

Us gravity energy storage patent

Are gravity energy storage systems the future of energy storage?

Gravity energy storage systems, using weights lifted and lowered by electric winches to store energy, have great potential to deliver valuable energy storage services to enable this transformation.

How do gravity energy storage systems work?

The Gravitricity system Gravity energy storage systems depend on the principle of lifting one or more solid masses a vertical distance in order to increase their gravitational potential energy. The system must then be reversible to allow the lowering of the weight (s) to result in useful release of the stored energy, less any efficiency losses.

What is a gravity energy storage device?

In simple terms a gravity energy storage device uses an electric lifting system to raise one or more weights a vertical distance thereby transferring electrical energy to be stored as gravitational potential energy.

Does gravity have energy storage?

In addition to electrical energy storage, Gravitricity has also filed patents covering additional or combined uses in the shaft, including interseasonal heat storage and the use of the shaft internal volume as a pressure vessel for CAES or hydrogen storage.

What is a single weight gravitational energy storage system?

Single weight Gravitricity system The simplest design of an underground gravitational energy storage system is a single weight cycling in a straight vertical shaft from an upper to a lower position. As shown in Fig. 5.6, this single weight could be supported by a number of winches around the shaft head.

Can gravity storage increase energy storage capacity?

An adaptation of the Gravitricity storage system covered by the company's patents, and which will be explored for future developments of the technology, is to increase the energy storage capacity to be gained from a given shaft by using it as a pressure vessel as well as a vertical passage for a heavy weight.

Additional details of the connections and guidance system are provided in the patent filed by Gravitricity [22].
from publication: Gravity energy storage with suspended weights for abandoned mine ...

Gravity Energy Storage (GES) is an emerging renewable energy storage technology that uses suspended solid weights to store and release energy. This study is the first to investigate the feasibility of using unstabilized Compressed Earth Blocks (uCEBs) as a cost-effective and sustainable alternative for weight manufacturing in GES systems. The analysis ...

Energy savings to the tune of 70 percent when compared to current competing technologies are being claimed

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on the back of the system"s combined efficiency with a lack of degradation in storage ...

This invention generally relates to energy storage and more particularly gravity energy storage. 2. Prior Art. An area of prior art is gravity energy storage. This uses mechanical energy to raise a mass through a height, storing energy as gravitational potential energy. Energy is subsequently retrieved by lowering the mass.

US20110108362A1 US12/590,770 US59077009A US2011108362A1 US 20110108362 A1 US20110108362 A1 US 20110108362A1 US 59077009 A US59077009 A US 59077009A US 2011108362 A1 US2011108362 A1 US 2011108362A1 Authority US United States Prior art keywords lever energy free energy water machine Prior art date 2009-11-12 Legal status (The ...

A system for harvesting, storing, and generating energy includes a subsurface structure supporting machinery to convert received energy into potential energy, store that potential energy, and at a later time convert that potential energy into electrical energy. The system includes one or more buoyant chambers that support the subsurface structure and are maintained with an ...

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.

Justia Patents US Patent Application for GRAVITY-BASED ENERGY-STORAGE SYSTEM AND METHOD Patent Application (Application #20150130191) ... solicitation from the US Department of Energy in 2010, all of these energy storage methods suffer from one or more of the following limitations: 1) the capital cost is too high to be economically viable; 2 ...

It also revealed that the concrete foundations have been completed for the firm"s first gravity storage project in the US, in Georgia with Enel Green Power. Energy Vault now provides a range of energy storage solutions including battery storage and green hydrogen and is forecasting for US\$325-425 million in revenues this year.

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 ...

The Gravity Field Energy Storage & Recovery System invention is a mechanical, electrical and electronic system that has the ability to harness any electrical or mechanical power source and allow it to do work to configure a mechanical system into a state of high potential energy, using either a high-mass object in a gravitational field or a ...

In Gravitricity Ltd"s UK patent GB 2 585 124 B the energy storage system is said to enable a "gravity-based energy storage to have a significantly larger capacity in a single ...

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The utility model is related to a kind of high efficiency gravity energy storage device, it is characterized in that, the high efficiency gravity energy storage device includes support meanss, fixed pulley group, running block, weight, steel wire rope, roller, decelerator, motor and frequency converter, the support meanss whole installation is trapezoidal, including support frame and ...

What is claimed: 1. A gravity energy storage and generating device comprising; a piston and pulley assembly for selectively storing and releasing energy to power an apparatus as in FIGS. 1 and 2 including; a main supporting cylinder structure's shape could be round, square, rectangular or triangular; a piston with wheel to be guided on rails; a plurality of pulley ...

The proposed technology, called Underground Gravity Energy Storage (UGES), can discharge electricity by lowering large volumes of sand into an underground mine through the mine shaft. ... (17.8%) and the US and Canada (11.6%). The average underground mine's depth is roughly 500 m. Based on the calculation presented in the Results section and ...

The invention provides a gravity energy storage system based on a vertical shaft and a roadway, which comprises a vertical shaft (1), the roadway (2), an upper track (3), a lower track (4), a supporting beam frame (5), a motor generator (6), a winch (7), a car (8) and n weight carriers (9); under the working condition of energy storage, a heavy object carrier (9-n) moves to the inside ...

Energy Vault has connected its first commercial EVx gravity-based energy storage system to the grid in China, while construction has been launched on three others, all-in-all totalling 468MWh of capacity. ... looks at patent filing activity in energy storage technologies outside the world of electrochemical batteries. ... Startup Proximal ...

US United States Prior art keywords energy buoyancy suspended water platform Prior art date ... 2012-05-03 Priority to US14/395,248 priority Critical patent/US20150130191A1/en ... compared to other sources and methods of obtaining the hundreds of millions of pounds needed for cost-effective gravity-based energy storage.

the gravity energy storage system described is unique in that it exploits buoyancy in the atmosphere to support a large mass and the height of approximately 20 km is much larger than the hundreds of meters height of the prior art. Platforms described can scale to support a mass of many thousands of tons, which when multiplied by the 20 km ...

[0018] A 2010 US patent application by Howson (publication US2010/0283244) describes a system similar to Morgan mentioned above where buoyant volumes are pulled to greater depth underwater in order to store potential energy, the power to do so being provided by an offshore, bottom-mounted wind turbine. ... compared to other sources and methods ...

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Our GraviStore underground gravity energy storage technology uses the force of gravity to offer some of the best characteristics of lithium batteries and pumped hydro storage. Hydrogen Storage Our H 2 FlexiStore underground hydrogen storage technology uses the geology of the earth to contain pressurised fuel gas, allowing safe, large-scale ...

FIG. 10 shows a perspective view of a large platform 73 assembled at altitude from small platforms 62, each incorporating gravity energy storage. This illustrates the modular, distributed and redundant nature of high altitude gravity energy storage, with many gravity storage weights 88 and their attendant winches and cables.

Justia Patents US Patent Application for GRAVITY FIELD ENERGY STORAGE AND RECOVERY SYSTEM Patent Application (Application #20200217303) GRAVITY FIELD ENERGY STORAGE AND RECOVERY SYSTEM . Feb 26, 2020. Device for storing energy, using a physical object, such as a mass or buoyant object floating in fluid. A mass is repositioned to ...

Gravitricity is an innovative gravity-based mechanical energy storage technology being developed by Gravitricity, an energy storage company based in Edinburgh, Scotland, UK. The novel energy storage system is based on the principle of raising and lowering a heavyweight to store and release electrical power.

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