MODERNIZATION SOLAR

High-efficiency solar-powered containerized oil refineries price reduction

Overview

There is an urgent need to shift away from the present heavy dependence on fossil fuels and embrace renewable energy sources, particularly in the context of the energy-intensive oil refining process. Built on.

Can solar energy systems decarbonize oil refineries?

Other studies in the literature considered coupling solar energy systems to oil refineries to decarbonize their operation. The applicability and feasibility of introducing a concentrated solar power (CSP) system to reduce partial reliance on process heaters of a crude oil refinery was studied by Danish et al.

Can solar energy drive crude oil refineries?

Employing solar energy to drive crude oil refineries is one of the investigated pathways for using renewable energy sources to support lowering the carbon emissions and environmental impact of operating the processing of fossil-based fuels.

How efficient is solar energy in crude oil heating?

The thermodynamic analyses described earlier is utilized to assess the system performance. The energy and exergy efficiencies of the system are found to be 60.94% and 19.34%, respectively. Furthermore, for a 10% solar share in crude oil heating, 11,950 tons of CO 2 emission are avoided per year.

Can solar-assisted petrochemical refineries greenize oil refineries?

This paper proposes a solar-assisted method for a petrochemical refinery, considering hydrogen production deployed in Yanbu, Saudi Arabia, as a case study to greenize oil refineries.

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Sustainable refining: integrating renewable energy and ...

Nov 29, 2025 · The study demonstrates that integrat-ing solar heat into crude oil distillation is a cost-effective and impactful strategy for decarbonizing refineries. Khan et al. [93] conducted a ...

Using concentrated solar power for crude oil distillation: a ...

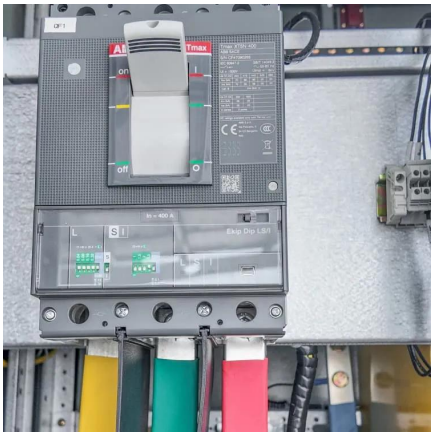
Jan 21, 2025 · It was published on Energy under the title "Concentrated solar heat for the decarbonization of industrial chemical processes: a case study on crude oil distillation". About ...

Analysis of a Solar-Assisted Crude Oil Refinery System

Jun 6, 2024 · With the growing urge to decarbonize the energy sector, actions toward reducing emissions of the oil and gas sector can contribute to bringing large cuts to carbon emissions. ...

Published at Energy Conversion and management

Jan 30, 2024 · Abstract: Built on the Solar Reactive Utilization framework, this study presents an innovative concept called the Solar Oil Refinery, applying solar energy in the energy ...



Analysis and assessment of using an integrated solar energy ...

Aug 1, 2019 · In large crude oil refineries, keeping emission levels low and minimizing energy losses can primarily be controlled by performing thermo-economic and environmental ...

Using concentrated solar power for crude oil ...

Jan 21, 2025 · It was published on Energy under the title "Concentrated solar heat for the decarbonization of industrial chemical processes: a case ...

Solar oil refinery: Solar-driven hybrid chemical cracking of ...

Jan 15, 2024 · This process is characterized by a substantial increase of gas and liquid phase products, coupled with a significant reduction of solid phase products and unreacted residual ...

Concentrated Solar Thermal: a solution for oil ...

Sep 25, 2025 · Concentrated Solar Thermal offers a pathway to decarbonising oil refining by replacing fossil-fuelled steam with solar-powered alternatives.

(PDF) Solar-assisted hybrid oil heating system ...

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(PDF) Solar-assisted hybrid oil heating system for heavy ...

Jul 16, 2023 · The purpose of this study is to investigate the potential use of solar energy within an oil refinery to reduce its fossil fuel consumption and greenhouse gas emissions. A validated ...

[Solar-assisted hybrid oil heating system for heavy refinery ...]

Sep 1, 2023 · The present study investigates the feasibility of solar hybrid system to generate steam in the oil refinery to maintain the temperature of heavy crude oil products before ...

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