Are counter-rotating turbines more efficient?

It was found that both counter-rotating configurations were more efficientin power generation than the control case in which all turbines have one clockwise rotor; the alternate-row case was found to produce 1.4% more power and the dual-rotor case was found to produce 22.6% more power than the control wind farm.

Does distance affect the performance of a vertical axis counter-rotating wind turbine?

Didan et al. [2] investigated experimentally the performance of a novel vertical axis counter-rotating wind turbine, and Pacholczyk et al. [3] analyzed a new small CRWT considering the influence of distance between the two wind rotors, its performance being highlighted using the computational fluid dynamics (CFD) method.

Does a counter-rotating wind system generate more electricity than a conventional wind system?

Several studies have compared the efficiency of counter-rotating vs. conventional WTs,concluding that counter-rotating systems can generate up to 40% more electricity. Thus,Climescu et al. [49]analyzed the dynamics of counter-rotating vs. conventional wind systems with a cylindrical gearbox.

What is a contra-rotating vertical turbine?

Under the surface,one turbine is fixed to the rotor,the other to the "stator," doubling the relative speed of rotation as compared to a static stator,and generating a whole bunch of electricity we can burn our toast with. The company calls this a contra-rotating vertical turbine,or CRVT.

Could a floating wind turbine revolutionize wind power?

Norway-based company World Wide Wind (WWW) has unveiled a new kind of floating,vertical-axis wind turbine (VAWT) that has the potentialto revolutionize the way we capture and utilize wind power. This novel VAWT design uses two sets of tilting,contra-rotating blades to deliver twice the output of today's largest turbines.

Could a turbine halve the cost of offshore wind?

A wildly innovative turbine that could halve the cost of offshore wind is set to go into testing in Norway. The 19-m (62-ft), 30-kW, contra-rotating vertical-axis turbine is a prototype of a design that could scale to unprecedented size and power.

COUNTER ROTATING WIND TURBINE

World Wide Wind is a newly established Norwegian company presenting a novel solution and technology ??? counter-rotating vertical axis turbines ??? specifically designed for offshore floating wind power and representing significant improvements over ???

This paper presents a theoretical study of the dynamic behaviour of a wind turbine consisting of a wind rotor, a speed increaser with fixed axes, and a counter-rotating electric generator, operating in variable wind conditions. In the first part, the dynamic analytical model of the wind turbine mechanical system is elaborated based on the dynamic equations associated ???

In addition, the analyzed wind system with a counter-rotating generator displays better energy performance with low values for output power and ratio of input speeds, whereas the wind turbine with

COUNTER ROTATING WIND TURBINE

One of the rotors is rotating in counter-clockwise direction and the other in clockwise direction. In 2002, Appa Technology Initiatives [2] has built a prototype in California and performed some field tests. The prototype model consisted of a 6 KW contra-rotating wind turbine system with two 2-bladed rotors. The results of these tests indicated

Investigation of the dual rotor counter-rotating wind turbine (CRWT) performance using non-dimensional parameters of the rotor diameter ratio and the rotor axial distance ratio against the characteristics of power coefficient with tip speed ratio (TSR) as input parameters have been successfully carried through CFD simulation.

For the case of a small-scale Darrieus type counter-rotating wind turbine, this effect was demonstrated in the context of the model . In general, the counter-rotation scheme can be applied for a wide range of classical wind turbines and even for novel types of vertical axis wind power systems such as those proposed in [5,6,7].

COUNTER ROTATING WIND TURBINE

The paper presents the results of the research on achieving an increase in the energy efficiency of counter-rotating wind power conversion systems. For this purpose, there have been designed different sizes of wind rotors, were 3D printed and tested in an open-circuit aerodynamic tunnel for different wind velocities and axial distances between

BEMT for the counter-rotating wind turbine is developed for a parametric study. Pitch angles, rotating speeds and radii of the two rotors are chosen as parameters. Maximum total power is obtained when each rotor shares the total power. The rotating speed of the rear rotor should be reduced for the maximum total power. Despite the decrease of the front rotor, it is ???

1. Introduction. The spanwise component of a yawed wind turbine's axial force induces a counter-rotating vortex pair (CVP) that laterally deflects and deforms (Bastankhah & Port?-Agel Reference Bastankhah and Port?-Agel 2016; Branlard & Gaunaa Reference Branlard and Gaunaa 2016; Howland et al. Reference Howland, Bossuyt, Mart?nez-Tossas, Meyers and Meneveau 2016) ???

COUNTER ROTATING WIND TURBINE

The concept of a vertical-axis counter-rotating rotor is used to overcome the starting drawback of small Vertical Axis Wind Turbines (hereafter VAWT). For this purpose, we attempt to simulate the flow around a Counter-Rotating VAWT (CR-VAWT) with Large Eddy Simulation (LES) and both starting behavior and power performance is outlined by

World Wide Wind unveils gigantic contra-rotating turbine . Norway-based company World Wide Wind ( ) has unveiled a new kind of floating, vertical-axis wind turbine (VAWT) that has the potential

This paper is focused on the optimal design, simulation, and experimental testing of a counter-rotating double-rotor axial flux permanent magnet synchronous generator (CRDR-AFPMSG) for wind turbine applications. For the optimal design of the CRDR-AFPMSG, the particle swarm optimization algorithm to maximize efficiency and power density and minimize ???

COUNTER ROTATING WIND TURBINE

A small Counter-Rotating Wind Turbine (CRWT) has been proposed and its performance has been investigated numerically. Results of a parametric study have been presented in this paper. As parameters, the axial distance between rotors and a tip speed ratio of each rotor have been selected. Performance parameters have been compared with reference ???

A wildly innovative turbine that could halve the cost of offshore wind is set to go into testing in Norway. The 19-m (62-ft), 30-kW, contra-rotating vertical-axis turbine is a prototype

In the present work, the aerodynamic performance prediction of a unique 30 kW counter-rotating (C/R) wind turbine system, which consists of the main rotor and the auxiliary rotor, has been investigated by using the quasi-steady strip theory. The near wake behavior of the auxiliary rotor that is located upwind of the main rotor is taken into consideration in the ???

COUNTER ROTATING WIND TURBINE

The objective of this study is to assess the effects of using counter-rotating wind turbines on the performance of a wind farm. Large eddy simulations, coupled with the actuator line model, were conducted to investigate flow through a test wind farm with 48 large-scale wind turbines with the same layout as Lillgrund in Sweden. Two counter-rotating cases were tested; ???

3.1 Single rotor wind turbine and counter-rotating wind turbine geometry. The wind turbine selected for this study is NREL Phase VI since there are enough data about its aerodynamic and acoustic performance. NREL Phase VI with airfoil S809 is a wind turbine operating with a stall-regulated method and has 10.058 m diameter and 19.8 kW rated power.

Wind energy conversion systems play a major role in the transition to carbon-neutral power systems, and obviously, a special attention is paid in identifying the most effective solutions for a higher valorization of the local wind potential. In this context, this paper presents a comparative study on the energy performances of wind turbines (WTs) that include a counter ???

COUNTER ROTATING WIND TURBINE

However, although the counter- or contra-rotating concept has shown its significance in improving the performance of both types of wind turbines, by comparing the outputs of the counter-rotating horizontal-axis wind turbine (CRHAWT) and the counter-rotating vertical-axis wind turbine (CRVAWT), the latter has clearly been proved to have the

Our review on counter-rotating wind turbines indicates that the existing literature is focused on single isolated wind turbines, and there is a dearth of published research exploring ???

The dual rotor wind turbine (DRWT) offers more rapid rates of wind energy extraction. The current study intends to compare the performance of the turbine with and without the addition of a

COUNTER ROTATING WIND TURBINE

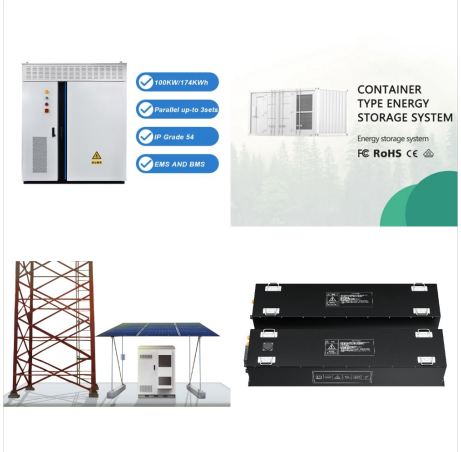
A Counter-Rotating Wind Turbine is a turbine with two counter-rotating rotors. However, this type of a wind turbine is not yet operating on a commercial scale and still needs development and studies. Even with well-designed rotor blades in HAWT, due ???

Abstract This experimental work studied the flow characteristics in the near wake region behind dual-rotor wind turbines using two-dimensional particle image velocimetry. Two auxiliary rotors of 50% and 80% scale of the main rotor were installed upwind and operated in counter-rotating condition, which are compared to the conventional single-rotor turbine. In all ???

We investigated the use of counter-rotating vertical-axis wind turbines (VAWTs) in order to achieve higher power output per unit land area than existing wind farms consisting of HAWTs. Full-scale field tests of 10-m tall VAWTs in various counter-rotating configurations were conducted under natural wind conditions during summer 2010.

COUNTER ROTATING WIND TURBINE

The present work was studied the effect of the tip speed ratio to the starting rotation, rev up rotation, power and torque coefficients of a two-shaft co-axis counter-rotating wind turbine (CR-WT). The prototype of CR-WT was tested in the open type wind tunnel with the velocities of 1.5, 2.0, 3.0, 4.0 and 5.0 m/s. CR-WT consisted of 8 blades.



by counter-rotating wind turbines and the impact of the distance between each rotor. 2/8 This paper presents the main results of this study and the positive impact of counter rotating turbines compared to single turbine performance for floating conditions. Figure 1: The TWINFLOAT(R) concept ((C) Nenuphar)

investigated the use of counter-rotating vertical-axis wind turbines (VAWTs) in order to achieve higher power output per unit land area than existing wind farms consisting of HAWTs. Full-scale field tests of 10-m tall VAWTs in various counter-rotating configurations were conducted under natural wind conditions during summer 2010.

COUNTER ROTATING WIND TURBINE

A counter-rotating wind turbine having two rotors rotating in opposite directions on the same axis is proposed to improve the aerodynamic performance of a wind turbine. In order to predict the aerodynamic performance of the counter-rotating wind turbine, the inflow interference in its rear rotor by the wake of the front rotor needs to be