Utility-scale energy storage jerusalem

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Intelligent insights & conversations with global power industry professionals

Much like that one coworker which everyone has, lithium-ion batteries are pretty great at doing their job, but after they finish their work they hang around for way too long and start to get toxic -- but while your coworker eventually gets tired and goes home to bother his roommates, the batteries usually end up in a landfill leaking corrosive chemicals like mercury, cadmium, lead and nickel into the soil and water table, thereby presenting a pretty serious risk to human health and the environment alike.

In light of lithium-ion batteries" shortcomings, the world"s bright minds have developed an alternative solution for energy storage, and one of the more innovative approaches utilizes humanity"s premiere multitool: the rock. As it turns out, Caveman"s First Hammer(TM) is pretty good at holding heat -- especially when it"s been crushed and compacted. That heat can then be converted into steam, which in turn can produce battery acid-free electricity.

Israeli energy solution company Brenmiller Energy has taken that idea and run with it, resulting in its development of advanced, highly-efficient thermal energy storage (TES) units. This week, Brenmiller Energy announced that it has partnered with Italian energy company The Enel Group to implement a heat-based energy storage system in Enel"s power plant in Santa Barbara, Tuscany.

The Italian-Israeli collaboration

The effort between Enel and Brenmiller is the result of an Italian-Israeli collaboration protocol aimed at accelerating cooperation between Israeli companies and large Italian industries. The project was partly financed by the Israeli Innovation Authority, which supported Brenmiller with 1 million euros in financing.

The Italian flag shown on the Old City walls of Jerusalem to show solidarity during the coronavirus outbreak (credit: ARNON BOSSANI)

"Today we are celebrating a successful Italian-Israeli cooperation experience thanks to which Italy will benefit from an innovative made-in-Israel solution for energy storage."

The integration of the TES system with the existing power plant enables Enel and Brenmiller to test the technology in the field, in challenging operating conditions and on a large scale. The system offers reduced power plant start-up times and greater speed in load variations, which are necessary performance requirements to enable the efficient use of renewable energy. As well, it can be used to store excess energy produced from renewable sources in the form of heat to offer decarbonization services to industrial customers and to integrate long-term storage solutions with renewable plants.

"Our TES system at Enel"s Santa Barbara power plant in Tuscany is the first-ever system of its kind to provide utility-scale thermal energy storage and offers commercial and industrial users a viable path towards decarbonization," said Avi Brenmiller, chairman and CEO of Brenmiller Energy. "The TES also makes it possible to add additional renewables to the grid with greater reliability. We believe the success of this moment reflects the types of innovative collaborations needed to transition the global economy away from its heavy, albeit lessening, dependence on fossil fuels, and towards a 100% clean, flexible, and affordable energy grid."

The TES technology -- which resembles a long, solid cinder block with pipes running through it lengthwise -- sends steam through its pipes in order to heat its crushed-rock interior, reaching 550?C and holding up to 24MWh of clean heat for five hours. To discharge, the stored heat is released, heating pressurized water and generating steam, which is converted into electricity.

"This solution makes renewables more reliable, flexible and resilient and can be used to decarbonize sectors that need heat at high temperatures," said Ernesto Ciorra, director of "innovability" at Enel.