

# GRAVITY ENERGY STORAGE TECHNOLOGY PATENT

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What is gravity energy storage technology? The most widely used scenario of gravity energy storage technology is wind power generation system, followed by solar power generation system and ocean power generation system. In addition, there are geothermal, hydro-energy, bioenergy and hydrogen generation system.



When was gravity energy storage invented? The first patent application for gravity energy storage technology was filed by Tah Sun Lin in the USA in 1974, providing a device for harnessing wave energy and storing the energy in the form of potential energy for subsequent use in driving various machines.



How many patents are there in gravity energy storage? The paper data utilized in this research was extracted from the Clarivate Analytics company's WoS Core Collection database (SCI-Expanded). The search strategy was based on the association of keywords related to gravity energy storage. By June 2023, 1166 patents and 82 SCI papers were retrieved.



Does gravity energy storage technology need technological breakthroughs? The results of paper analysis show that the global output of gravity energy storage technology patents and papers continues to grow steadily, which is at the initial stage of commercialization, still needs technological breakthroughs.



Does gravity energy storage technology have a domain knowledge map? Based on the literature data, by utilizing bibliometric and social network analysis approaches, this research performed a bibliometric network analysis and generated a domain knowledge map in order to elucidate the status, progress, and trends of research and application of gravity energy storage technology.

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Can gravity energy storage solve the problem of new energy consumption? The bi-directional charging and discharging functionality of energy storage systems can effectively solve the problem of new energy consumption. Gravity energy storage (GES) is a kind of physical energy storage technology that is environmentally friendly and economically competitive.



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. When there is excess electrical energy in the grid, UGES can store electricity by elevating sand from the mine and depositing it in upper storage sites on top of



Gravity energy storage is a kind of physical energy storage with competitive environmental and economic performance, which has received more and more attention in recent years. This paper introduces the working principle and energy storage structure of gravitational potential energy storage as a physical energy storage method, analyzes in



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 ???



Energy savings to the tune of 70 percent when compared to current competing technologies are being claimed on the back of the system's combined efficiency with a lack of degradation in storage

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Research Progress of Gravity Energy Storage Technology: XIA Yan 1, WAN Ji-fang 1, LI Jing-cui 1, YUAN Guang-jie 1, YANG Yang 2: 1. CNPC Engineering Technology R&D Company Limited, Beijing 102206, China; 2. School of Mechanical Engineering, Yangtze University, Jingzhou 434023, Hubei, China:



This article appears in the January 2021 print issue as "The Ups and Downs of Gravity Energy Storage." From Your Site Articles using existing mining technology. Our patent-pending design



It was seen that patent filings in gravity based energy storage systems has been, on average, increasing year-on-year. 2023 was also full of commercial developments and brought news that Gravitricity and Energy Vault are moving forward with commercialising gravity energy storage systems around the world; Gravitricity are partnering with ABB 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 ???



Major Energy Storage Breakthrough: Energy Vault has developed a gravity energy storage platform that is designed to be cost-efficient, reliable, safe to operate and environmentally sustainable in order to outperform alternatives and be well -positioned to meet market demand. It is inspired by pumped hydro plants

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## Commercial and Industrial ESS

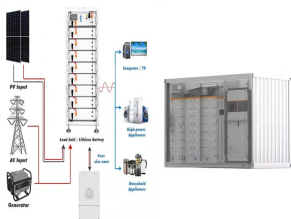
- Air Cooling / Liquid Cooling
- Budget-Friendly Solution
- Renewable Energy Integration
- Modular Design for Flexible Expansion



Large-scale energy storage technology plays an essential role in a high proportion of renewable energy power systems. Solid gravity energy storage technology has the potential advantages of wide geographical adaptability, high cycle efficiency, good economy, and high reliability, and it is prospected to have a broad application in vast new energy-rich areas.



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 ???



Commissioning has been completed on the first commercial-scale project using Energy Vault's gravity energy storage technology, while the firm has also secured a 400MWh BESS order for a project in Australia. However, it expects revenues this year to be 70-85% lower than 2023. looks at patent filing activity in energy storage technologies



-18 Priority to US14/490,630 priority Critical patent/US10138875B2/en the Gravity Field Energy Storage & Recovery System or periodic power harvesting technology requires massive energy storage systems to transform the periodic energy pulses to a quasi-continuous system to meet society's demand. 2. Description of Related Art

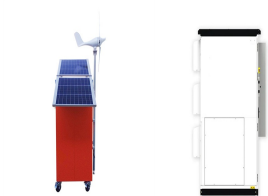


With the grid-connected ratio of renewable energy growing up, the development of energy storage technology has received widespread attention. Gravity energy storage, as one of the new physical energy storage technologies, has outstanding strengths in environmental protection and economy. Based on the working principle of gravity energy storage, through extensive surveys, this ???

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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 firm's technology works by raising weights in a deep shaft and releasing them when energy is required. The technology is similar to that employed by Switzerland-headquartered and NYSE-listed Energy Vault, whose CEO Robert Piconi provided an update to its first commercial gravity energy storage project in Rudong, China, in a shareholder



Based on the type of blocks, GES technology can be divided into GES technology using a single giant block (Giant monolithic GES, G-GES) and GES technology using several standardized blocks (Modular-gravity energy storage, M-GES), as shown in Fig. 2. The use of modular weights for gravity energy storage power plants has great advantages over ???



By? spending years in the flywheel industry, Jim Fiske learned a great deal about grid-scale energy storage and its true requirements. After determining that flywheels were not the best option, he and the investor of his flywheel company founded Gravity Power. Gravity Power???????s technology has the potential to change energy storage worldwide.



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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Gravity energy storage is a kind of physical energy storage with competitive environmental and economic performance, which has received more and more attention in recent years. This paper introduces the working principle and ???



Energy Vault System with pilling blocks. Gravity on rail lines; Advanced Rail Energy Storage (ARES) offers the Gravity Line, a system of weighted rail cars that are towed up a hill of at least 200 feet to act as energy storage and whose gravitational potential energy is used for power generation. Systems are composed of 5 MW tracks, with each



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.



Applications of Gravity Energy Storage Technology. Grid Stabilization: Gravity-based energy storage technology systems can help stabilize the grid by storing excess energy during periods of low demand and releasing it when demand peaks, thus reducing the need for costly peaker plants and enhancing grid reliability.; Renewable Integration: By providing a ???



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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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About Gravity Energy Storage: It is a new technology that stores energy using gravity.; How does it work? It involves lifting a heavy mass during excess energy generation and releasing it to produce electricity when demand rises or solar energy is unavailable.; The types of weights used are often water, concrete blocks or compressed earth blocks.