



GETON CONTAINERS

Collaboration on 100kWh Energy Storage Container for Tunnels





Overview

Can energy tunnels be used for underground thermal energy storage?

The decarbonization of the built environment requires rapid growth in energy storage solutions due to the intermittent nature of most renewable energy sources. This paper focuses on the efficacy of so-called energy tunnels (i.e., tunnels equipped with pipe heat exchangers) used for underground thermal energy storage.

Are thermal energy storage operations via energy tunnels feasible?

It shows that thermal energy storage operations via energy tunnels are feasible in site conditions characterized by no groundwater flow, limited temperature differentials between the heat carrier fluid circulating in the pipe heat exchangers and the surroundings, and thermal insulation on the tunnel intrados.

1. Introduction.

What are energy tunnels & how do they work?

In this context, so-called called energy tunnels (i.e., tunnels equipped with heat exchangers) offer the promising opportunity to transfer large amounts of renewable geothermal energy and waste thermal energy from the ground to buildings, and vice versa, due to their large contact surface with soil and rock masses.

3.

How does convection affect thermal energy storage performance of tunnels?

Convection effects on the thermal energy storage performance of tunnels are unraveled. Groundwater flows and airflows severely affect the storage efficiency of tunnels. Thermal insulation layers deployed on the intrados of tunnels can enhance performance. Storage efficiencies of tunnels can drop from 60 % to less than 10 % due to convection.



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[Scenario-adaptive hierarchical optimisation framework for ...](#)

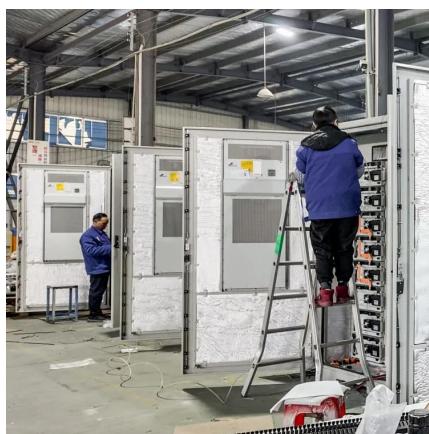
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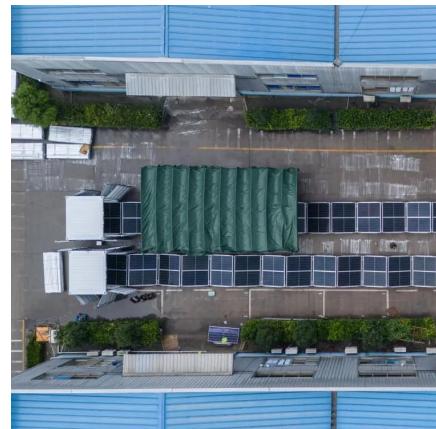
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Influence of convection on the thermal storage performance of energy

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