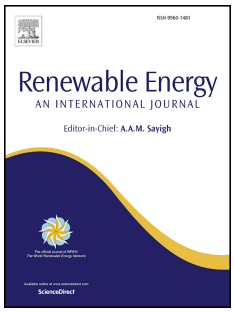
Accepted Manuscript



A novel trigeneration system using geothermal heat source and liquefied natural gas cold energy recovery: Energy, exergy and exergoeconomic analysis

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PII: S0960-1481(17)31183-7

DOI: 10.1016/j.renene.2017.11.082

Reference: RENE 9484

To appear in: *Renewable Energy*

Received Date: 11 August 2017

Revised Date: 20 November 2017

Accepted Date: 28 November 2017

Please cite this article as: Ghaebi H, Parikhani T, Rostamzadeh H, A novel trigeneration system using geothermal heat source and liquefied natural gas cold energy recovery: Energy, exergy and exergoeconomic analysis, *Renewable Energy* (2018), doi: 10.1016/j.renene.2017.11.082.

A novel trigeneration system using geothermal heat source and liquefied natural gas cold energy recovery: Energy, exergy and exergoeconomic analysis

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Abstract

This paper deals with the energy, exergy, and exergoeconomic analysis of a novel trigeneration system working with geothermal heat source and liquefied natural gas (LNG) cold energy recovery as thermal sink. The proposed trigeneration system is constructed based on the absorption refrigeration cycle (ARC). Due to the high ammonia concentration at condenser outlet of ARC, a heat pump system is employed for heating production, while LNG cold energy is used for recovering the latent heat of the basic solution from the condenser as heat source as well as for producing power output. A comprehensive thermodynamic modeling of the proposed system is presented and the performance of the system is investigated based on the following performance criteria: net power output, cooling output, heating output, thermal efficiency, exergy efficiency and sum unit cost of the product (SUCP) of the system. In this respect, the simulation revealed that the net power output, cooling output, heating capacity, thermal efficiency, exergy efficiency and total SUCP of the system can be calculated 405.1 kW, 1109 kW, 35.3 kW, 85.92 %, 18.52 %, and 68.76 $/GJ, respectively, under the proposed constrain

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