Gravity energy storage reykjavik

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The premise behind gravity-driven energy production solutions is fairly simple, on paper. A large mass is lowered down a shaft. The cables attached to that weight spins a hoisting system that generates electricity via infrastructure above. The weight is lifted back to the top under renewable power when the sun is shining or the wind is blowing, or when traditional energy is cheaper, or by switching the hoisting system to a generator to help bring the weight back up.

Best of all, it"s a system that uses empty mine shafts, infrastructure that is already in place and often resource-intensive to maintain, even in a disused state.

"Those shafts are on average between 500 and 1,200 metres deep. In South Africa and in some of the deeper gold mines in the US, they could be as deep as 2,000 metres, which could create a very nice period for regeneration."

"Abandoned" shafts are typically under the care of mining companies, Barclay says. Those companies have to conduct maintenance to keep them in a safe condition, or plug them and shut them off, which includes rehabilitation.

ABB"s recent research, which surveyed more than 400 global mining leaders, found that nearly half (47%) of mining companies anticipate significant sustainability-led transformation by 2030.

Alongside the sustainability payoff, Barclay says, a regen retrofit could enable an otherwise-unused shaft to be classified as "operational", reducing closing charges, fees and penalties.

The generation of the maximum amount of electricity over the longest period of time requires a certain weight to be lowered down the available length of shaft, with a specific level of resistance provided by the hoisting system that acts as a generator.

"What the leading players are looking to do is find that place where they can have the object lowered as long as they can and regen as much as they can, without being in an environment where any person can be injured or damage something or the environment," Barclay says.

"The trick is the balance between the size of weight, the speed you lower it, and the amount of regen you want," Barclay says. "You"re generating power as long as you"re lowering the weight - that period we call the "regen cycle"." As it puts power into the grid immediately, it could represent an excellent solution during periods of peak demand when the mine site is connected to a grid serving a community.

On more remote sites, it can serve as a localized solution, providing for the unique energy needs of the mining

business itself. "It solves a problem around what miners call "peak power shaving", or controlling their costs when they suddenly need power during peak demand," he says.

"That"s the beauty of this system. You can switch it on within minutes and put power straight into the grid. We"re talking about sufficient power to potentially run a small mining operation for a few hours if configured correctly."

Currently, gravity energy production is in a pilot phase. Projects are underway around the world, including in Wollongong, NSW, to test and prove the process as a viable, sustainable energy alternative.

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