

Why is integrating wind power with energy storage technologies important?

Volume 10, Issue 9, 15 May 2024, e30466 Integrating wind power with energy storage technologies is crucial for frequency regulation in modern power systems, ensuring the reliable and cost-effective operation of power systems while promoting the widespread adoption of renewable energy sources.

What are the different types of wind energy patents?

These patents cover inventions related to offshore wind energy, including key technology concept groupings such as: fixed and floating foundations, towers, mechanical power transmission, blades and rotors, hybrid systems, energy storage, and grids and submarine cables.

When did wind energy technology become a patented technology?

Following an initial phase marked by limited patent filings, the patenting activity in offshore wind energy technologies experienced a notable surge starting in 2006. Subsequently, a period of consistent annual expansion persisted until 2012.

How many generations of wind energy patents are there?

This means that we trace forward through two generations of citations starting from DOE-funded wind energy patents; and backward through two generations starting from the patents owned by leading wind energy organizations. Hence there are two types of links between DOE-funded patents and subsequent generations of patents:

Can energy storage control wind power & energy storage?

As of recently, there is not much research done on how to configure energy storage capacity and control wind power and energy storage to help with frequency regulation. Energy storage, like wind turbines, has the potential to regulate system frequency via extra differential droop control.

What is a patent for a wind turbine?

The patent at the head of Table 9 (US #7,004,724) is assigned to General Electric and describes a method for avoiding asynchronous loads in wind turbines. Since being issued in 2006, this patent has been cited as prior art by 86 subsequent patents, almost seven times as many citations as expected given its age and technology.

In this article, we develop a two-factor learning curve model to analyse the impact of innovation and deployment policies on the cost of energy storage technologies. We ...

Floating wind power generation foundation structure and wind power generator system CN115333173B (en) * 2022-10-12: 2023-02-03: : Active power control method of multi-energy complementary system based on hydroelectric power and battery energy storage NO347835B1 (en) * 2023-05-12: 2024-04-15: Mf Eng Drift



Wind power generation and energy storage patent

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Wind Power Energy Storage However, the intermittent nature of wind, much like solar power, poses a significant challenge to its integration into the energy grid. ... thereby increasing wind speeds and enhancing energy generation potential. By mitigating turbulence and wind shear effects, wind walls can improve turbine performance and ...

The total number of published PCT applications for renewable energy can be divided into the four main sectors: solar power, fuel cells (which generate electricity through chemical reactions), wind energy and geothermal (using ...

An energy storage and recovery system employs air compressed utilizing power from an operating wind turbine. This compressed air is stored within one or more chambers of a structure supporting the wind turbine above the ground. By functioning as both a physical support and as a vessel for storing compressed air, the relative contribution of the support structure to ...

A solar PV panel can be mounted on the top surface of the ODGV for solar energy generation. Estimation on wind-solar energy output shows that the system can generate a total of 572.8 kWh of energy ...

An environmentally friendly combination of wind turbine and solar energy collectors are provided. Solar photovoltaic material is secured to the surface of the wind turbine tower to augment the power generation capability of a wind turbine. The wind turbine energy output is controlled by a power management program and may be combined with the solar power energy that is ...

Renewables represent key solutions to decelerate the impacts of climate change and limit global warming to 1.5 °C. Offshore wind has witnessed a surge of interest from the energy community as a means to support the decarbonisation of energy systems and end-use sectors, owing to its considerable energy potential and cost-competitiveness.. According to ...

Definitions. the present invention relates to electrical generation, and particularly to a portable solar and wind-powered energy generating system that provides an ecologically friendly, portable system for generating electricity for to be delivered to an electrical load, such as a storage battery, a power outlet, a charger for electrical vehicles or the like, or a combination thereof, or ...

Discover how power companies like Contemporary Amperex Technology Ltd, General Motors Co, and Tesla Inc are revolutionizing energy storage through innovative patents. Improve battery safety, efficiency, and reliability with cutting-edge technologies. Learn more about the impact of energy storage in the power industry and explore the latest trends in innovation, investment, ...

Based on current price trajectories and a patent activity level of 444 patents per year using our model, battery

prices will fall from 2016 to 2020 by 39%, which puts utility-scale battery storage ...

"Nobel Engineering Award" to Offshore Wind Energy Generation. ... Stiesdal has made more than 175 inventions and has received more than 650 patents related to wind power technology. Stiesdal is involved in around 175 inventions, including thermal storage, pyrolysis and other technologies, with an emphasis on simplicity and economy rather ...

New Energy World embraces the whole energy industry as it connects and converges to address the decarbonisation challenge. It covers progress being made across the industry, from the dynamics under way to reduce emissions in oil and gas, through improvements to the efficiency of energy conversion and use, to cutting-edge initiatives in renewable and low ...

The generating of the solar wind-energy of solar wind-energy charging station is a good innovative combination as the power supply of charging station, solar power generation in the time of the sunlight foot, standby wind power generation when not enough one group of complementary power supply system of coordinating, both solved power outage problem from far-off regions, ...

To test the methods, we used Wind Power Energy as an example to illustrate the method's usefulness. Firstly, we used "wind power" and "wind energy" to collect 40,827 related journal papers in Scopus and 72,979 related patents in Derwent Innovation databases. Main Path Analysis was conducted to explore the development trajectory.

This revolutionary concept can be scaled up or scaled down as needed, and can be applied to the fabrication of a drive component or be composed upon a drive shaft as a part of an electrical generator element that can help recharge the battery or send power to capacitor-based energy storage. Wind, Solar and Tidal Power Generator (PEN): U.S ...

The utility model relates to alternative energy. The present wind turbine includes a symmetrical housing, which tapers from a lower part to an upper part and has a hemispherical fairing mounted thereabove, and lateral ribs which are vertically fastened on the housing and on which is fastened an annular fairing with a convex outer surface, a multi-bladed wind impeller being rigidly ...

Abstract: Provided is a power generation system including a wave power generator that can be configured in a simple manner. The power generation system 1 includes: a power generation unit including a wave power generator 11; a power storage unit 40 accumulating electric power obtained by the power generation unit; a production unit 51 producing at least ...

Integrating wind power with energy storage technologies is crucial for frequency regulation in modern power systems, ensuring the reliable and cost-effective operation of ...

Wind power generation and energy storage patent

Currently, the world is moving rapidly toward carbon neutrality, and renewable energy technology is very important in carbon neutrality. Among various renewable energy technologies, wind power is attracting much attention due to its sustainability, resource abundance, and high applicability. This study analyzed wind power patents from 2010 to 2021 ...

Fig.4a shows the wind power, P_w , from a 1.5 MW wind turbine and the energy storage power reference, P_{ess} , derived after ensuring a dispatch power, P_d of 1.0 MW. A comparison between the integral and non-linear control in Fig. 4c shows that using the non-linear controller, there is less deviation from the actual P_d of 1.0 MW.

The provision and operation of the energy generator system 100 to capture the power and energy of the wind 500 and store that energy as compressed air 400 in one or more on-site primary storage tanks or main wind park storage tanks and/or transfer that compressed air to one or more off site storage tanks 200 constitutes a first stage in ...

To ensure grid reliability, energy storage system (ESS) integration with the grid is essential. Due to continuous variations in electricity consumption, a peak-to-valley fluctuation between day and night, frequency and voltage regulations, variation in demand and supply and high PV penetration may cause grid instability [2] cause of that, peak shaving and load ...

Justia Patents Wind, Solar, Thermal, Or Fuel-cell Source US Patent for Portable solar power generator with energy storage Patent (Patent # 11,146,206) Portable solar power generator with energy storage . Sep 27, 2019 - GRIDKICKER LLC. Disclosed is an apparatus for a solar power generator as it relates to a portable and expandable solar power ...

As shown in Table 1, across all EST lists (EPO, 2019; USPTO, 2009; WIPO, 2010), we found that all forms of renewable energy generation either come directly or indirectly from thermal energy generated by the sun or deep inside the earth - this includes solar energy, wind energy, biomass energy, geothermal energy, nuclear energy, water energy ...

Wind energy is one of the most sustainable and renewable resources of power generation. Offshore Wind Turbines (OWTs) derive significant wind energy compared to onshore installations.

The report analyzes global patent filings from 2002 to 2022 in offshore wind energy technologies. Patent filings are good indicators for innovation, commercialization, and knowledge transfer trends across international markets. ... mechanical power transmission, blades and rotors, hybrid systems, energy storage, and grids and submarine cables ...

PDF | On Dec 1, 2022, Shiqi Zhang and others published Overview of US patents for energy management of renewable energy systems with hydrogen | Find, read and cite all the research you need on ...

Wind power generation and energy storage patent

The Winga e-Jetstream Generator design converges low wind onto an annular rotor, and diverges it to create a large augmentation of the wind velocity. While a three-wing rotor would only be able to create 51.1 W/m² from a mean wind velocity of 4.4 m/s, the Winga e-Jetstream Generator would be able to create as much 26,168.5 W/m²;

In conclusion, it is important to remark that wind generator power oscillations for a period of 30 ... [224], the effects on the operation of electrical networks considering bulk energy storage capacity and wind power plants are discussed. In this sense, many operating strategies for wind-ESS are considered. ...

This invention relates to a Compressed Air Turbine-Generator, or CAT-G that will enable the ability to manage energy gathered from ecologically friendly sources, such as solar and wind power. Compressed Air Energy Storage, (C.A.E.S.), is a promising mode of clean energy storage. A major challenge facing this technology is the need to efficiently convert the compressed air ...

The invention discloses a wind-solar hybrid power generation system. The wind-solar hybrid power generation system has the advantages that alternating currents are generated by a wind-driven power generator, and fixed voltages can be effectively outputted by a rectifier and a DC/DC power converter; solar energy is converted into direct currents by a photovoltaic array under a ...

However, the energy to produce hydrogen must be renewable and so our energy mix must change (renewable energy currently at between 13% [3] to 20 % [10]) which requires harnessing natural resources in extreme conditions (such as floating off-shore wind).Storage of energy at the GW scale which is required for net zero emissions will require the uptake in use ...

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