

Sustainability of solar power generation in China

What is the potential of solar power generation in China?

Chen et al. developed a comprehensive solar resource assessment system based on the GIS +MCDM method in 2019. This system was applied to the assessment of the potential of PV power generation in the countries under the "Belt and Road" initiative. The results showed that the PV potential of China is 100.8 PWh.

How much solar power does China produce?

At the end of 2015, the PV installed capacity of China was approximately 43.54 GW, and the contribution of PV power generation to total power generation was $\leq 0.7\%$. Five years later (end of 2020), the PV installed capacity of China exceeded 253.83 GW. However, PV power generation does not result in zero carbon emissions.

Why is China a global leader in solar photovoltaic power generation?

growth and success in the solar photovoltaic power generation market. As the world's largest energy consumer, China's commitment to renewable energy and its pursuit of a more sustainable energy future have positioned it as a global leader in solar photovoltaic power generation, playing a crucial role in the f

Why is it important to assess photovoltaic power generation potential in China?

Clear spatial dislocations between PV power generation potential and population distribution and electricity demand. Accurate assessment of the photovoltaic (PV) power generation potential in China is important for the reduction of carbon emission intensity and the achievement of the goal of Carbon Neutral.

What is the PV power generation potential of China?

The PV power generation potential of China is 131.942 PWh, which is approximately 23 times the electricity demand of China in 2015. The spatial distribution characteristics of PV power generation potential mainly showed a downward trend from northwest to southeast.

Why is China a good place for solar power plants?

Because of its favorable latitude and high annual sunshine hours, China is a prime site for solar photovoltaic (PV) power plants. Researchers in China have looked at the sun's potential in various areas, and their findings have shed light on how much energy the sun can produce.

Solar photovoltaic (PV) installations, which enable carbon neutrality, are expected to surge in the coming decades. This growth will support sustainable development goals (SDGs) via reductions in power-generation ...

Concerns over climate change and the negative effects of burning fossil fuels have been driving the development of renewable energy globally. China has also set a series of ambitious targets for the

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development of low carbon power generation to meet the 2030 carbon emission reduction commitment made in Paris Agreement [1] the meantime, several recent ...

CSP is a promising technology for solar energy utilization with far-reaching implications for China (Yang et al., 2010). However, an efficient and economical thermal energy storage (TES) system is one of the key factors ...

However, the sustainability and ecological efficiency of the generating plants have not been fully understood. This study applies emergy analysis and systems accounting to ...

Low-carbon power generation has been proposed as the key to address climate change. However, the sustainability and ecological efficiency of the generating plants have not been fully understood. This study applies emergy analysis and systems accounting to a pilot solar power tower plant in China for the first time to elaborate its sustainable and ecological ...

For example, Zhang, et al. [25] concluded that the total solar radiation in China displayed a downward trend from 1979 to 2017, and the variation trend of the solar radiation over the years was 2.54 MJ/m²/yr. Feng, et al. [41] developed a new global solar radiation model which can accurately represent the decadal variability of solar radiation in China during ...

Renewable energy plays a significant role in achieving energy savings and emission reduction. As a sustainable and environmental friendly renewable energy power technology, concentrated solar power (CSP) integrates power generation and energy storage to ensure the smooth operation of the power system. However, the cost of CSP is an obstacle ...

China's energy sector has undergone significant developments in recent years, with a particular focus on expanding its solar energy capacity and transitioning towards cleaner and more sustainable energy sources (Hao et al., 2023) in China's role in global solar energy generation is substantial and continually growing, fueled by domestic policy initiatives and ...

The photovoltaic industry has the opportunity to develop rapidly in China, and its solar power capacity already accounted for 35% of the world's total in 2020. However, solar power generation had only reached 3.4% of total power generation and 10.7% of renewable energy power generation by 2020 (China Electricity Council 2021).

According to World Energy Outlook (2019) issued by the International Energy Agency (IEA), the expansion of generation from wind and solar photovoltaic (PV) resources helps renewables overtake coal in the power generation mix in the mid-2020s. By 2040, low-carbon sources provide more than half of total electricity generation. Wind and solar PV are the star ...

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Power generation by fossil-fuel resources has peaked, whilst solar energy is predicted to be at the vanguard of energy generation in the near future. Moreover, it is predicted that by 2050, the generation of solar energy will have increased to 48% due to economic and industrial growth [13, 14].

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