

Economic evaluation of photovoltaic solar power generation

Are there studies on solar PV power efficiency at the national level?

(1) There are few studies on solar PV power efficiency at the national level. Although solar PV generation is widespread and can provide electricity to meet the energy needs of economic development, few analyses have been conducted to assess solar PV power efficiency.

What are the indicators of solar PV power efficiency?

Solar PV installed capacity and solar PV generation are the most basic indicators of solar PV power efficiency. Therefore, we selected solar PV installed capacity, the cumulative number of solar PV patents, gross capital formation, and labor as input variables and solar PV generation as the output variable.

What are the economic dimensions of solar PV generation?

The economic dimensions considered in this paper refer to government provision of substantial support and subsidies for solar PV generation, which generally include solar PV generation planning policies, science and technology, research and development activities, capital costs, power costs, and market resource allocation.

What is the importance of assessing solar PV power efficiency?

The importance of assessing solar PV power efficiency is of interest to the vast majority of economies. A country should measure solar PV power efficiency and keep related records. Therefore, this study used economic dimensions in its analysis. The remainder of the paper is organized as follows.

How does government policy affect solar PV power efficiency?

They also have relatively greater expectations of non-fossil-fuel energy generation, which will also increase the level of attention given to solar PV generation; furthermore, more government policies and researcher input will influence solar PV power efficiency. . . 3. Results and discussion

How is solar PV power efficiency measured?

A three-stage data envelopment analysis model assessed solar PV power efficiency. Solar PV power efficiency was measured for 26 countries from 2000 to 2020. The measurement of solar PV power efficiency was based on economic dimensions. Most of the countries with high average solar PV power efficiency are high-income.

(1) (Islam et al., 2022; Talla Konchou et al., 2021): $P_{PV} = N_{PV} \cdot P_r \cdot i_{PV} \cdot (G_{Gref} \cdot [1 + v(T - T_{ref})])$ In which, P_{PV} (kW) stands for the total power produced by the ...

This study proposes a method to accurately assess the power generation of photovoltaic modules in complex weather conditions. Firstly, the maximum power point under different radiations is ...

Over the past ten years, power generation from coal has been responsible for more than 40% of the global

energy production [].The International Energy Agency (IEA) estimates a further increase in coal-based electricity ...

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Hamzat et al. studied the economic viability of a hybrid solar power generation system for thermal management of PV systems. PCM and thermal techniques are used for cooling. This experiment represents that ...

where, $WG(i)$ is the power generated by wind generation at i time period, MW; $price(i)$ is the grid electricity price at i time period, \$/kWh; t is the time step, and it is assumed to be 10 min. 3.1.2 Revenue with energy storage ...

To achieve the best area for installing a solar power plant, the defined criteria in the literature are identified and categorized. It makes possible to characterize and quantify ...

The results show that Zhengding County has a very high amount of road space available for PV power generation, with an effective PV installation area of 20.98 km² and an ...

This paper basically presents the review of the technoeconomic analysis of solar photovoltaic power generation. This paper is organized as follows: system design methods are discussed ...

The estimation of PV power potential is obtained from the effective PV area, solar radiation, and conversion efficiency of PV panels [27]: $E = I \cdot e \cdot A_{PV} \cdot l$ where E ...

This study constructs an optimization method for small grid-connected PV and WT power generation systems with multi-objective criteria (technical, economic and environmental) to achieve the optimal configuration ...

The techno-economic analysis conducted on scaled solar PV plants with a power capacity range of 1000-7000 MW has yielded several significant findings. The transition from mono-facial to bi-facial modules, ...

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