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Gravity Energy Storage Market Forecasts to 2032 – Global Analysis By Mass Medium (Concrete Blocks, Steel Masses, Railcars, and Engineered Weights), Project Scale, Model, Technology, End User and By Geography

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Abstracts

According to Stratistics MRC, the Global Gravity Energy Storage Market is accounted for $2.2 billion in 2025 and is expected to reach $10.1 billion by 2032 growing at a CAGR of 24.2% during the forecast period. Gravity energy storage is a system that stores energy by lifting heavy weights, such as concrete blocks or water, using excess electricity, and releases energy by lowering them to generate power. Utilizing natural gravitational forces, it provides sustainable, long-duration energy storage. Designed for renewable energy integration, these systems offer grid stability and eco-friendly solutions, catering to industries seeking reliable, low-maintenance alternatives to traditional battery storage.

According to ARPA-E, gravity storage systems use weights in deep shafts or abandoned mines to store potential energy for large-scale, long-duration grid storage.

Market Dynamics:

Driver:

Increasing renewable energy integration

The primary driver is the global push to integrate large-scale renewable energy sources like solar and wind into the grid. These sources are intermittent, creating a critical need for long-duration energy storage (LDES) to store excess energy and discharge it when

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needed. Gravity storage, with its potential for high capacity and long lifespan, offers a viable solution for grid balancing and ensuring reliability, making it essential for achieving higher renewable penetration and decarbonization goals.

Restraint:

Technical limitations and scalability issues

A significant restraint is the current technical challenge of scaling this technology for widespread grid-level application. While the principle is simple, constructing massive structures or deep shafts for weights requires immense capital, specific geographical conditions (e.g., deep mines or tall elevations), and complex engineering. The energy density is also lower compared to some alternatives, meaning very large systems are needed for significant storage capacity, posing substantial hurdles for feasibility, permitting, and rapid, cost-effective deployment.

Opportunity:

Advancements in system design

A major opportunity lies in rapid advancements in innovative system designs that overcome initial scalability challenges. Companies are developing novel concepts like using existing topography (old mine shafts), modular tower systems, and automated robotic cranes to stack and lower composite blocks. These innovations aim to reduce material costs, land use, and environmental impact while improving efficiency and scalability, making the technology more economically viable and attractive to investors and utility providers.

Threat:

Competition from battery storage

The market faces a severe threat from the rapidly advancing and scaling battery storage sector, particularly lithium-ion. Batteries benefit from falling costs, massive manufacturing scale, high energy density, and rapid response times. While gravity storage excels in duration, the dominance, familiarity, and continued innovation in electrochemical storage solutions pose a major competitive challenge for securing project funding and market share, especially for shorter-duration storage needs.

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Covid-19 Impact:

The COVID-19 pandemic initially caused disruptions in supply chains and delayed pilot projects due to lockdowns and economic uncertainty. However, the long-term impact has been positive, as recovery plans heavily emphasized building resilient and green infrastructure. The pandemic underscored the need for stable energy systems and accelerated government and corporate focus on renewable integration and supporting technologies like long-duration energy storage, bringing greater attention and potential investment to gravity-based solutions.

The concrete blocks segment is expected to be the largest during the forecast period

The concrete blocks segment is expected to account for the largest market share during the forecast period, resulting from the material's low cost, high density, durability, and widespread availability. Using mass-produced concrete blocks as weights offers a simple, cost-effective, and scalable method for storing potential energy. This design leverages established construction techniques and supply chains, reducing technological risk and initial capital expenditure compared to more novel designs. Its practicality and straightforward engineering make it the leading and most commercially viable approach in the early market development phase.

The pilot segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the pilot segment is predicted to witness the highest growth rate, propelled by the critical need to demonstrate the technology's feasibility, efficiency, and economic viability at a meaningful scale. As the technology moves from concept to commercialization, a surge in pilot and demonstration projects is essential to de-risk investments, attract funding, secure permits, and prove grid integration capabilities. This phase will see the highest relative growth as numerous companies and utilities initiate first-of-a-kind projects to validate their designs and gather operational data.

Region with largest share:

During the forecast period, the Asia Pacific region is expected to hold the largest market share, attributed to massive investments in renewable energy, particularly in China and India, creating an urgent need for grid-scale storage. The region has rapid energy demand growth, supportive government policies for clean energy technology, and availability of suitable sites for deployment. Strong manufacturing capabilities for necessary components like steel and concrete further position Asia Pacific as the

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primary market for initial large-scale gravity energy storage installations.

Region with highest CAGR:

Over the forecast period, the North America region is anticipated to exhibit the highest CAGR associated with, strong governmental support for energy storage innovation through policies like the U.S. Inflation Reduction Act, which provides investment tax credits for standalone storage. High venture capital investment in novel long-duration storage technologies, a focus on grid resilience and decarbonization, and the presence of innovative startups driving pilot projects contribute to a rapidly expanding market from a smaller base, resulting in the highest growth rate.

Key players in the market

Some of the key players in Gravity Energy Storage Market include Energy Vault, Gravitricity, LightSail Energy, EnergyNest, Sinclair Knight Merz, Highview Power Storage, Gravity Power LLC, Advanced Rail Energy Storage (ARES), ABB Ltd., Heindl Energy, Quidnet Energy, Greensmith Energy, Hydrostor, Energy Vault Holdings, Inc., Vattenfall AB and Siemens Energy.

Key Developments:

In Aug 2025, Hach introduced the new BioTector B7000 Online ATP Monitoring System for real-time detection of microbial contamination in water treatment processes. It provides rapid results in 5-10 minutes.

In July 2025, Thermo Fisher launched the new DionexInuvion Ion Chromatography system designed for simplified and versatile ion analysis for environmental, industrial and municipal water testing labs.

In June 2025, Thermo Fisher announced the launch of its 'Make in India' Class 1 analyser-based Continuous Ambient Air Quality Monitoring System (CAAQMS) to support India's environmental monitoring efforts.

Mass Mediums Covered:

- Concrete Blocks
- Steel Masses

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- Railcars
- Engineered Weights

Project Scales Covered:

- Pilot
- Community Scale (kW–MW)
- Utility-Scale (MWs–100s MWs)

Models Covered:

- CAPEX Project
- Energy-As-A-Service
- Merchant Operations
- Contracted Capacity

Technologies Covered:

- Crane/Lift-Based
- Rail/Track Mass Movers
- Subterranean-Piston Systems
- Suspended-Mass

End Users Covered:

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- Utilities
- Industry
- Commercial

Regions Covered:

- North America
  - US
  - Canada
  - Mexico
- Europe
  - Germany
  - UK
  - Italy
  - France
  - Spain
  - Rest of Europe
- Asia Pacific
  - Japan
  - China
  - India

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- Australia
- New Zealand
- South Korea
- Rest of Asia Pacific

South America

- Argentina
- Brazil
- Chile
- Rest of South America

Middle East & Africa

- Saudi Arabia
- UAE
- Qatar
- South Africa
- Rest of Middle East & Africa

What our report offers:
- Market share assessments for the regional and country-level segments
- Strategic recommendations for the new entrants
- Covers Market data for the years 2024, 2025, 2026, 2028, and 2032
- Market Trends (Drivers, Constraints, Opportunities, Threats, Challenges, Investment Opportunities, and recommendations)
- Strategic recommendations in key business segments based on the market estimations

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- Competitive landscaping mapping the key common trends
- Company profiling with detailed strategies, financials, and recent developments
- Supply chain trends mapping the latest technological advancements

Free Customization Offerings:

All the customers of this report will be entitled to receive one of the following free customization options:

Company Profiling

Comprehensive profiling of additional market players (up to 3)

SWOT Analysis of key players (up to 3)

Regional Segmentation

Market estimations, Forecasts and CAGR of any prominent country as per the client's interest (Note: Depends on feasibility check)

Competitive Benchmarking

Benchmarking of key players based on product portfolio, geographical presence, and strategic alliances

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Note: Tables for North America, Europe, APAC, South America, and Middle East & Africa Regions are also represented in the same manner as above.

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