analyzes the effects ...

Permanent magnet generators become the most promising solution for high power wind generator due to their

high power density, high efficiency and high reliability ...

In this paper a method for turbine speed control of induction generator with full-scale double AC-DC-AC power converter to maximize absorbed wind power in the wide wind ...

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Web: https://maximgroup.co.za/contact-us/
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