



BUHLE POWER

Solar energy storage single capacity





Overview

How can plant solar multiple and storage hours be optimised?

Plant solar multiple and storage hours are optimised using a multi-objective genetic algorithm to minimise the levelised cost of electricity (LCOE) and maximise the capacity factor (CF). The optimal LCOE is found to be ranging from 122.7 USD/MWh e to 217.8 USD/MWh e when using optimistic and pessimistic power block cost assumptions.

How much LCOE does a solar plant need?

The parametric sweep indicates a minimal LCOE in the region of solar multiple of 2.3-2.9 with approximately 14-20 h of storage. In order to obtain precise optimal plant design parameters and show the trade-off between LCOE and CF, a multi-objective optimisation routine is implemented. Fig. 7.

What happens if solar storage is undersized?

An undersized storage would lead to curtailment of solar energy provided by the collector-receiver due to the storage being full, and consequently a less-than-optimal amount of electricity being generated throughout the year.

What is the maximum CF of a 31.5 kW solar system?

For a system with 31.5 kW e scale, the maximum CF of 96.43% is achieved at a high LCOE of 269.3 USD/MWh e with 4.96 solar multiple and 23.94 storage hours. The design variables do not appear to vary significantly with plant size. Fig. 8.



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