

Wind-energy storage is a new technology, but it is showing great promise in real-world renewable energy applications. The most prominent example is Xcel Energy's Wind-to-Battery project initiated in 2009 and based in Luverne, Minn., at the 11.5-MW MinWind Energy LLC wind plant. ... USA patent: US8151565B2. Related Articles [Read More &gt;](#)

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.

The number of patents used in all four samples on the wind energy application are outlined in Table C1. The sample size used for Sample 2 (Keyword Set - WEDD1) is 257, which is between 5 and 10% margin of error.

Wind turbine energy storage and frequency control GB0809235D0 (en) \* 2008-05-21: 2008-06-25: Poweroasis Ltd ... Free format text: PATENT EXPIRED FOR FAILURE TO PAY MAINTENANCE FEES (ORIGINAL EVENT CODE: EXP.); ENTITY STATUS OF PATENT OWNER: LARGE ENTITY. 2019-08-05: STCH ...

Stiesdal is involved in around 175 inventions, including thermal storage, pyrolysis and other technologies, with an emphasis on simplicity and economy rather than advanced technology. ... According to the Offshore Wind Energy Patent Insights Report, patent applications for offshore wind energy technology have increased by an average of 18% ...

Utility scale electric energy storage system US8593012B2 (en) 2009-08-11: 2013-11-26: Advanced Rail Energy Storage, Llc: Utility scale electric energy storage system DE102013005097A1 (en) \* 2013-03-23: 2014-09-25: Herbert Weh: Wind turbine with integrated tube bundle storage US9562519B1 (en) 2013-04-16

Comparing Figure 4 with Figure 1 suggests that the trend in DOE-funded (and WETO-funded) wind energy patenting is in line with the broader trend in this technology, with little activity in the early periods in the analysis, followed by a rapid growth in the early part of this century.

Since its initial launch a year ago, EPO patent examiners and data analysts have compiled almost 70 datasets within this platform, encompassing such diverse technologies as offshore wind energy, smart solar systems, the optimisation of energy storage technologies and solutions for carbon-intensive industries such as steel and cement production.

Methodology for wind energy application can be generalized for patent searching to target other technology domains. Wind energy patents are conventionally defined using Cooperative Patent Classification (CPC) and International Patent Classification (IPC) codes that represent wind motors (F03D) and wind energy (Y02E 10/70).

Research from Reddie & Grose, a UK and European firm of Patent, Trade Mark and Design attorneys, shows a significant global increase in patent filings relating to wind power generation in the previous 10 years, with China producing the highest volume of patent applications in this time.. An analysis of published global patent applications relating to wind ...

Dramatic cost declines in solar and wind technologies, and now energy storage, ... measuring policy-induced innovation using patent data. Appl. Energy 179, 1351-1359 (2016).

Solar thermal power plants may incorporate heat storage facilities to overcome the variability of solar (and wind) energy. This can be achieved by generating and accumulating steam, or even through thermal energy storage using molten salt (molten salt energy storage, MSES). Electricity can then be generated accordingly, on demand.

2007-12-14 Priority to US11/956,529 priority Critical patent/US7834471B2/en 2009-06-18 Publication of US20090152867A1 publication Critical patent/US20090152867A1/en ... Wind turbine based energy storage system and method using heavy weighted devices US7944075B2 (en) \* 2007-03-07: 2011-05-17: Daniel Boone ...

Patenting is an important index for measuring the outcome of a research & development project or the performance of a firm or an institute [[1], [2], [3]] is also used to measure the level of science and technology competitiveness of a nation, the industry, and the benefit of a multinational cooperation project [4]. Within an organization, a patent can be used ...

This report describes the results of an analysis tracing the technological influence of wind energy research funded by the U.S. Department of Energy (DOE)'s Wind Energy Technologies Office ...

lengthy product development cycles. Newer energy storage products not built with lithium-ion battery types are realizing similar limits as some of the most promising and well-funded energy storage start-ups today are simply running out of cash (see Aquion case study). Chinese policy

Wind energy integration into power systems presents inherent unpredictability because of the intermittent nature of wind energy. The penetration rate determines how wind energy integration affects system reliability and stability [4]. According to a reliability aspect, at a fairly low penetration rate, net-load variations are equivalent to current load variations [5], and ...

In terms of mechanical energy storage, solutions for storing energy during off-peak periods or high-wind speeds are being explored using flywheel energy storage, where a rotor (flywheel) is accelerated to a high speed and then releases its kinetic energy through a dynamo to create electricity, slowing the rotor.

6. On-site energy storage and hydrogen production to balance power systems and create additional value.

# Wind energy storage patent

There is a growing focus on flexible energy systems to counter the variability of renewable technologies. Patent data in offshore wind energy technologies also show a growing interest in energy storage options,

The Offshore Wind Energy Patent Insights Report shows that between 2002-2022 patent filings for offshore wind technologies have grown on average by 18%. This growth stagnated between 2014-2017 but, in recent years, has witnessed a sharp increase in filings. ... is emphasis to promote flexibility in energy systems and the patent data reveals ...

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 ...

Wind energy began to take off in 2012, and numbers have fluctuated significantly ever since. The number of patent applications for nuclear energy has remained low. Biomass and tidal energy patents were small in number prior to 2000, but, between 2000 and 2010, they gradually increased, accelerating after 2010.

Using firm-level patent data from 1978 to 2015, I examine the impact of market-based environmental policies on innovation in energy storage. My results highlight the role of environmental taxes, feed-in tariffs for solar energy and tradable certificates for CO<sub>2</sub> emission to promote firms' patenting activity, whereas renewable energy certificates and ...

Xiao, Z.: Gravity energy storage type wind driven generator with double wind wheels, has gravity energy storage system that is provided for realizing peak-to-peak energy storage. In: Patent 202302004A (2023) Google Scholar Wang, T., et al: Marine wind power generation system based on gravity energy storage technology, has energy storage power ...

As a leader in renewable energy investment, China's wind energy industry (WEI) has received extensive academic attention [[5], [6], [7]]. Currently, risk and uncertainty are the main issues faced while investing in the electricity market; however, diversified investments combining hydro and wind energy decrease risk and increase the reliability of the power supply ...

A system for harnessing wind energy to charge the electric storage battery of a vehicle, whether the vehicle is parked or in motion. While the vehicle is being driven, a roof-mounted, internal wind turbine harnesses wind energy and causes rotation of the shaft of an electric generator mounted to an interior surface of the roof. For charging the battery while the vehicle is parked, an ...

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.

## Wind energy storage patent

The invention relates to an utilization, storage and using technology of wind energy for solving the low utilization ratio of wind utilization at present. Umbrella wind tunnel structure is adopted in the invention so that the large area turbine in wine tunnel drives the liquid air cell comprised by multi-level air compressor and temperature ...

U.S. Pat. No. 7,944,075 to Boone discloses a wind turbine-based energy storage system and method using heavy weighted devices. The Boone patent discloses an energy storage system, and related method, comprising a plurality of wind turbines, each with a vertical shaft that passes through a support platform. One or more braces may be affixed to ...

Enphase Energy has been granted a patent for a storage system that works with an energy management system. The system includes a single-phase or three-phase AC coupled battery, microinverters that connect to battery cells forming a local grid, and a controller that determines when to charge or discharge the battery based on energy availability.

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