Patents on compressed air energy storage

Compressed air energy storage (CAES) is one of the many energy storage options that can store electric energy in the form of potential energy (compressed air) and can be deployed near central power plants or distributioncenters. In response to demand, the stored energy can be discharged by expanding the stored air with a turboexpander generator.

technical field [0001] The invention belongs to the technical field of energy storage, and in particular relates to a gravity compressed air energy storage system and a working method thereof. Background technique [0002] In recent ...

It summarizes the technical point description of the patent document. This approach significantly enhances the efficiency of the compression and expansion processes, ...

In the realm of Chinese patents, lithium-ion batteries and supercapacitors demonstrate significant growth, alongside other flourishing technologies such as compressed air and hydrogen energy storage, liquid ...

Compressed air energy storage is a promising technique due to its efficiency, cleanliness, long life, and low cost. This paper reviews CAES technologies and seeks to demonstrate CAES"s models, fundamentals, operating modes, and classifications. Application perspectives are described to promote the popularisation of CAES in the energy internet ...

There is described an energy storage system (300, 310) for storing energy in connection with a renewable energy generating facility (100). The energy storage system (300, 310) is operable to employ one or more of: (a) compressed air energy storage apparatus (300, 310) for storing energy generated by the energy generating facility (100), the stored energy ...

In Germany, a patent for the storage of electrical energy via compressed air was issued in 1956 whereby "energy is used for the isothermal compression of air; the compressed air is stored and transmitted long distances to generate mechanical energy at remote locations by converting heat energy into mechanical energy." [5].The patent holder, Bozidar Djordjevitch, is ...

New compressed air energy storage concept improves the profitability of existing simple cycle, combined cycle, wind energy, and landfill gas power plants. In: Proceedings of ASME Turbo Expo 2004: Power for Land, Sea, and Air; 2004 Jun 14-17; Vienna. 2004

The recent increase in the use of carbonless energy systems have resulted in the need for reliable energy storage due to the intermittent nature of renewables. Among the existing energy storage technologies,

compressed-air ...

Keywords: ACAES; thermomechanical energy storage; isobaric CAES; thermodynamic analysis 1. Introduction There are two heat-based categories of Compressed Air Energy Storage (CAES): sys-tems which use a supplementary heat input to heat the air prior to expansion, most often denoted Diabatic CAES (DCAES) systems; and systems which do not ...

Energy storage technology is a key technology to solve the problems of small capacity and large load fluctuations in distributed energy systems, and it is of great significance for the development and improvement of power grid energy storage structure. [0003] Compressed air energy storage system is an energy storage technology widely used at ...

Energy storage system using supercritical air according to this invention runs compressors by use of low-cost off-peak electricity to pressurize air to supercritical state (at ...

By then the patent application "Means for Storing Fluids for Power Generation" was submitted by F.W. Gay to the US Patent Office [3]. However, until the late 1960s the development of compressed air energy storage (CAES) was pursued neither in science nor in industry. ... Development of second generation CAES like hybrid, adiabatic or ...

At present, the commercialised large-scale physical energy storage technology mainly includes pumped water storage and compressed air energy storage (CAES). The former accounts for about 99% of the global 141 ...

Abstract: Modifications to power plants for moderating climate warming and increasing safety combine a large compressed air energy storage (CAES) system with a thermal power plant such that free power plant waste heat replaces natural gas used at existing and planned CAES facilities. The system allows higher percentages of wind and solar energy on ...

In the realm of mechanical energy storage, it is clear that pumped hydroelectric (PSH), flywheel (FES), and compressed air energy storage (CAES) lead the way in patent publications. Of these, pumped storage hydroelectricity (PSH) is the dominant sub-sector, reflecting its established position in the market.

Compressed air energy storage (CAES) is an effective solution for balancing this mismatch and therefore is suitable for use in future electrical systems to achieve a high penetration of renewable energy generation. This study introduces recent progress in CAES, mainly advanced CAES, which is a clean energy technology that eliminates the use of ...

An adiabatic Compressed Air Energy Storage (CAES) system includes a low pressure compressor structure (14) to provide compressed air; a first heat exchanger (26) to extract ...

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Method for operating an adiabatic compressed air storage power plant and adiabatic compressed air storage power plant US20130091834A1 (en) 2011-10-14: 2013-04-18: Sustainx, Inc. Dead-volume management in compressed-gas energy storage and recovery systems EP2589762A1 (en) 2011-11-04: 2013-05-08

@article{osti_1531732, title = {High-efficiency liquid heat exchange in compressed-gas energy storage systems}, author = {Bollinger, Benjamin and Magari, Patrick and McBride, Troy O.}, abstractNote = {In various embodiments, efficiency of energy storage and recovery systems employing compressed air and liquid heat exchange is improved via control of the ...

The number of SCI literature and public patents (search by the US, European, and Chinese patent databases) ... compressed air energy storage and suspended weight gravity energy storage. 4th International Conference on Power, Energy and Mechanical Engineering (ICPEME 2020) (2020) Google Scholar [25] A. Emrani, A. Berrada, M. Bakhouya.

A compressed-air energy storage system according to embodiments of the present invention comprises a reversible mechanism to compress and expand air, one or more compressed air storage tanks, a control system, one or more heat exchangers, and, in certain embodiments of the invention, a motor-generator.The reversible air compressor-expander ...

WO2023228938 - COMPRESSED AIR ENERGY STORAGE METHOD. [Problem] To provide an economical compressed air energy storage (CAES) method for effectively ...

A compressed air energy storage (CAES) system is disclosed for the generation of power. The system may include a compressor configured to receive inlet air and output compressed air to ...

The present invention provides a compressed air energy storage power generation device including: an electric compressor configured to compress air using electric power; a pressure...

A compressed air energy storage (CAES) system is disclosed for the generation of power. The system may include a compressor configured to receive inlet air and output compressed air to an air storage during an off-peak period. During a peak load period, compressed air from the air storage may be released to generate power. A heat exchanger fluidly coupled to the air ...

A compressed air energy storage, regenerative technology, applied in engine functions, gas turbine devices, liquid variable capacity machinery, etc., can solve the problems of slow ...

Low-cost fabricated compressed air energy storage (CAES) will be a most promising method to store electricity for medium- and long-term periods [2]. When off-peak electricity is available it can be used to produce compressed air via a series of compressors. ... The first patent for CAES technology was filed by Frazer W. Gay in 1948 [6]. This ...

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An internal combustion reciprocating engine is operable as a compressor during slack demand periods utilizing excess power from a power grid to charge air into an air storage reservoir and ...

@misc{osti_1532111, author = {McBride, Troy O. and Bollinger, Benjamin R. and Bessette, Jon and Bell, Alexander and Kepshire, Dax and La Ven, Arne and Rauwerdink, Adam}, title = {Systems and methods for efficient two-phase heat transfer in compressed-air energy storage systems}, annote = {In various embodiments, foam is compressed to store energy ...

Case docket: MULTIPLE CAVERN COMPRESSED AIR ENERGY STORAGE SYSTEM AND METHOD, 14/5,074 in U.S. Patent Application, last filing 01/22/2016, filed 09/13/2013.

Compressed air energy storage system is a promising solution in the energy storage field: it is characterized by a high reliability, low environmental impact and a remarkable energy density. ... Four patents related to storage system based on liquid piston and scroll compressor/expander technology have been filed [19]. Enairys Powertech first ...

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