

Current situation of solar thermal power generation

What is the future of solar energy?

The Future of Solar Energy considers only the two widely recognized classes of technologies for converting solar energy into electricity -- photovoltaics (PV) and concentrated solar power (CSP), sometimes called solar thermal) -- in their current and plausible future forms.

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 are the challenges faced by solar energy production?

The identified challenges include developing new materials, enhanced performance, accelerated system installation and improved manufacturing processes, combining solar energy with other clean energy production and storage systems, and integrating solar energy utilisation with local energy utilisation patterns.

1. Past

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).

How many solar thermal power plants are there?

There are already approximately 100 solar thermal power plants worldwide, mainly in the Sunbelt regions, such as here in Morocco and other countries in North Africa. A DLR short study on solar thermal power plants summarises the current technological status, requirements and possibilities.

What are the technological and economic problems faced by solar power plants?

Several technological and economic problems must be overcome by concentrated solar power plants, thermofluids and heat transfer fluids, and thermal energy storage systems. Economic problems include high capital costs, pricing unpredictability, finance, lack of scale, material prices, availability, and operational expenses.

Due to the fluctuating renewable energy sources represented by wind power, it is essential that new type power systems are equipped with sufficient energy storage devices to ...

At the early stages of STPP deployment, the research was focused on improving the solar field performance

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(Montes et al., 2009) spite of keeping a conservative power block configuration, some optimization studies ...

Thermoelectric materials convert waste heat into electricity, making sustainable power generation possible when a temperature gradient is applied. Solar radiation is one potential abundant and eco-friendly heat source for this application, ...

Combining solar-thermal power with fossil fuel generation can increase the capacity factor of the solar applications 33. Rankine, Brayton, and combined cycle power generation schemes have been proposed in this ...

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Owing to exponential population growth, rapid industrialization, urbanization, modernization and improvement in the standard of living, the global electricity consumption is ...

