

عنوان مقاله:

Cost and performance analysis of an integrated solar combined cycle with two tanks for indirect thermal energy storage

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نویسندگان:

Bagher Shahbazi - Faculty of Mechanical Engineering, University of Tabriz, Tabriz, Iran

Faramarz Talati - Faculty of Mechanical Engineering, University of Tabriz, Tabriz, Iran

Mohammad Seyyedmahmoodi - Faculty of Mechanical Engineering, University of Tabriz, Tabriz, Iran

Mortaza Yari - Faculty of Mechanical Engineering, University of Tabriz, Tabriz, Iran

خلاصه مقاله:

In this paper, the annual and economic performance of an integrated solar combined cycle (ISCC) with indirect energy storage tanks is investigated. The study includes four scenarios, in which the combined cycle performance was studied exclusively in the first scenario. In the second scenario, the integrated solar combined cycle (ISCC) was examined, and the use of supplementary firing instead of solar energy with the assumption of producing the same power as that by the ISCC scenario was examined for the third scenario. For the fourth scenario, the use of energy storage in the form of indirect tanks with the purpose of energy storage during peak solar direct normal irradiation times and discharge during peak power electricity consumption within the network for such power plants were subjected to investigation. Results show that the contribution of solar energy in the annual produced power by the ISCC scenario is 40 GWh, which is 2.2% of the total. In the case that this amount of power is produced using supplementary firing, there will be about 1.98 tons of increased fuel consumption, and about 18 kton increased in CO₂ production. By using the energy storage system, the annual power generation increases by 5 GWh, which will raise the plant's annual revenue by 0.25 M\$ if the increment occurs during peak hours. Moreover, the levelized costs of energy (LCOE) for the four scenarios are 8.99, 8.86, 9.04, and 9.135 cents/kWh, respectively.

کلمات کلیدی:

Integrated Solar Combined Cycle, Thermal Energy Storage, Economic Analysis, Levelized Cost of Electricity

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