Cook islands compressed air energy storage

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We catch up with the president of Canada-headquartered Hydrostor, Jon Norman, about the firm’s advanced compressed air energy storage (A-CAES) tech, current projects, future plans and being a developer versus system integrator.

Hydrostor is deploying projects in the US and Australia using advanced compressed air energy storage (A-CAES) technology utilising “off-the-shelf” components. Norman says the company is, therefore, more of a system integrator than a technology provider and, for now, is also a developer of its own projects.

It could have increased efficiency by redesigning parts of the system, but that would have reduced how proven the tech would be, and, subsequently, its bankability. Goldman Sachs Asset Management committed to investing US$250 million in the company in 2022, and Hydrostor is the investor’s “global LDES (long-duration energy storage) play”, Norman says.

The firm’s A-CAES system works on the basic level in the same way as ‘non-advanced’ CAES, by running electricity through a compressor which turns that into high-pressure air to be stored underground and then run back through a turbine to release the energy.

What makes it ‘advanced’ is that it takes the heat from the compressor and instead of releasing it it runs it through heat exchangers to store in pressurised water. That water is then held in a reservoir (seen in the render above) and pushed down into the cavern to push the air back up and out when discharging, and vice versa. The process is called hydrostatic compensation and is where the company’s name comes from.

The company’s A-CAES system uses ten times less space than conventional CAES and 20 times less water than pumped hydro energy storage (PHES), Norman claims.

The firm has two, small-scale operational projects in Canada, the larger of which is a 2.2MW/10MWh commercial system in Goderich, Ontario, and is working on several large-scale initiatives elsewhere.

Its most advanced projects are the 200MW/1,600MWh Silver City project in Broken Hill, New South Wales, Australia and Willow Rock, a 500MW/4,000MWh undertaking in California.

Norman: “For the Broken Hill project, we are looking to reach financial close this year. We’re working with contractors and are well advanced in the permitting process. We’re the equity partner for the project and are working with a financial syndicate to secure traditional project financing for it, with an in-service date planned for 2027.”

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For Willow Rock, it emerged in June last year that the firm was choosing alternative sites for the initiative after ‘superior geological conditions for the compressed air cavern’ were discovered elsewhere, a spokesperson said at the time.

Norman disagrees with the characterisation of this as a project delay: “The media reported this as an unexpected site change. We had to file our permits before we could drill boreholes at the site, so we always had backup sites. We’re still targeting 2028/29 for a commercial operation date (COD) with the option to push that to 2030.”

“The new location is great, and the local authority is extremely supportive of the project. The date issue is more to do with development in California generally, which is one of the more challenging areas to develop in the world.”

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