

Can compressed air energy storage be used in underground mine tunnels?

Compressed air energy storage (CAES) in underground mine tunnels using the technique of lined rock cavern (LRC) provides a promising solution to large-scale energy storage. A coupled thermodynamic and thermomechanical modelling for CAES in mine tunnels was implemented. Thermodynamic analysis of air during CAES operation was carried out.

Can abandoned mines be used as energy storage systems?

The thermodynamic performance of the underground reservoir was analyzed. A round-trip efficiency of 0.71 was achieved. In the current energy transition, abandoned mines can be used as strategic large scale energy storage systems. Lined mining drifts can store compressed air at high pressure in compressed air energy storage systems.

Can abandoned mines be used as compressed air storage systems?

Underground space in abandoned mines may be used as compressed air storage systems for CAES plants. The simplified schematic diagram of the CAES system is shown in Figure 1. The compressor and turbine facilities are installed above the ground, while the compressed air reservoir is underground.

Can abandoned coal mines be used as compressed air reservoirs?

In this paper, abandoned mines are proposed as underground reservoirs for large scale energy storage systems. A 200 m<sup>3</sup> tunnel in an abandoned coal mine was investigated as compressed air reservoir for A-CAES plants, where the ambient air is stored at high pressure.

Can abandoned mines be used as underground reservoirs?

Underground space from abandoned mines can be used as underground reservoirs for underground pumped storage hydropower (UPSH) and compressed air energy storage (CAES) systems [5,6,7,8,9,10,11 ].

Is air storage possible in isolated workings of closed coal mines?

The concept of air storage in isolated workings of closed coal mine is presented taking into account availability of such places in the Silesian Coal Basin of southern Poland. The article also discusses major challenges of such concept such as insulation of underground workings, geomechanical stability of workings and site availability.

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Compressed air energy storage (CAES) systems among the technologies to store large amounts of energy to promote the integration of intermittent renewable energy into the ...

From solar thermal to compressed air energy storage, these solutions offer a path to a more sustainable future while addressing the decline in coal production. ... J.M. Energy ...

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Currently, energy storage has been widely confirmed as an important method to achieve safe and stable utilization of intermittent energy, such as traditional wind and solar ...

We discuss underground storage options suitable for CAES, including submerged bladders, underground mines, salt caverns, porous aquifers, depleted reservoirs, cased wellbores, and surface...

There are massive abandoned coalmines and corresponding underground space, which provides a viable solution to energy storage of renewable energy generation. Here a novel scheme of ...

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