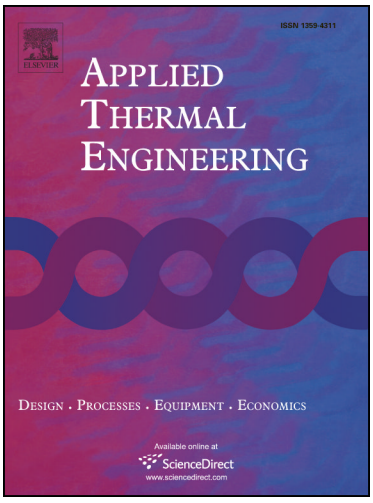

Mixed mode operation for the Solar Aided Power Generation

Jiyun Qin, Eric Hu, Graham J. Nathan, Lei Chen

PII: S1359-4311(17)35506-0
DOI: https://doi.org/10.1016/j.applthermaleng.2018.04.118
Reference: ATE 12115

To appear in: *Applied Thermal Engineering*

Received Date: 24 August 2017
Revised Date: 8 March 2018
Accepted Date: 25 April 2018

Please cite this article as: J. Qin, E. Hu, G.J. Nathan, L. Chen, Mixed mode operation for the Solar Aided Power Generation, *Applied Thermal Engineering* (2018), doi: https://doi.org/10.1016/j.applthermaleng.2018.04.118

Mixed mode operation for the Solar Aided Power Generation

Jiyun Qin, Eric Hu*, Graham J. Nathan, Lei Chen

School of Mechanical Engineering, the University of Adelaide, Adelaide SA 5005

Australia

* Corresponding authors: eric.hu@adelaide.edu.au

Abstract

Integrating solar heat into a regenerative Rankine cycle power plant to displace the heat of the extraction steam is a highly efficient method to use solar thermal energy for power generation purpose. This technology is termed Solar Aided Power Generation. Such a power system can be operated for power boosting or fuel saving mode of operation. Here, we proposed a mixed mode of operation. In such a mixed mode of operation, the Solar Aided Power Generation is operated at a series of time intervals. In each time interval, such a power system is operated in one selected mode (i.e. either power boosting or fuel saving mode) with higher profitability. In this paper, the superiority of the mixed mode of operation over the single mode of operation (i.e. power boosting or fuel saving) has been demonstrated through two case studies. In these case studies, a Solar Aided Power Generation plant located in Australia and China where the market (and weather) conditions are significantly different, is assumed to operate in power boosting, fuel saving and mixed mode of operation. The results indicate that the mixed mode of operation could guarantee the best economics