

عنوان مقاله:

Enhanced performance and reduced payback period of a low grade geothermal-based ORC through employing two TEGs

محل انتشار:

دو فصلنامه تجهیزات و سیستم های انرژی، دوره 7، شماره 1 (سال: 1398)

تعداد صفحات اصل مقاله: 17

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خلاصه مقاله:

In this paper, a novel integrated system is proposed to improve the performance of a conventional low-grade geothermal-based organic Rankine cycle (ORC). The main idea is to utilize two TEG units to recover the waste heat of the condenser and geothermal brine. The proposed model is investigated and compared with simple ORC from the energy, exergy, and exergoeconomic viewpoints through the parametric study. Furthermore, the payback period of the systems is calculated to investigate the economic aspects of the model in more details. Results show that the exergy efficiency of the proposed system would be 56.81% at the base case (4.67% higher than the simple geothermal-based ORC system) and the total product cost of the proposed integrated system is 24.55 \$/GJ at the base case (5.5% lower than simple ORC), while the payback period of the suggested system is 2.422 years (15 days lower than the simple ORC cycle). Furthermore, the net power output of the novel proposed system is 75.24 kW (9% higher than the simple ORC cycle). Comprehensive parametric study and comparison of the exergy and exergoeconomic aspects reveal that the proposed system is a promising method to optimize such systems from exergy/exergoeconomic viewpoints.

کلمات کلیدی:

Exergy, Exergoeconomic, ORC, Geothermal, Thermoelectric Generator

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