

Gravity energy storage ville neuss

In May 2024, Energy Vault, a company specializing in long-duration, grid-scale energy storage, announced an exclusive global partnership with SOM. Having made strides in gravity energy storage systems (GESS)--which hold the potential to store and supply renewable energy to the power grid safely, for long periods, and without degrading--the global company sought out SOM's architecture and engineering expertise to develop the next generation of GESS technology. When integrated into tall buildings, these systems can maximize sustainability, accelerate carbon payback of building construction, and lower the levelized cost of energy consumption. They can also bring sustainable energy storage to natural landscapes with minimal environmental impact.

As part of this strategic partnership, SOM is the exclusive architect and structural engineer for fixed frames and deployable structures for all new Energy Vault gravity energy storage systems, including incorporating gravity energy storage technology into tall buildings in urban environments and deployable structures in natural environments.

Gravity energy storage systems operate using similar principles as pumped hydro storage, which is currently the largest source of grid storage. GESS installations use surplus energy to lift heavy blocks, which creates potential energy that can later be converted into electricity when lowered to the ground. Unlike pumped hydro storage facilities, which can only be built on specific natural sites, GESS installations can theoretically be constructed anywhere--opening up wide new possibilities for clean energy storage and distribution.

Energy Vault collaborated with SOM to find efficiencies in their existing EVx(TM) platform, enabling the design and engineering of several new typologies--including towers over 300 meters and up to 1,000 meters tall--which would be able to achieve a carbon payback within accelerated timeframes of 3 to 4 years. Through this partnership, Energy Vault and SOM are designing a new platform of G-VAULT GESS solutions focused on improved economics, energy density and sustainability.

SOM's partnership with Energy Vault demonstrates a commitment not only to accelerate the world's transition away from fossil fuels, but also to explore, together, how the architecture of renewable energy can enhance our shared natural landscapes and urban environments.

Current energy storage solutions face challenges such as negative environmental impacts, geographical constraints, scalability issues, and long-term sustainability issues.

For instance, lithium storage requires rare earth minerals and poses recycling challenges, while pumped hydro requires large reservoirs and significant land use, limiting deployment.

One of the alternatives, Gravity energy storage, emerges as a promising solution, offering a novel way to store



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energy using the earth's gravitational force. This method involves elevating heavy weights during excess energy production and releasing them to generate electricity when needed.

The technology is appealing due to its potential for high energy capacity, long lifespan, minimal environmental impact, and the ability to repurpose existing infrastructures such as disused mines and oil wells.

It further offers lower costs over the lifecycle, minimal geographical limitations, and a smaller environmental footprint. As a mechanical storage solution, it also avoids the chemical issues associated with battery disposal and the extensive land use required for pumped hydro.

This article explores five innovative growth-stage startups advancing gravity energy storage technology. These startups have the potential to grow rapidly, are in a good market position, or can introduce game-changing technology to the market in the next 2-3 years.

This makes them a great option to partner, collaborate, or acquire.

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