

Solar Energy South Africa

Dual tank solar thermal power generation system



Overview

What are solar power plants with thermal energy storage (TES)?

Solar power plants with thermal energy storage (TES) are one of the available renewable technologies which have more potential.

How much thermal energy can a solar energy storage system store?

At nominal conditions, the storage system can store about 15 MWh of thermal energy, accumulating around 195 tons of thermal oil (“Therminol SP-1”). The latter flows through the solar field as HTF and serves equally as storage medium in TES tanks.

How does a solar energy storage system work?

At present, this solar facility integrates as a vital sub-system, a two-tank direct TES unit for accumulating the solar thermal energy produced in the solar field. At nominal conditions, the storage system can store about 15 MWh of thermal energy, accumulating around 195 tons of thermal oil (“Therminol SP-1”).

How does a two-tank direct TES case improve solar energy production?

The existing two-tank direct TES case overcomes the instability of the thermal power generated by the solar field. The presence of this TES device raises the ORC mean yearly efficiency up to a value of 19.7% and the ORC electrical energy production up to 0.92 GWh per year.

How to choose a solar thermal power plant?

Solar thermal power plants for electricity production include, at least, two main systems: the solar field and the power block. Regarding this last one, the particular thermodynamic cycle layout and the working fluid employed, have a decisive influence in the plant performance. In turn, this selection depends on the solar technology employed.

What is a solar-only alternative to a gas turbine?

However, as the fossil heat source is introduced in the topping gas turbine cycle, the solar-only alternative entails the replacement of the combustion chamber by the solar receiver, and the use of high concentration solar systems, as explained in the previous section.

Dual tank solar thermal power generation system



Molten Salts Tanks Thermal Energy Storage: Aspects ...

Concentrating solar power plants use sensible thermal energy storage, a mature technology based on molten salts, due to the high storage efficiency (up to 99%). Both parabolic trough collectors and the central ...

Study on Thermal Performance of Single-Tank ...

For the intermittence and instability of solar energy, energy storage can be a good solution in many civil and industrial thermal scenarios. With the advantages of low cost, simple structure, and high efficiency, a single ...



Thermodynamic cycles for solar thermal power ...

Abstract Solar thermal power plants for electricity production include, at least, two main systems: the solar field and the power block. solar electric generation systems; STPP; solar thermal power plant; sCO 2;

Contact Us

For catalog requests, pricing, or partnerships, please visit:
<https://ian-solar.co.za>