

Solar Energy South Africa

Solar thermal power generation macroeconomics



Overview

What is solar thermal power generation?

Harnessing solar energy for electric power generation is one of the growing technologies which provide a sustainable solution to the severe environmental issues such as climate change, global warming, and pollution. This chapter deals with the solar thermal power generation based on the line and point focussing solar concentrators.

Do solar thermal power plants affect economic performance?

This paper investigated the economic impact of solar thermal power plants assessed in the literature. Several factors that impact on the economic performance of solar thermal power plants were identified including the type of solar thermal technology, DNI values, plant capacity, cooling method and the inclusion of thermal energy storage.

What is the trade-off between solar multiple and thermal storage capacity?

The trade-off between solar multiple and thermal storage capacity is crucial in achieving cost-effective power generation in CSP plants. The solar multiple expresses the ratio between the thermal energy captured by the solar field and that required to operate the power cycle at a nominal load .

How does thermal energy storage affect solar power generation?

Incorporating thermal energy storage (TES) can significantly boost the electrical capacity factor by enabling power generation after sunset or during periods of low solar resource. In contrast, the thermal capacity factor indicates the fraction of maximum possible thermal energy collected by the solar field over the year.

How can solar thermal components reduce the cost of electricity generation?

Advancements in the design of the solar thermal components improve the performance and consequently reduce the cost of electricity generation. This

chapter discusses all the available CSP technologies and highlights the various design and operational parameters on which the overall efficiency of the solar power plants depends.

How do solar thermal technologies produce electricity?

This high temperature is achieved by concentrating solar radiation on the receiver, and these technologies are known as concentrating solar power (CSP) technologies. Hence, the electricity generation by solar thermal technologies involves the collection and concentration of solar radiation in the form of heat and its conversion into electricity.

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Thermodynamic cycles for solar thermal power ...

Currently, the SRC is the most widespread and commercially available power block option, either coupled to a PTC solar field working with thermal oil, and generating steam at 370-390°C and 100 bar or coupled to a ...

The economic and environmental analysis of solar ...

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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 ...



Solar thermal energy

Roof-mounted close-coupled thermosiphon solar water heater. The first three units of Solnova in the foreground, with the two towers of the PS10 and PS20 solar power stations in the background.. Solar thermal energy (STE) is a form ...

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