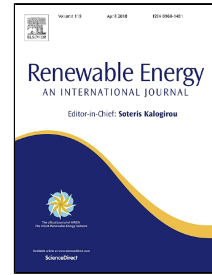


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Two-tank molten salts thermal energy storage system for solar power plants at pilot plant scale: lessons learnt and recommendations for its design, start-up and operation



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1 **Two-tank molten salts thermal energy storage system for solar power plants at pilot plant**
2 **scale: lessons learnt and recommendations for its design, start-up and operation**

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8
9 **Abstract**

10
11 Renewable energies are main players to ensure the long-term energy supply. Solar power plants
12 with thermal energy storage (TES) are one of the available renewable technologies which have
13 more potential. Nowadays, there are still several aspects in the design and operation of these
14 power plants which need to be improved, such as the correct operation of some specific
15 instrumentation, the compatibility between TES materials and storage tanks materials, and
16 operational process strategies. This paper presents the acquired experience during the design,
17 start-up, and operation of a kWh scale pilot experimental facility built at the University of
18 Lleida (Spain) together with Abengoa Research (Spain) in 2008. The versatility of this facility
19 has allowed simulating real working conditions and therefore testing different TES systems,
20 TES materials, solar power plant components, and operational strategies focused on TES for
21 temperatures up to 400 °C. In the present paper, the authors show the lessons learnt at pilot and
22 present the main problems and limitations encountered, and give advices of this experimental
23 set-up to extrapolate the data to real plant, to provide solutions to technical problems and reduce
24 the cost of commercial plants.

25
26 **Keywords:** molten salts; two-tank; thermal energy storage (TES); concentrated solar power
27 (CSP); lessons learnt; pilot plant

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