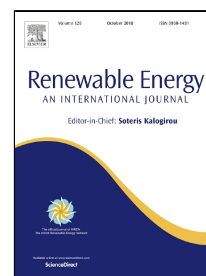


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Performance and economic evaluation of linear Fresnel reflector plant integrated direct contact membrane distillation system

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ABSTRACT

This paper presents an investigation of a 111 MWe linear Fresnel reflector (LFR) plant integrated direct contact membrane distillation (DCMD) system. Both the technologies are synergized by using seawater as cooling fluid in the condenser, and then utilizing heated seawater from the condenser into the DCMD unit. The performance analysis of the LFR plant and DCMD unit has been conducted mainly in regard to direct normal irradiance (DNI) and feed water temperature, respectively. For the LFR plant, electricity generation increased with increasing DNI. The highest and the lowest energy production was 38.33 GWh and 14.08 GWh in June and December, respectively. The real levelized cost of energy was found to be 0.34 ¢/kWh. For DCMD unit, the evaporation efficiency increased from 39.13% to 50.01% corresponding to a feed temperature increase from 30 °C to 45 °C. The average freshwater production capacity of the DCMD unit was found to be 31,844.6 L/day with a water production cost \$0.425/m³. The investigations revealed that the performance of the proposed system is

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