

High temperature trough solar integrated system





Overview

Can a concentrated solar power plant use high-temperature electrolysis?

High-temperature electrolysis systems produce hydrogen with high electrical efficiency, but require additional thermal energy for steam generation. Thus, this study explores the thermal and electrical integration of a concentrated solar power (CSP) plant with a high-temperature electrolysis system.

Can parabolic trough collectors integrate a CSP plant with an HTE-SOEC system?

In this context, our study presents a techno-economic assessment (TEA) of electrically and thermally integrating a CSP plant using parabolic trough collectors (PTCs) with an HTE-SOEC system.

How are solar and electrochemical systems integrated?

In the presented concept, the solar and electrochemical systems are integrated through a heat exchanger that extracts heat from the synthetic oil at the outlet of the power block at a temperature around 290 °C, in line with the simplified diagram shown in Figure 2.

Can solar energy be used for high-temperature electrolysis?

Within the electrochemical pathway, using solar heat and electricity for high-temperature electrolysis (HTE) with solid oxide electrolysis cells (SOECs) shows promise for improving efficiency and reducing hydrogen production costs (Seitz et al., 2017).



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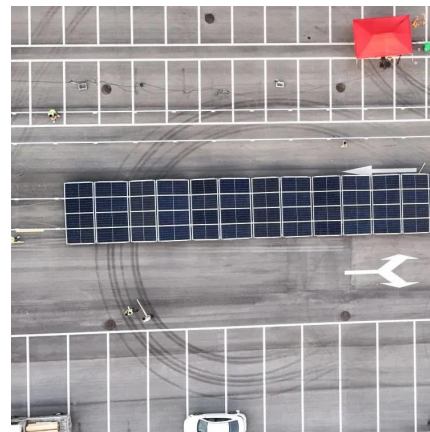


[Parabolic trough solar collectors integrated with a Kalina ...](#)

Nov 1, 2017 · In the present paper, integration of a Kalina cycle for high temperature and pressure applications with parabolic trough solar collectors is proposed and analyzed.

[Comparative analysis of a novel geothermal and nanofluid-based solar](#)

In this comparative study, the thermodynamic and economic investigation of an integrated system driven by a parabolic trough collector and geothermal water is carried out. The proposed ...



[Research on the thermal characteristics of the solar-gas ...](#)

Jul 23, 2025 · Solar energy and the gas-steam combined cycle exhibit excellent thermal-grade matching characteristics. In accordance with the principle of "energy matching and cascade ...



[Energy, exergy, economic and environmental \(4E\) evaluation of a solar](#)

This paper proposes a solar-integrated energy system at medium-high temperature (i.e., working temperature > 300 °C) for power generation, desalination, and sodium hydroxide (NaOH) ...



Proceedings of

Apr 16, 2023 · However, the parabolic trough collector (PTC) system still encounters a knotty problem of considerable radiation heat loss caused by its high operating temperature ...



[High-Temperature Solar Thermal Systems: Volume ...](#)

This book explores the recent technological development and advancement in high-temperature solar thermal technologies, offering a comprehensive guide to harnessing solar energy for ...



[Development and assessment of a novel integrated system...](#)

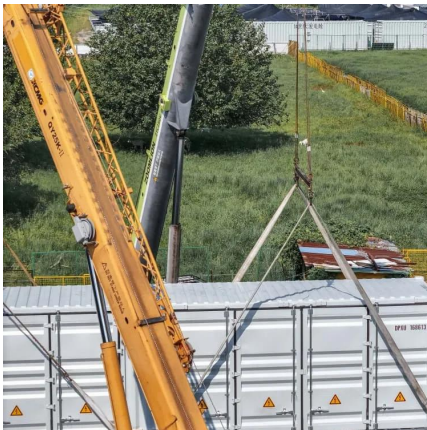
Oct 24, 2023 · Therefore, this research offers a thermodynamic evaluation of a novel integrated system driven by solar energy that aims to produce power, heating and freshwater. The ...





[Preliminary analysis of a parabolic trough concentrating solar ...](#)

Apr 23, 2024 · Abstract Parabolic trough concentrating (PTC) solar power generation is the most technologically mature way of concentrating solar power technology. PTC plants are generally ...

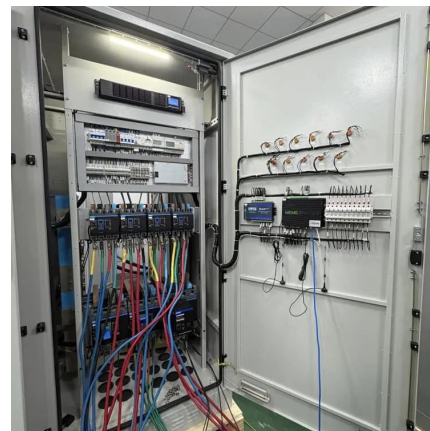


[Energy, exergy, economic and environmental \(4E\) evaluation of a solar](#)

Nov 15, 2023 · Energy, exergy, economic and environmental (4E) evaluation of a solar-integrated energy system at medium-high temperature using CO₂ as the parabolic trough collector ...

['Solar Hydrogen Production: Techno-Economic ...](#)

Feb 24, 2025 · Abstract High-temperature electrolysis systems produce hydrogen with high electrical efficiency, but require additional thermal energy for steam generation. Thus, this ...



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