

# LATEST GRAVITY ENERGY STORAGE PATENT LIST QUERY



What is gravity energy storage technology? Classification of energy storage technologies. Gravity energy storage technology (GES) depends on the vertical movement of a heavy object in a gravitational field to store or release electricity.



How many technical routes does solid gravity energy storage technology have? Solid gravity energy storage technology has as many as eight technical routes. Although the technical routes are different, some essential features are the same. They can be summarized into two aspects: principle and equipment.



Why is solid gravity energy storage called SGES? This is the reason why they are all called solid gravity energy storage. As for equipment, each technology route needs different equipment to achieve heavy lifting. However, it can be found that they all need motor-generation units and weight, which means that motor-generation units and weight are the critical equipment of SGES.



Can virtual devices improve solid gravity energy storage performance? Therefore, improving these two virtual devices can improve solid gravity energy storage performance. The motor-generation unit is the energy conversion hub of solid gravity energy storage, which directly determines the cycle efficiency of solid gravity energy storage technology.



What is solid gravity energy storage? They can be summarized into two aspects: principle and equipment. As for the principle, although each technological route lifts heavy objects in different ways (e.g., using ropes, carriers, or water currents), they all do so by lifting heavy objects to store electrical energy. This is the reason why they are all called solid gravity energy storage.

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What is the cycle efficiency of solid gravity energy storage (SGES)? The motor-generation unit is the energy conversion hub of solid gravity energy storage, which directly determines the cycle efficiency of solid gravity energy storage technology. The current efficiency of motor-generation units is about 90 %, so SGES's cycle efficiency is around 80 %.



Gravity Energy Storage System (GESS) mit einer Leistung von 25 Megawatt / 100 Megawattstunden soll Effizienz von 80 % haben. Die umstrittene Technologie von Energy Vault zur Langzeit-Energiespeicherung namens Gravity Energy Storage System (kurz: GESS) steht wenige Wochen vor der entscheidenden Bewährungsprobe Rudong bei Shanghai hat ???



A Scottish company called Gravitricity has now broken ground on a demonstrator facility for a creative new system that stores energy in the form of "gravity" by lifting and dropping huge weights.



Gravity energy storage systems have inherent advantages in that they typically have a long operating life with a minimal maintenance burden. They are also relatively simple and do not require hazardous or scarce materials. However, looking at the patent filing activity, it is clear that there are still technical problems to solve. In a previous Guest Blog for Energy ???



This patent application describes a "Device" entitled "Gravity Engine" that extracts energy from gravity and buoyancy and converts this into energy of another form, for example, Electrical energy. Devices using similar principles of operation described have potential to be scaled from very small to large scale electrical or other energy production to suit individual applications.

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TIME's list of 200 groundbreaking inventions highlights innovations that are changing how we live, work, play, and think about what's possible EVx gravity energy storage system technology



Invention defines a method and apparatus for storing energy where a power source is used to reposition a mass in a gravitational field to a position of higher potential energy where the stored potential energy may be recovered with extremely low loss regardless of the state of charge of the system, where the force of gravity may be allowed to accelerates the mass, where the ???



Gravity energy storage technology (GES) depends on the vertical movement of a heavy object in a gravitational field to store or release electricity. The number of SCI literature and public patents (search by the US, European, and Chinese patent databases) has increased in the past ten years, as shown in Fig. 3 (a). The result shows that the



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



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

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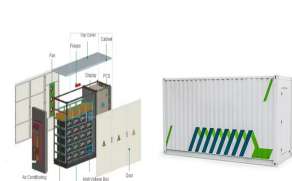
It also revealed that the concrete foundations have been completed for the firm's first gravity storage project in the US, in Georgia with Enel Green Power. Energy Vault now provides a range of energy storage solutions including battery storage and green hydrogen and is forecasting for US\$325-425 million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



where  $m_i$  is the mass of the  $i$ th object in kg,  $h_i$  is its height in m, and  $g = 9.81 \text{ m/s}^2$  is the acceleration due to gravity.. As of 2022, 90.3% of the world energy storage capacity is pumped hydro energy storage (PHES). [1] Although effective, a primary concern of PHES is the geographical constraint of water and longer term scalability.



Academics have patented new concepts on electric power energy storage using gravity, with the concept of gravity energy storage using soil batteries being promoted by two University of Nottingham



By repurposing disused mine shafts for energy storage, they can be used productively for up to 50 years beyond their original lifetime, thus mitigating decommissioning costs. Gravitricity says it has an expanding portfolio of intellectual property in underground energy storage including eight granted patents and a further two pending.

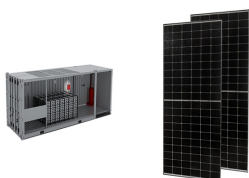


An energy storage system and method that enables gravity-based energy storage to have a significantly larger capacity in a single shaft for given capital cost and thus an improved cost per unit energy for large scale energy storage as well as enabling continuity of power input and output at an external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

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Discover how Green Gravity's gravitational energy storage technology is changing the game in renewable energy storage. Mark Swinnerton, a former BHP executive, leads the way with innovative solutions. ENB's latest Cost Report findings provide optimism as investments in oil and gas, as well as new energy rise. ENB Future of Energy Report 2023.



It is predicted that the penetration rate of gravity energy storage is expected to reach 5.5% in 2025, and the penetration rate of gravity energy storage is expected to reach 15% in 2030, and the market size of new gravity energy storage is expected to exceed 30 billion in the long run, and the market share is expected to increase significantly .



Energy storage technologies using gravity (A) Gravitricity,?? (B) Sink Float Technology,?? (C) Energy Vault,?? (D) Advanced Rail Energy Storage (ARES),???? (E) Mountain Gravity Energy

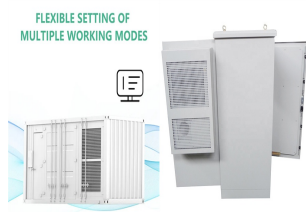


Gravitricity is an innovative gravity-based mechanical energy storage technology being developed by Gravitricity, an energy storage company based in Edinburgh, Scotland, UK. The novel energy storage system is based on the principle of raising and lowering a heavyweight to store and release electrical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



The energy a gravity-based storage system can store and discharge is a function of mass, gravity (which is constant) and the distance of the drop: this formula, Energy = mass x gravity x height, or  $E = mgh$ , will be familiar to ???

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Edinburgh-based startup Gravitricity is set to turn one of Europe's deepest mines into the continent's first-ever gravity energy storage system. The gravity tech uses massive weights that are



The present invention provides novel designs and improved methods for the construction and operation of a gravity powered energy storage facility. This facility might also be called a gravity battery or a gravitational potential energy storage device. The device converts electricity into gravitational potential energy, and vice versa, by raising and lowering massive ???



Gravity energy storage (GES) is an innovative technology to store electricity as the potential energy of solid weights lifted against the Earth's gravity force. When surplus electricity is available, it is used to lift weights. (2020) Industrial System for Energy Storage, Energozapas LLC, Patent No. US10833533B2; 12/27/2018; 02/06/2020



Skyline Starfish: Energy Vault's concept demonstrator has been hooked to the grid in Ticino, Switzerland, since July 2020. By raising and lowering 35-metric-ton blocks (not shown) the tower stores



Country: USA | Funding: \$31.3M Quidnet Energy is developing an alternative approach to energy storage by storing water to deliver energy. This new form of sub-surface pumped hydro storage enables large-scale deployment of renewable energy and allows for predictable, dispatchable delivery of power from intermittent renewable energy resources such as ???

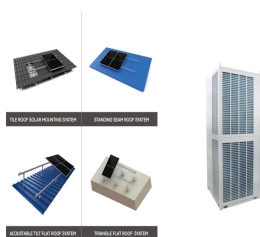


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Among different forms of stored energy, gravity energy storage, as a kind of physical energy storage with competitive environmental protection and economy, has received wide attention for its



The concept is similar to other gravity energy storage technologies, but Swinnerton believes the use of old mine shafts, rather than purpose-built tall towers, will be his competitive advantage. "Green Gravity's energy storage technology represents a breakthrough in the search for economic long-duration storage of renewable energy," he said.



Patents for gravity energy storage: Who is filing them and what's being protected? 11. 01. 2024 9:31 Energy Storage, Ben Lincoln, Potter Clarkson. Patent lawyer Ben Lincoln from Potter Clarkson returns to the Energy-Storage.news Guest Blog, this time looking at gravity energy storage and what sort of IP is looking to be protected.