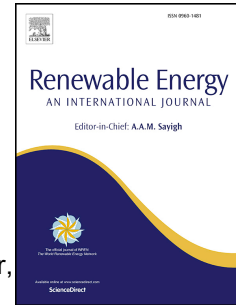


# Accepted Manuscript

Techno-economic analysis of a solar thermal retrofit for an air-cooled geothermal Organic Rankine Cycle power plant

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12 **Abstract**

13 High ambient temperatures are often coupled with high levels of solar irradiation  
14 and lead to a significant reduction of the power output of air-cooled geothermal Or-  
15 ganic Rankine Cycle (ORC) power plants. Consequently, hybridisation based on  
16 solar thermal power is promising. In this work, a solar thermal retrofit based on su-  
17 perheating of the ORC working fluid is analysed under technical and economic crite-  
18 ria considering typical conditions in Turkey. The conducted off-design simulations  
19 prove that the isentropic efficiency of the turbine has a major impact on the perfor-  
20 mance of the entire system. The solar field size and the corresponding degree of su-  
21 perheating is limited in the respect to the built-in components. Therefore, the thermal  
22 stability of the examined ORC working fluid is sufficient and a low-temperature  
23 parabolic trough field with water as heat transfer fluid can be realised. For the retro-

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