

## Compressed air energy storage companies

ALACAES is a privately held Swiss company that is developing an advanced adiabatic compressed air energy storage (AA-CAES) solution for large-scale electricity storage.

ALACAES's patented technology uses caverns in mountains as the pressure chamber and a proprietary thermal energy storage technology to achieve an overall round-trip storage efficiency in excess of 72% and eliminate any kind of green house gas emissions.

In 2016 ALACAES built and successfully tested the world wide first pilot plant of an advanced adiabatic compressed air energy storage technology in the Swiss Alps.

The power industry continues to be a hotbed of innovation, with activity driven by the growth in renewable generation, need for improved efficiency and reduction in greenhouse gas emissions, and growing importance of technologies such as energy storage. In the last three years alone, there have been over 439,000 patents filed and granted in the power industry, according to GlobalData's report on Environment Sustainability in Power: Compressed air energy storage system. [Buy the report here.](#)

However, not all innovations are equal and nor do they follow a constant upward trend. Instead, their evolution takes the form of an S-shaped curve that reflects their typical lifecycle from early emergence to accelerating adoption, before finally stabilising and reaching maturity.

Identifying where a particular innovation is on this journey, especially those that are in the emerging and accelerating stages, is essential for understanding their current level of adoption and the likely future trajectory and impact they will have.

According to GlobalData's Technology Foresights, which plots the S-curve for the power industry using innovation intensity models built on over 83,000 patents, there are 90+ innovation areas that will shape the future of the industry.

Within the emerging innovation stage, smart lighting system, PCM thermal energy storage, and solid electrolyte fuel cell membrane are disruptive technologies that are in the early stages of application and should be tracked closely. Ceramic oxide nuclear fuel, geothermal heat pumps, and hybrid PV plants are some of the accelerating innovation areas, where adoption has been steadily increasing. Among maturing innovation areas are combined-cycle gas turbines and ethylene co-polymer PV modules, which are now well established in the industry.

Compressed air energy storage (CAES) is a technology of storing electrical energy generated during periods of

surplus supply and making it accessible again during times of high demand. Electrical energy is utilised in a CAES system to compress air, which is then stored in an underground reservoir and back produced using energy recovered in a gas turbine.

GlobalData's analysis also uncovers the companies at the forefront of each innovation area and assesses the potential reach and impact of their patenting activity across different applications and geographies. According to GlobalData, there are 20+ companies, spanning technology vendors, established power companies, and up-and-coming start-ups engaged in the development and application of compressed air energy storage system.

"Application diversity" measures the number of different applications identified for each relevant patent and broadly splits companies into either "niche" or "diversified" innovators.

Siemens is one of the leading patent filers in compressed air energy storage systems. Siemens, a world leader in power generation, with a broad portfolio and global installed base of thousands of utility- and industrial-grade gas turbines and compressors, is at the forefront of CAES technology. Back in 1991, a McIntosh 110 MW CAES plant in Alabama, was built with Siemens Energy technology. Recently, Siemens has signed an agreement to collaborate with Corre Energy, a European company focused on long-duration energy storage based on compressed air technology.

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