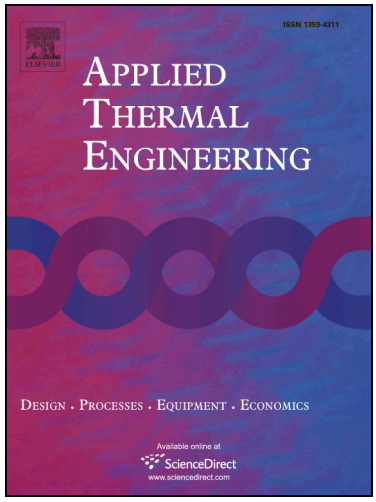

Thermodynamic modeling and performance analysis of four new integrated organic Rankine cycles (A comparative study)

Reza Kheiri, Hadi Ghaebi, Mohammad Ebadollahi, Hadi Rostamzadeh

PII: S1359-4311(17)32899-5
DOI: http://dx.doi.org/10.1016/j.applthermaleng.2017.04.150
Reference: ATE 10299

To appear in: *Applied Thermal Engineering*

Received Date: 23 September 2016
Revised Date: 24 February 2017
Accepted Date: 29 April 2017

Please cite this article as: R. Kheiri, H. Ghaebi, M. Ebadollahi, H. Rostamzadeh, Thermodynamic modeling and performance analysis of four new integrated organic Rankine cycles (A comparative study), *Applied Thermal Engineering* (2017), doi: http://dx.doi.org/10.1016/j.applthermaleng.2017.04.150

Thermodynamic modeling and performance analysis of four new integrated organic Rankine cycles (A comparative study)

Reza Kheiri, Hadi Ghaebi*, Mohammad Ebadollahi, Hadi Rostamzadeh

Department of Mechanical Engineering, Faculty of Engineering, University of Mohaghegh Ardabili, P.O.Box 179, Ardabil, Iran

Abstract

Due to environmental pollution and limitation of the fossil fuels, renewable energy resources can be considered as the main alternative for these nonrenewable resources. Since the organic Rankine cycle (ORC) uses organic working fluids and low grade heat sources (LGHSs) to generate power, its usability is limited due to low thermal efficiency in the industry. Thus, in order to improve the thermal efficiency and net power production of the ORC, four new modified ORCs are proposed: ORC with an ejector (EORC), ORC with an ejector and a regenerator (ERORC), ORC with an ejector and a feed fluid heater (EFFHORC), and ORC with an ejector, a regenerator and a feed fluid heater (ERFFHORC). In the EORC, an ejector and a two-stage evaporator has been integrated into the simple ORC. In the ERORC, an ejector, a regenerator with a two-stage evaporator have been integrated into the simple ORC in order to modify two previous cycles. Steam enters to the regenerator prior to the ejector and supply a part of the energy requirement of the first-stage evaporator. The EFFHORC incorporates with an open feed fluid heater, an ejector, and a two-stage evaporator as well as the basic ORC. Steam from the second-stage evaporator enters to ejector as a primary fluid and then its pressure is

* Corresponding Author: E-mail: hghaebi@uma.ac.ir , Tel & Fax: (+98-45) 33512910