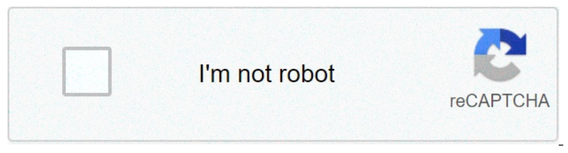

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Organic rankine cycle geothermal power plant

Optimizing the performance of a Geothermal Power Plant (PLTP) can be done in various ways, one way that can be done is by adding an Organic Rankine Cycle (ORC). ORC with components consisting of 4 main systems, namely Evaporators, Turbines, Condensers and Pumps. It will be added to a dry-steam geothermal system. R290 is choosen as working fluid (WF) among four other candidates such as R134a, R600, R600a, and R152a. The ORC system optimization is focused on the number of WF masses that can be done in the ORC evaporator system. The ORC analysis results in a total energy of 11589kW with thermal efficiency of 17%. Energy produced by ORC can increase PLTP energy production by 9%.1. ASHRAE Handbook. Thermophysical Properties Of Refrigerants ASHRAE. 2009, Google Scholar2. M. Astolfi, M.C Romano, P. Bombarda, et al. “Binary ORC (Organic Rankine cycles) power plants for the exploitation of medium–low temperature geothermal sources–Part A: Thermodynamic optimization”. Energy. 2014: 423–43 Google ScholarCrossref3. M. Astolfi, M. C. Romano, P. Bombarda, and E. Macchi. “Binary ORC (Organic Rankine Cycles) 859 power plants for the exploitation of medium–low temperature geothermal sources – Part B: Techno-economic optimization.” Energy. 2014: 23–34. Google Scholar4. Y. A. Cengel, M. A. Boles. “Thermodynamics: an engineering approach.” McGrawHill; 1989. Google Scholar5. A. Desideri, S. Gusev, M. Broek, V. Lemort, and S. Quoilin. “Experimental comparison of organic fluids for low temperature ORC (organic Rankine cycle) systems for waste heat recovery applications”. Energy. 2016: 460–469. Google ScholarCrossref6. L. Dian-xun, Z. Shu-sheng, and W. Gui-hua. “Selection of organic Rankine cycle working fluids in the low-temperature waste heat utilization”. Elsevier, 2015, Google Scholar7. R. DiPippo. “Geothermal power plants, environmental impact”. 2nd ed. Elsevier. 2005 principles, applications, case studies and, Google Scholar8. R. DiPippo. “Second law assessment of binary plants generating power from low temperature geothermal fluids. Geothermics”. 2004:565–86. Google Scholar9. F. Heberle, P. Bassermann, M. Preiinger, and D. Bruggemann, “Exergoeconomic optimization of an organic Rankine cycle for low-temperature geothermalheat sources”, International Journal of Thermodynamics 15. 2012. Google ScholarCrossref10. G. Shu, G. Yu, H. Tian, H. Wei, and X. Liang. “Organic Rankine Cycles (ORC) used in waste heat utilization”. Applied Energy. 2014: 325–338. Google ScholarCrossref11. H. Caliskan, and A. Hepbasli, “Exergetic cost analysis and sustainability assessment of an internal combustion engine”, International Journal of Exergy 8. 2011 Google ScholarCrossref12. M.P. Hochstein, and S. Sudarman. “History of geothermal exploration in Indonesia from 1970 to 2000”. Geothermics. 2000:220–66, Google Scholar13. M.J. Moran, H.N. Shapiro, D.D. Boettner, and M.B. Bailey. “Fundamentals of Engineering Thermodynamics”, seventh ed. Wiley,.2011, Google Scholar14. NIST Steam Tables, “Properties of Water and Steam (Thermodynamic Properties of Ordinary Water Substance)”. 2016, Google Scholar15. Z. Shengjun, W. Huaixin, and G. Tao. “Performance comparison and parametric optimization of subcritical Organic Rankine Cycle (ORC) and transcritical power cycle system for low-temperature geothermal power generation”. Applied energy. 2011: 2740–2754. Google ScholarCrossref16. M. Yari. “Exergetic analysis of various types of geothermal power plants. Renew Energy”. 2014:12–21, Google Scholar© 2020 Author(s). Published by AIP Publishing. false Please Note: The number of views represents the full text views from December 2016 to date. Article views prior to December 2016 are not included. You do not currently have access to this chapter. Organic Rankine Cycle is a technology that convert low-temperature heat sources into a mechanical energy, and it can be used to produce electrical energy in a closed system. The heat sources can be received from renewable energy such as geothermal, solar, and biomass. Furthermore, the ORC system can also be used to increase energy efficiency in the industry by utilizing the waste heat produced. Therefore, there are two classification of the ORC system, namely a heat recovery system and binary power plant. Recently, the ORC system has made a thrive in the geothermal power plant. The ORC system can be applied to resources with low to medium temperature characteristics (