

What is a hybrid solar energy system?

The hybrid system integrates solar and wind sources, a diesel generator and batteries for storage (Fig. 1). Hybridization of wind and solar energy aims to leverage the complementary nature of these sources, considering their intermittent nature.

Can solar power be used in a steam generator?

However, when adding solar energy to the power cycle the steam generator unit needs to adapt to solar field fluctuations and have to operate under variable load. As a consequence, some components of the plant should work in the off-design condition, penalizing their performance in partial loads.

How much steam does a solar field generate?

Although the solar field has been sized to generate up to 60% of the steam demanded by the cogeneration unit (30 t/h), the steam output of the solar field exceeded 32 t/h when the direct radiation was higher than 883 W/m² during a clear day.

How many evaporator loops can a solar field generate?

The configuration of each loop was determined for the solar field to generate superheated steam at 420 °C and 45 bar (a), while the number of loops was defined based on the required capacity of the solar field (30 t/h). One collector row consists of 16 evaporator collectors and 4 superheating collectors and the maximum number of collector rows is 5.

Can solar irradiation be used for co-generation of hydrogen and heat?

Here we present the successful scaling of a thermally integrated photoelectrochemical device--utilizing concentrated solar irradiation--to a kW-scale pilot plant capable of co-generation of hydrogen and heat. A solar-to-hydrogen device-level efficiency of greater than 20% at an H₂ production rate of >2.0 kW (>0.8 g min⁻¹) is achieved.

Can a solar-aided thermal power plant operate in off-design condition?

The solar-aided operation of a conventional thermal power plant is able to provide fuel economy or power boosting during the sunny-hours. Nevertheless, it might be observed that some plant components will operate in the off-design condition once solar energy is added to the cycle.

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