

Analysis of the advantages of solar power generation

What are the benefits of solar energy?

Solar energy would help steady energy prices and give numerous social, environmental and economic benefits. This has been indicated by solar energy's contribution to achieving sustainable development through meeting energy demands, creating jobs and protecting the environment.

Do solar energy benefits outweigh the costs?

Benefits of solar photovoltaic energy generation outweigh the costs, according to new research from the MIT Energy Initiative. Over a seven-year period, decline in PV costs outpaced decline in value; by 2017, market, health, and climate benefits outweighed the cost of PV systems.

What is the future of solar energy?

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].

Why is solar energy a good resource for generating electricity?

It plays a substantial role in achieving sustainable development energy solutions. Therefore, the massive amount of solar energy attainable daily makes it a very attractive resource for generating electricity.

Why do we need a large installed capacity of solar energy applications?

Both technologies, applications of concentrated solar power or solar photovoltaics, are always under continuous development to fulfil our energy needs. Hence, a large installed capacity of solar energy applications worldwide, in the same context, supports the energy sector and meets the employment market to gain sufficient development.

Why is solar energy a promising alternative source?

Benefits and applications Solar energy has become a promising alternative source due to its advantages: abundance, pollution free and renewability.

The characteristic analysis of the solar energy photovoltaic power generation system B Liu¹, K Li¹, D D Niu^{2,3}, Y A Jin² and Y Liu² 1Jilin Province Electric Research Institute Co. LTD, Changchun, 130021, China 2College of Automotive Engineering, Jilin University, Changchun, 130025, China Email: 1941708406@qq.com
Abstract. Solar energy is an inexhaustible, clean, ...

Among renewable energy resources, solar energy offers a clean source for electrical power generation with zero emissions of greenhouse gases (GHG) to the atmosphere (Wilberforce et al., 2019; Abdelsalam et al., 2020; Ashok et al., 2017). The solar irradiation contains excessive amounts of energy in 1 min that could be

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employed as a great opportunity ...

Given this situation, analysing how climate change confluences the energy output of the solar PV system helps design a sustainable energy system that has low carbon intensity and smoothly supplies energy for a long ...

The limitation of solar power generation technologies is the diurnal (day and night) and intermittent (hourly, daily, and seasonal) nature of solar radiation. ... Hybridization of CSP systems with biofuels exhibits similar benefits as with conventional fossil fuel plants. ... Semprini S, Sanchez D, De Pascale A (2016) Performance analysis of a ...

For China, some researchers have also assessed the PV power generation potential. He et al. [43] utilized 10-year hourly solar irradiation data from 2001 to 2010 from 200 representative locations to develop provincial solar availability profiles. It was found that the potential solar output of China could reach approximately 14 PWh and 130 PWh in the lower ...

There is a clear growth trend that can be seen in the solar PV industry, and solar systems will become an integral part of our society and thus our environments. In this context, understanding the effects of the expanded entrance of the control system on solar PV generation is important technically to overview the challenges. This article provides a comprehensive ...

Solar photovoltaic (PV) power generation has strong intermittency and volatility due to its high dependence on solar radiation and other meteorological factors. Therefore, the negative impact of grid-connected PV on power systems has become one of the constraints in the development of large scale PV systems. Accurate forecasting of solar power generation and ...

Albeit, the electricity generation from solar energy in Nigeria has also been estimated from solar radiation data, results of this analysis showed some areas in Northern Nigeria as the regions with the highest electricity generation capacity; the estimation using 1 kWp (Kilowatt-peak) PV (photovoltaic) modules were made from obtained data for possible ...

In this Analysis, we determine the magnitude and delivery location of all distributed solar, utility-scale solar and utility-scale wind generation across the continental US from 2007 to 2015.

It should be noted that the solar forecasting becomes important due to the substantial increase of solar power generation worldwide. ... Duhan M, Saroha S (2022) A comprehensive review and analysis of solar forecasting techniques. *Front Energy* 16(2):187-223 ... Benefits of solar forecasting for energy imbalance markets. *Renew Energy* 86:819 ...

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For the generation of electricity in far flung area at reasonable price, sizing of the power supply system plays an important role. Photovoltaic systems and some other renewable energy systems are, therefore, an excellent choices in remote areas for low to medium power levels, because of easy scaling of the input power source [6], [7].The main attraction of the PV ...

Furthermore, our analysis of solar generation offers a unique perspective in assessing its health benefits compared to similar sources, such as wind power. Increased wind power generation is often associated with decreased pollution due to higher wind speeds and enhanced dispersion of air pollutants, which may hamper identification of health impacts.

This study explores sustainable development and achieving net-zero emissions by assessing the impact of solar energy adoption on carbon emissions in 40 high and upper middle-income nations and 22 low and lower middle-income countries from 2000 to 2021. Dynamic GMM analysis reveals substantial potential in mitigating emissions, with a 1% ...

As shown in Fig. 3, between 2007 and 2015, total power sector emissions of CO₂, SO₂, NO_x, and PM_{2.5} declined by 20%, 72%, 50%, and 46%, respectively. The most dramatic change in the power sector was to SO₂ emissions 24 which fell from 9.0 million metric tons in 2007 to 2.5 million metric tons in 2015 as coal power plants were fitted with new control technologies to

Solar energy data analysis examines a wide range of issues such as solar adoption trends and the performance and reliability of solar energy generation facilities. Data analysis helps increase situational awareness for diverse audiences including the solar industry, electric utilities, regulators, local and state governments, public interest groups, and academia.

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