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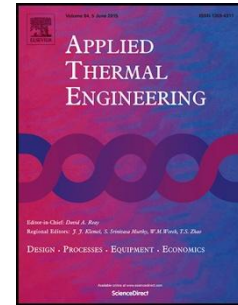
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Investigation on the dynamic behaviour of a parabolic trough power plant during strongly cloudy days

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Highlights

- A detail dynamic model of a parabolic trough solar thermal power plant is done
- Simulated results are compared to the experimental data from the real power plant
- Discrepancy between model result and real data is caused by operation strategy
- The model strategy increased the operating hours of power plant around 2.5 – 3 h

Abstract

The objective of this study is the development of a full scale dynamic model of a parabolic trough power plant with a thermal storage system, operated by the Actividades de Construcción y Servicios Group in Spain. The model includes solar field, thermal storage system and the power block and describes the heat transfer fluid and steam/water paths in detail. The parabolic trough power plant is modelled using Advanced Process Simulation Software (APROS). To validate the model, the numerical results are compared to measured data, obtained from “Andasol II” during strongly cloudy periods in the summer days. The comparisons show a qualitative agreement between the dynamic simulation model and the measurements. The results confirm that the thermal storage enables the parabolic trough power plant to provide a constant power rate when the storage energy discharge is available, despite significant oscillations in the solar radiation.

Key words

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