Global energy storage patents

Our study provides a way to inquire how relevant batteries are for the Circular Economy approach. For the present work, we built a new dataset containing 92,700 secondary ...

Hydrogen Patents for a Clean Energy Future - Analysis and key findings. A report by the International Energy Agency. ... graphene tanks, cryogenic storage, fuel cell motors for aircraft and the reduction of iron ore. If hydrogen is to play a major role in reducing fossil fuel emissions, its future depends on uniting a wide range of advances in ...

Inventions in energy (including renewable energy and storage) ... Patents and the Energy Transition: Global Trends in Clean Energy Technology Innovation (IEA, 2021). Hart, D. M.

Global aviation demand, energy efficiency and CO? emissions; Global direct primary energy consumption; Global electricity use for air conditioning; Global fossil fuel consumption; Global hydropower consumption; Global installed renewable energy capacity by technology; Global primary energy consumption by source Line chart

Both the US and global energy storage markets have experienced rapid growth over the last year and are expected to continue expanding. An estimated 650 gigawatts (GW) (or 1,877 gigawatt-hours) of new energy storage capacity is expected to be added globally from 2023 to 2030, which would result in the size of global energy storage capacity increasing by 15 ...

Our empirical analysis draws attention to energy prices and past innovation to foster global innovation in energy storage. We find that an increase in the average energy ...

The main countries and regions of patents that accepted gravity energy storage technology patents are shown in Fig. 2(a). The figure clearly illustrates, China is the most important target market for gravity energy storage technology, accounting for 60% of the total number of the global gravity energy storage technology patents.

The importance of batteries has been growing as a solution in a very dynamic puzzle. As a set of technologies at the intersection of the clean-digital transition, their role is expected to grow further in the coming decades [6].A report about electricity storage developments published by the International Energy Agency (IEA) in association with the ...

The use of Energy Storage Systems (ESS) with conventional electricity to create a hybrid microgrid is crucial for mitigating the unpredictability and increased intermittent of RESs. ... such as the Scopus database and the Derwent global patent database, might be an idea to consider about for potential future proposals. ...

Global energy storage patents

Electricity storage inventions show annual growth of 14% over past decade, joint study by European Patent Office (EPO) and International Energy Agency (IEA) finds Amount ...

Novel ideas related to new energy technologies are likely patented before they are scientifically published to request exclusive rights for their commercial exploitation (Mueller et al., 2015), (Chanchetti et al., 2016).Patent documents provide a strong source for e.g., which countries, institutes, and companies are investing in different technologies and to what extent.

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 ...

Nature Energy - Achieving ambitious climate goals requires the development of new technologies at rapid pace. Probst et al. analyse global patent data and find that a growth ...

Amount of batteries and other energy storage needs to grow fiftyfold by 2040 to put world on track for climate and sustainable energy goals; ... The report, Innovation in batteries and electricity storage - a global analysis based on patent data, shows that batteries account for nearly 90% of all patenting activity in the area of electricity ...

To make the patent database for the analysis, first, a comprehensive survey on green hydrogen projects worldwide was conducted and hydrogen-related technologies were classified into two network categories of the stand-alone and the grid-connected type, as well as three options for renewable energy resources, Energy Storage System (ESS) and ...

Its Report on Statistical Analysis of Green and Low-Carbon Patents this year shows a record high year-on-year growth of published applications worldwide since 2017. Energy-storage patents dominated, with a 37.2 percent share and a 19.8 percent growth rate, while carbon capture, utilization and storage lagged at 6.7 percent.

EPO"s first joint study with the International Energy Agency underlines the key role that battery innovation is playing in the clean energy transition. Innovation in batteries and electricity storage - A global analysis based on patent data | epo

The DOE Global Energy Storage Database provides research-grade information on grid-connected energy storage projects and relevant state and federal policies. All data can be exported to Excel or JSON format. As of September 22, 2023, this page serves as the official hub for The Global Energy Storage Database.

An energy storage system and method that enables gravity-based energy storage to have a significantly larger capacity in a single shaft for given capital cost and thus an improved cost per unit energy for large scale energy storage as well as enabling continuity of power input and output at an external connection point across the extent of the system"s energy capacity comprises a ...

Global energy storage patents

The ESS Mission The goal of the ESS program is to develop advanced energy storage technologies and systems, in collaboration with industry, academia, and government institutions that will increase the reliability, performance, and competitiveness of electricity generation and transmission in the electric grid and in standalone systems. Upcoming Events November 19 - ...

1. I ntroduction. Energy consumption in buildings is a paramount global concern that profoundly impacts sustainability and the natural environment. As the demand for energy-efficient buildings and sustainable energy sources continues to escalate [1], there is an increasingly urgent need to accurately predict and effectively optimize energy usage. ...

element to energy transitions in the EU and beyond. Combining the energy expertise of the IEA with the EPO"s patent knowledge, it provides the most comprehensive and up-to-date global review of patenting trends in a broad range of technologies - from the production of hydrogen to its storage, distribution and transformation,

Grid-connected lithium-ion battery energy storage system towards sustainable energy: A patent landscape analysis and technology updates. Author links open overlay panel S.B. Wali a, M.A ... The study has presented a bibliographic and technological analysis of global patents to identify the present status of the patent in the field of grid ...

Abbas et al. (Abbas et al., 2020) analyzes in detail a set of different thermal energy storage technologies (TES) and identifies major depository countries. Here Japan ...

The disclosure relates to particle heaters for heating solid particles to store electrical energy as thermal energy. Thermal energy storage directly converts off-peak electricity into heat for thermal energy storage, which may be converted back to electricity, for example during peak-hour power generation. The particle heater is an integral part of an electro-thermal energy storage system, ...

This study by the EPO and IEA is the most comprehensive, global and up-to-date investigation of hydrogen-related patenting so far. It covers technologies for the full range of hydrogen supply, storage, distribution, transformation and end-user applications, as well as introducing new search strategies to compare incremental innovation related to established fossil fuel processes with ...

Patent data show a massive surge in global patent filings from 2006 to 2012, followed by a stagnation until 2017 when patent activity witnessed a resurgence. Floating foundations, transportation, and mechanical ... On-site energy storage and hydrogen production to balance power systems and create additional value.

An example flywheel energy storage device includes a fiber-resin composite shell having an elliptical ovoid shape. The example device also includes an axially oriented internal compressive support between the axial walls of the shell. The example device also includes an inner boss plate and an outer boss plate on each side of

the shell.

As of 2017, global storage capacity was 176.5 GW and only 2.9 GW were added in 2019. Innovation has played a decisive role in making batteries cheaper and promoting the development of new storage systems such as compressed air-energy storage and flywheels. ... Out of these, there are 12,701 electricity storage patents. We also consider energy ...

The Office of Electricity"s (OE) Energy Storage Division"s research and leadership drive DOE"s efforts to rapidly deploy technologies commercially and expedite grid-scale energy storage in meeting future grid demands. The Division advances research to identify safe, low-cost, and earth-abundant elements for cost-effective long-duration energy storage.

The energy storage system 100 illustrates a sealed container including various components and features described herein. With reference to FIG. 1B, an explode view of the energy storage system 100 of FIG. 1a is illustrated. With reference to FIG. 1B, the energy storage system 100 includes a frame structure 102, 120.

As such, better energy storage technologies can open up opportunities to integrate larger quantities of renewable energy into the energy system as a whole, thus helping to replace fossil fuels in a variety of applications. These challenges help to explain the rapid and sustained increase in electricity storage innovation documented in this

The ESS Mission The goal of the ESS program is to develop advanced energy storage technologies and systems, in collaboration with industry, academia, and government institutions that will increase the reliability, performance, and ...

A human energy harvesting and storage system that captures energy from various human activities and stores that energy on a vehicle to be used for various vehicle applications. In one embodiment, piezoelectric devices, or other types of energy generating devices, are provided in the seat of the vehicle that generate electricity from the weight and movement of a person ...

Rising global demand for sustainable energy has led nations to foster policy-driven international collaboration in hydrogen storage technology. Concurrently, hydrogen energy"s use in transportation and industry is catalyzing the worldwide diffusion of HST. ... Air Liquide has successfully acquired hydrogen storage patents in Europe, the U.S ...

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.

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 $$_2$$ 2 emission to promote firms" patenting activity, whereas renewable energy certificates and ...

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