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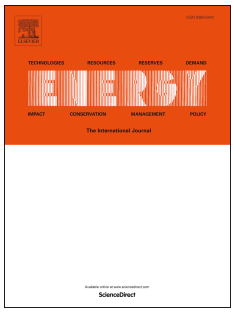

Levelized cost of energy modeling for concentrated solar power projects: A China study

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Levelized cost of energy modeling for concentrated solar power projects: a China study

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Abstract: Renewable energy plays significant role in achieving energy savings and emissions reduction. As a sustainable and environmental friendly renewable energy source, concentrated solar power (CSP) is of interest for research and development. This is because CSP plants can be equipped with thermal storage systems, thereby producing electricity when sunlight is not available. The installation of CSP plants also leads to substantial 'peak shaving effects'. However, the cost of CSP generation is an obstacle hampering the commercialization of this emerging industry. This paper constructs a mathematical model of the levelized cost of energy (LCOE) to calculate the power generation cost of CSP projects on the basis of lifetime cost structure analysis. A sensitivity analysis is conducted to examine the impact of different variables on the LCOE of CSP projects. The variables considered in this study are investment cost over the construction period, annual operation and maintenance cost, annual electricity production and the discount rate. Finally, the influence of incentive policies such as preferential loans, tax support and zero land cost for power stations is analyzed. This research offers a new method for power generation cost calculation of CSP projects and provides support for governments to formulate incentive policies for the industry.

Keywords: Renewable energy; Concentrated solar power (CSP); Construction project; Levelized cost of energy (LCOE); Calculation model; Sensitivity analysis