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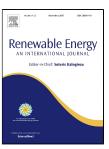
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ACCEPTED MANUSCRIPT

1 The comparative analysis on thermal storage systems for solar power

with direct steam generation

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Abstract:

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7 Two sensible heat storage systems and two latent heat storage systems, in which

8 liquid lead-bismuth eutectic alloy (LBE) is selected as sensible heat storage medium

and sodium nitrate is selected as phase change storage material, are investigated for

concentrated solar power (CSP) with direct steam generation (DSG) in the present

work. The temperature pinch point likely occurs in sensible heat storage system,

which restricts the optimization space. The temperature difference distributes more

uniformly in latent heat storage system than in sensible heat storage system, and the

outlet temperature of steam is far higher in latent heat storage system than in sensible

heat storage system. The exergy efficiency is more two times in latent heat storage

system than in sensible heat storage system. The three-tank latent heat storage system

has the most flexible and effective performance among the four storage systems.

18 **Key words:** liquid lead-bismuth eutectic alloy (LBE); solar energy; storage system;

19 heat transfer; direct steam generation (DSG); exergy efficiency.

1. Introduction

The concentrated solar power (CSP) has a competitive edge among all the current

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