

# Thermal efficiency of air energy storage power generation





## Overview

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Compressed air energy storage (CAES) is a large-scale physical energy storage method, which can solve the difficulties of grid connection of unstable renewable energy power, such as wind and photovoltaic power.

What is thermo-economic performance of a compressed air energy storage system?

The thermo-economic performance of the system is linearly related with the pressure loss of the heat exchanger. When the charging pressure is 10MPa and the discharge pressure is 3.5MPa, the system has the best performance.   
Keywords:above-ground compressed air energy storage system, renewable energy, thermo-economic analysis NONMENCLATURE.

What are the future research directions of thermal energy storage in caes?

The future research directions of thermal energy storage in CAES are discussed. Compressed air energy storage (CAES) is a large-scale physical energy storage method, which can solve the difficulties of grid connection of unstable renewable energy power, such as wind and photovoltaic power, and improve its utilization rate.

Can compressed air energy storage improve the profitability of existing power plants?

Linden Svd, Patel M. New compressed air energy storage concept improves the profitability of existing simple cycle, combined cycle, wind energy, and landfill gas power plants. In: Proceedings of ASME Turbo Expo 2004: Power for Land, Sea, and Air; 2004 Jun 14-17; Vienna, Austria. ASME; 2004. p. 103-10. F. He, Y. Xu, X. Zhang, C. Liu, H. Chen.

Does above-ground compressed air energy storage have a thermo-economic performance?

This essay proposes an above-ground compressed air energy storage and the thermo-economic performance are analyzed. The advantages of discharge pressure and mechanical efficiency have positive effects on round-trip efficiency of the system.



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A review of thermal energy storage in compressed air energy storage

Dec 1, 2019 · Compressed air energy storage (CAES) is a large-scale physical energy storage method, which can solve the difficulties of grid connection of unstable renewable energy

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Compressed Air Energy Storage Systems

Jul 16, 2025 · Technical Terms Compressed Air Energy Storage (CAES): A method of storing energy by compressing air and storing it under high pressure, which is later expanded to ...

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A comprehensive review of compressed air energy storage ...

Apr 25, 2025 · As the world transitions to decarbonized energy systems, emerging long-duration energy storage technologies are crucial for supporting the large-scale deployment of ...

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Maximizing Efficiency in Compressed Air Energy Storage: ...

Mar 24, 2024 · Abstract Motivated by the suboptimal performances observed in existing compressed air energy storage (CAES) systems, this work focuses on the efficiency ...

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Thermal power air energy storage

This work experimentally investigates the cooling potential availed by the thermal management of a compressed air energy storage system. The heat generation/rejection caused by gas ...

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Technology Strategy Assessment

Jul 19, 2023 · Characterization of a TES system includes storage media, storage containment, and heat exchange/transfer (i.e., the ability of the TES system to support power generation or ...

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Performance of an above-ground compressed air energy storage

Jun 17, 2024 · Compressed air energy storage technology has become a crucial mechanism to realize large-scale power generation from renewable energy. This essay proposes an above ...

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Long Duration Energy Storage Technologies

Mar 27, 2025 · Long Duration Energy Storage (LDES) enables extended storage of power and helps stabilize intermittent power supply when integrated with renewable energy. Technologies ...

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Maximizing Efficiency in Compressed Air Energy Storage: ...

Mar 24, 2024 · Motivated by the suboptimal performances observed in existing compressed air energy storage (CAES) systems, this work focuses on the efficiency optimization of CAES ...

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Advanced Compressed Air Energy Storage Systems: ...

Mar 1, 2024 · Gil et al. [38] investigated high-temperature thermal storage for power



generation, reporting that the development of an efficient and cost-effective thermal storage system is ...

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Maximizing Efficiency in Compressed Air ...

Mar 24, 2024 · Abstract Motivated by the suboptimal performances observed in existing compressed air energy storage (CAES) systems, this work ...

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A comprehensive review of compressed air ...

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