

Highview Power

The worldwide commercial potential of a novel liquid air energy storage system developed by London-based Highview Power convinced Sumitomo Heavy Industries to take a £35 million minority stake in the company early in 2020.

That investment from the Japanese-owned global industries group has allowed Highview Power to press ahead with ambitious plans to build 20 liquid air bulk storage plants of 100MW.

It is eight years since the business received its first grant from Innovate UK, just under £20,000 towards a proof-of-market study. Further grants from Innovate UK have helped to accelerate growth and development of the company's liquid air energy storage technology, now called the CRYOBattery.

The grants included £1.87 million to help convert a 5MW demonstrator into the world's first commercial-scale full liquid air energy storage system, capable of rapid response and qualifying as a supplier to the National Grid. This allowed Highview Power to gauge the commercial benefit from such an arrangement as well as the demand for similar systems and services around the world. It also reinforced investor confidence.

Highview's cryogenic energy storage technology sprang from engineer Peter Dearman's liquid air engine, which he invented some 15 years ago. Working with researchers at the University of Leeds, Peter developed the concept of using air as a form of energy storage, once compressed and liquefied at -196°C.

Energy Research Accelerator (ERA), an energy research hub, also funded by Innovate UK, and made up of eight internationally-renowned Midlands universities, played a key role, too: its institutions helped pioneer the large-scale energy storage technology that is now being scaled up by Highview Power.

Highview Power now employs 45 people at its Charing Cross Road headquarters, plus six staff in its New York office and another in Spain. This year the company will begin construction of its first truly commercial-sized liquid air energy storage plant at a site yet to be announced.

Edward Scrase, project engineering manager at Highview Power, said: "We are actively developing projects in the UK and the US. The Sumitomo investment has helped to move those along quite considerably."

SHI's technology centre will become a hub for the CRYOBattery business, expanding the technology's footprint in Europe, Asia and the Americas.

Increasing use of renewable power opens up a big market for the CRYOBattery, which is emissions-free. If hooked up to a wind farm, it can become more viable in periods of low or fluctuating demand. Liquid air is stored in a large insulated tank until there is a demand for that stored energy.

When the call comes, the process uses stored waste heat from the electric compressors to turn the refrigerated air back into gas at an even higher temperature. The 700-fold expansion in volume is used to drive a turbine and generate emissions-free electricity for up to five hours.

Highview Power's innovation lies mainly in the way that waste heat generated in the compression process is managed for reuse in the eventual discharge of the stored energy.