البحث رقم (6)

عنوان البحث	تقييم الأداء وتقييم التكلفة لمحطة توليد الطاقة بالطبق الشمسي: تحليل الحساسية للتكلفة المستوية للكهرباء (LCOE) وصافي القيمة الحالية(NPV) Performance and cost evaluation of solar dish power plant: sensitivity analysis of levelized cost of electricity (LCOE) and net present value (NPV)
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Solar dish (SD) technology is recognized as one of the most efficient solar thermal technologies for electricity generation. Moreover, SD technology has proven its suitability and reliability in solar energy potentials areas that are scarce to have water. In this regard, Egyptian western desert occupies an area of more than 65% of the total area of Egypt. It receives some of the highest solar radiation in the world (up to 3.0 MWh/m^2/year), making it a prime location for the exploitation of this technology. Then, it is worth to investigate the opportunities of SD power plant for electricity generation. This paper investigates the techno-economic performance of SD power plant under Egypt desert weather condition. Accordingly, the proposed power plant is modeled and simulated using System Advisor Model (SAM). The annual energy and the levelized costs of electricity (LCOE) are calculated based on the annual simulations of 50 MW installed capacity. The profitability of proposed power plant is assessed based on Egypt's feed in tariff of concentrated solar power (CSP) projects. The proposed location of this power plant is Benban solar power park, near Aswan city in the south of Egypt. This is because the nature of the place is convenient and configured for building solar power plant, as well as its proximity to the Egyptian electricity grid. Furthermore, a sensitivity analysis is conducted to investigate the effect of the main economic variables of the proposed power plant on the LCOE and NPV. The results show that annual energy output of 50 MW is estimated to 105 GWh/year. The LCOE is estimated to 13.38 ¢/kWh. The avoided GHG emissions and fossil fuels usage are equal to about 45 million tons of CO_2 emissions and 21.64 thousand tons of equivalent oil (toe) per year (respectively). Furthermore, the results indicate that LCOE and NPV are very highly sensitive to the collector cost.