Management measures for pumped storage of abandoned reservoirs

Can pumped storage power stations be built at abandoned mines?
The construction of pumped storage power stations at abandoned mines or with mines as upper or lower reservoirs is clearly a new approach for the further development of PS power stations, and it supports the complete utilization of mine resources. The development and application prospects of this approach are very broad.

Can pumped storage and sewage treatment be used in abandoned mines?
Based on the ground space resources,water resources,surrounding wind energy conditions,and photovoltaic conditions of the abandoned mine,a multi-energy complementary development and utilization design scheme suitable for pumped storage and sewage treatment can be proposed,as illustrated in Figure 8. Figure 8.

Can a reservoir be located in an abandoned mine?
As explained previously, several unpredictable severe problems may endanger the stability and safety of the abandoned mine area . Therefore, identifying a suitable location for the underground reservoir in an abandoned mine and estimating the current condition of the mine can be challenging [92, 146, 155, 204].

What is the underground reservoir of a pumped storage power station?
The underground reservoir of a pumped storage power station constitutes a vast system with multiphase and multi-physics coupling,encompassing factors such as the stability of surrounding rock,reservoir capacity,and groundwater dynamics.

Should abandoned open-pit mines be repurposed as pumped-storage power stations?
Repurposing these abandoned open-pit mines as pumped-storage power stations can enhance energy storage capacity, regulate regional power grid loads, improve the stability and reliability of the power system, and promote ecological restoration of abandoned mine areas and the transformation of resource-based cities.

What structures can be used as lower reservoirs in abandoned mines?
Typical structures in abandoned mines that can be used as lower reservoirs are often manifolds of tunnelswith sidearms,bifurcations and dead-end passages,forming either a fish-grid network of branches or ring-type roadways .

According to a summary of the PSPP models using abandoned mines, the application of PSAM is analyzed, and the combination of pumped storage and abandoned ...

The construction of pumped storage power stations among cascade reservoirs is a feasible way to expand the flexible resources of the multi-energy complementary clean ...

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Several countries have reported the conversion of abandoned mines to pumped storage plants, and a pilot project for the conversion of an underground reservoir group has ...

Abstract Electricity storage systems are necessary to increase the efficiency of variable renewable energies. Mine water in closed underground coal mines can be used for ...

As coal"s share in primary energy consumption wanes, the annual increase in abandoned coal mines presents escalating safety and environmental concerns. This paper ...

With the continued transformation of the energy structure, more and more coal mines have been abandoned. The construction of underground pumped storage power ...

Ministry of Power has, in April 2023, notified the guidelines to promote pumped storage projects. The Report on "Pumped Storage Plants - essential for India"s Energy Transition" recommends ...

Based on systematically collected and analyzed hydrogeological data of abandoned mines in China, this study reviews current underground space reuse practices and establishes a "pumped ...

The development of underground pumped storage plant using abandoned coal mine (UPSP-ACM) has a significance to abandoned coal mine resources utilization and energy ...

China is gradually transforming its coal-based energy supply structure towards sustainable development, resulting in a growing number of abandoned coal mines. ...

This research enhances the understanding of capacity division and estimation in underground reservoirs used for pumped storage in abandoned mines and provides theoretical ...

This constitutes a complex planning problem of pumped storage in abandoned open-pit mines. This paper takes Fushun open-pit mine, the second largest open-pit mine in the world, as the ...

Pumped storage hydropower plants can alleviate this problem by reducing the unevenness of renewable energy generation. It is a new exploration of energy storage methods to construct ...

The goal of this report is to help license applicants, resource agencies, and other members of the hydropower community involved in closed-loop pumped storage hydropower ...

A PHS plant exploits the potential energy of water, which is pumped from a lower reservoir to a higher one. This system operates by using low-cost power, typically ...

This constitutes a complex planning problem of pumped storage in abandoned open-pit mines. This paper

takes Fushun open-pit mine, the second largest open-pit mine in ...

Then, by combining the abandoned mine data, eight different sets of parameters of pumped storage are selected for the optimal configuration study, and the factors ...

Based on the relevant engineering background and geological exploration results of the West Open-Pit Mine, providing explanations for the site selection and design of ...

Abstract The development of underground pumped storage plant using abandoned coal mine (UPSP-ACM) has a significance to abandoned coal mine resources ...

This research contributes to the understanding of utilizing abandoned mines for UPSPs, highlighting the challenges associated with the use of coal mines as lower reservoirs ...

Reviving disused mines: pumped storage solutions for a sustainable future Rehabilitating disused mining sites is a becoming a global problem that will require multiple solutions to address it. Repurposing ...

The quest for carbon neutrality raises challenges in most sectors. In coal mining, overcapacity cutting is the major concern at this time, and the increase in the number of abandoned mine ...

The pumped hydroelectric storage (PHS) and geothermal utilization are vital means to efficiently repurpose resources in abandoned mine. In this work, the development potentials of the PHS ...

To address these challenges, the paper presents different numerical solutions available to comprehend and mitigate cyclical processes in abandoned mines. Finally, it ...

Many coal mines are being abandoned for economic and environmental reasons in China. The repurposing of abandoned open-pit coal mines into pumped storage hydropower ...

As an energy basin, the Yellow River basin is a key demonstration area to promote energy system reform in China. There are a large number of abandoned mines in the Yellow River basin, ...

Combined with the characteristics of goaf and related meteorological characteristics of typical abandoned coal mines in China, the energy storage characteristics of underground reservoirs ...

Various technical measures within the reservoir (or at the inlet) as well as management operations such as withdrawal management can be applied for water quality ...

This constitutes a complex planning problem of pumped storage in abandoned open-pit mines. This paper takes Fushun open-pit mine, the second largest open-pit mine in the world, as the analysis object ...

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Site selection of pumped storage power station in abandoned mines: results from fuzzy-based multi criteria decision model [J]. Journal of Mining Science and Technology, 2021, 6 (6): 667-677.

Every year in China, a significant number of mines are closed or abandoned. The pumped hydroelectric storage (PHS) and geothermal utilization are vital means to ...