

Does a solar-assisted air conditioning system save energy?

The existing vapour-compression air conditioning system operating alone consumes more energy compared to that when supplemented with the solar-driven absorption chiller with AES. A maximum of 58% energy-saving is achieved from the integrated solar-assisted cooling system in July and August.

How much energy-saving is achieved from integrated solar-assisted cooling system?

A maximum of 58% energy-saving is achieved from the integrated solar-assisted cooling system in July and August. Furthermore, a solar fraction of 63% is obtained from the integrated solar cooling system. Finally, the annual levelized cost of energy-savings of about 137,944 USD is achieved from the proposed cooling system.

1. Introduction

What is a solar-assisted cooling system?

The solar-assisted cooling system refers to a system consisting of conventional vapour compression air conditioning and solar-driven absorption cooling systems. In this case, the conventional system is operated for a shorter period due to the contribution of the solar-driven absorption system.

What is the performance of a solar absorption system with AES?

Xu et al. (2011) studied the performance of a solar absorption system with AES, where the solar collector served as the generator. The results indicated a system COP and storage density of 0.75 and 368.5 MJ/m³, respectively.

Who are the authors of solar air-conditioning system?

Farid Nasir Ani - Principle supervisor and corresponding author. Aminuddin Saat - Co-supervisor in Universiti Teknologi Malaysia, reviewing and editing. Shafiqur Rehman - Solar radiation data collection. Development of a Solar Air-Conditioning System in Saudi Arabia

Why do solar-assisted systems save a lot of energy?

Higher energy saving of 58% from the solar-assisted system with AES is due to extended hours of cooling due to the storage (on an average daily 14 h). It is noted that higher energy saving is achieved in May and June compared to the other summer months.

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In this research, a solar vapor absorption refrigeration (SVAR) system was combined with a conventional vapor compression refrigeration (VCR) system to analyze their combined ...



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Air-conditioning systems in Saudi Arabia consume approximately 65% of the electrical energy used in the building sector. Most air-conditioning systems in operation are of the vapor ...

The simulation of a solar absorption cooling system coupled with a chilled water system for a pilgrimage tent hypothetically located in Mina zone, Kingdom of Saudi Arabia, was carried out ...

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development and demonstration of solar hydrogen production...

Desert Technologies (DT) receives the Best Solar Innovation of the Year 2020 Award from the Middle East Solar Energy Industries Association ...

The hybrid of solar CSP and gas seems to be a quite competitive choice for CSP players while working with a standard generating technology. The reason could be most likely attributed to the cost.

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Air conditioning is vital for indoor comfort but traditionally relies on vapor compression systems, which raise electricity demand and carbon ...

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Overall, this research suggests that integrating renewable PV sources with reliable NPPs through CAES technology is a promising approach for future energy planning in Saudi Arabia, ...

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