Compressed air energy storage praia

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DESNZhas awardedalmost ?7 millionto UK projects that are developing innovative energy storage technologies, in first round of government-backed competition. These projects will benefit from this funding to develop new energy storage technologies that can utilise stored energy as heat, electricity or as a low-carbon energy carrier like hydrogen. Ranging from the development of thermal batteries to converting energy to hydrogen, they have been selected because of their potential to improve technology performance and reduce the cost of meeting net zero

The first round of funding is awarded under Phase 1 of the Longer Duration Energy Storage Demonstration competition (LODES), part of the government''s ?1 billion Net Zero Innovation Portfolio. Phase 1 will be followed by Phase 2, which will see the remainder of the ?68 million funding awarded to several of the most promising

As part of the first round of funding, EDF thermal generation alongside EDF UK R& D, io consulting and Hydrostor Inc. has secured ?1 million from the Department for Energy Security and Net Zero (DESNZ) to develop storage of electricity as compressed air, utilising Hydrostor''s Advanced Compressed Air Energy Storage technology, which could use mothballed EDF UK gas cavities in Cheshire.

This will not only help reduce the nation''s dependence on expensive fossil fuels, but will also provide cheaper energy to consumers, and will mean more of the UK''s energy is produced domestically. The green energy transition will therefore involve ensuring the UK''s electricity infrastructure can cope with greater shares of renewables, while meeting power demands securely.

The growth of renewable power generation is experiencing a remarkable surge worldwide. According to the U.S. Energy Information Administration (EIA), it is projected that by 2050, the share of wind and solar in the U.S. power-generation mix will reach 38 percent, which is twice the proportion recorded in 2019. The incorporation of Compressed Air Energy Storage (CAES) into renewable energy systems offers various economic, technical, and environmental advantages.

By 2030, it is anticipated that renewable energy sources will account for 36 percent of global energy production. Energy storage systems will be instrumental in attaining this objective. Mechanical storage systems stand out among the available energy storage methods due to their reduced investment expenses, prolonged lifetimes, and increased power/energy ratings. Notably, commercialized large-scale Compressed Air Energy Storage (CAES) facilities have arisen as a prominent energy storage solution.

Since the late 1970s, (CAES) technology has been commercially available. This energy storage system functions by utilizing electricity to compress air during off-peak hours, which is then stored in underground caverns. When energy demand is elevated during the peak hours, the stored compressed air is released, expanding and passing through a turbine to generate electricity.

In the charging phase, CAES makes use of off-peak and cost-effective electricity to compress ambient air. The compressed air is then stored in a dedicated pressurized reservoir, which can be either an underground cavern or an aboveground tank, typically maintained at a pressure of 40-80 bar.

During the discharge phase, the elastic potential energy stored in the compressed air is harnessed. The compressed air is drawn from the reservoir, heated, and subsequently expanded in a turbine train at high pressure and temperature. This expansion process generates electricity that can be fed back into the grid.

CAES technology encompasses different types, including adiabatic systems and diabatic systems. The key distinction between these configurations lies in how they handle the heat generated during the compression process.

The diabatic CAES systems are the first-generation technology. In these systems, ambient air is compressed using a compressor train. The compression process generates waste heat, which is then dissipated to the surrounding environment through intercoolers. During the discharge phase, fuel is combusted to heat the air before its expansion in the turbines. This combustion process allows for the generation of electricity during peak demand periods.