Current status of solar power generation development and utilization

Is solar energy a future energy resource?
The utilization of renewable energy as a future energy resource is drawing significant attention worldwide. The contribution of solar energy (including concentrating solar power (CSP) and solar photovoltaic (PV) power) to global electricity production, as one form of renewable energy sources, is generally still low, at 3.6%.

What is the status of solar technology developments?
The paper outlines the status of solar technology developments as covered in the World Solar Technology Report. A steady trendin technology improvements is observed,with crystalline solar PV being the dominant technology in the market.

Why did solar PV capacity increase in 2022?
According to the International Energy Agency (IEA),solar PV capacity increased by over 270 TWh in 2022,reaching a total of 1300 TWh globally. Declining costs,supportive policies,and rising demand for renewable energywere the driving forces behind this growth.

What is the future of solar energy?
It is predicted that by 2020, demand will increase to 158,055 GWh. This increase in demand is expected to be met entirely by renewable energy sources; solar photovoltaic energy is predicted to account for approximately 14,316 GWh of this total.

What is the contribution of solar energy to global electricity production?
While the contribution of solar energy to global electricity production remains generally low at 3.6%,it has firmly established itself among other renewable energy technologies,comprising nearly 31% of the total installed renewable energy capacity in 2022 (IRENA,2023).

What was the growth rate of solar energy in 2021?
During the period 2019-2021,solar energy expansion outpaced any other technology,with a compound annual growth rate of 21%. 2021 was also the first year when solar and wind together met more than 10% of the world's global power demand. Solar represents 3.7% of all generated electricity in 2021 and wind represents 6.6% .

Figure 2: Uganda Energy Demand Source: A. M. Mueller, Energy Sources in Uganda and Solar Radiation The figure below shows the major sources of energy generation in Uganda, from 2006 to 2015, Hydro power generation still being ...

The research status and future development arrangement of solar power generation technology in various

countries around the world are investigated. The principles, applications, advantages and disadvantages of two common solar power generation technologies, photovoltaic power generation and photothermal generation are introduced.

Considering the depletion of oil, coal, gas and other fossil energy, and the increasingly serious environmental pollution, all countries in the world are developing clean and renewable energy, such as wind energy, water energy, solar energy, etc., to alleviate the current energy crisis. Tidal current energy belongs to the marine renewable energy. It is clean, ...

Uganda Solar Energy Utilization: Current Status and ... * UN Environment-Tongji Institute of Environme nt and Sustainable Development, ... potential for solar power investment[12]. 1.1. Generation ...

A severe energy crisis has plagued Yemen for decades, and most of the population lack access to electricity. This has harmed the country"s economic, social, and industrial growth.

Nowadays, these two technologies are extensively used all over the world for large-scale power generation. Besides power generation, solar energy can be used for other thermal projects like heating, cooling and ventilation [4,5,6]. Thus, solar energy technology happens to be a mature and promising option in the coming future than the other ...

The biomass power plant can achieve cost parity with power generation using natural gas only when carbon prices fall within the range of £83-£146 per ton of CO 2. Ye et al. (2019) calculated that, according to the Integrated Environmental Control Model (IECM), the cost of power generation increased by 50-85% after retrofitting an existing power plant with CCS.

The identified challenges include developing new materials, enhanced performance, accelerated system installation and improved manufacturing processes, combining solar energy with other clean ...

The stability of this grid is not good sufficient for the intermittent power generation output from solar power plants [29]. Given the long construction cycle of state grids, the development and utilization model of solar energy in Western Sichuan Plateau region has become a rising challenge for the Sichuan government.

Introduction. Nowadays, the technology of renewable-energy-powered green hydrogen production is one method that is increasingly being regarded as an approach to lower emissions of greenhouse gases (GHGs) and environmental pollution in the transition towards worldwide decarbonization [1, 2].However, there is a societal realization that fossil fuels are ...

Table 1: Location, study approach, objectives and methods of the studies. The status of solar energy utilization, development opportunities and challenges in Ethiopia. It further articulated that Ethiopia has high solar energy potential related to its position and gifted 13 th month sunshine. The solar energy potential of the

country is may result because of the existence of the country ...

This study conducted a bibliometric analysis based on publication metrics from the Web of Science database to gain insights into global solar power research. The results ...

Current status and development trend of wind power generation-based hydrogen production technology. ... evaluated the technicality and economy of hydrogen production technology by wind and solar power. The results show that it is feasible to make hydrogen from the wind power and it provides a new way to solve the problem of the wind ...

In 2021, the world reached 920 GW of on-grid solar PV, 9 GW of off-grid solar PV, 522 GWth of solar thermal power and 6.4 GW of concentrated solar power (CSP). The ...

The objective of this paper is to introduce geothermal energy resources, utilization, development roadmap, and government support in China. Over the last 20 years, China was the first place in the world in direct utilization of geothermal energy with total amount reaching 17,870 MWt in 2014, and with an increasing trend annually.

The present review provides an overview of the present status of solar power generation and a high-penetration scenario for the future growth of solar energy. However, the ...

Through looking forward to the development trend of solar energy utilization from the aspects of improving efficiency, reducing cost, and diversifying utilization methods etc., we find that the utilization of solar energy resources has entered the fast track of development. ... Xu Y 2016 Research status of solar thermal power generation ...

Power Generation: In the power sector, ... One of the key areas of research in CO 2 utilization is the development of new technologies to convert CO 2 into valuable products, such as fuels, ... advantages, disadvantages, ...

As a kind of green and pollution-free renewable energy, wind energy has great development prospects. How to promote the development of the wind power industry and improve the efficiency of wind power development ...

The tracking status of solar photovoltaics has therefore been upgraded in 2023 from "more effort needed" to "on track". ... Power generation from solar PV increased by a record 270 TWh in 2022, up by 26% on 2021. ... Many global ...

However, in contrast to traditional thermal power generation, hydroelectric, and nuclear power generation, wind and solar power generation exhibit characteristics of intermittence and volatility. These traits result in a mismatch between the cost and profit return levels associated with resource development and utilization

[15,16,17]. With the ...

The present review provides an overview of the present status of solar power generation and a high-penetration scenario for the future growth of solar energy. ... the current cost of solar power has dropped by 18% ... and geothermal heat, providing a sustainable and clean alternative. The development and utilization of renewable energy ...

Power generation from solar PV increased by a record 270 TWh in 2022, up by 26% on 2021. Solar PV accounted for 4.5% of total global electricity generation, and it remains the third largest renewable electricity technology behind ...

One of the technologies in practical utilization is for power storage systems such as fuel cell batteries and Ene-Farm. Japan is leading the way in technological development and dissemination of power storage systems in its efforts to expand the use of fuel cells and Ene-Farm. ... Solar power generation capacity among major nations (Results for ...

The utilization of solar energy into the rechargeable battery, provides a solution to not only greatly enhance popularity of solar energy, but also directly achieve clean energy...