

Accepted Manuscript

Industrial waste heat: Estimation of the technically available resource in the EU per industrial sector, temperature level and country

Michael Papapetrou, George Kosmadakis, Andrea Cipollina, Umberto La Commare, Giorgio Micale

PII: S1359-4311(17)34791-9
DOI: <https://doi.org/10.1016/j.applthermaleng.2018.04.043>
Reference: ATE 12040

To appear in: *Applied Thermal Engineering*

Received Date: 19 July 2017
Revised Date: 19 February 2018
Accepted Date: 8 April 2018

Please cite this article as: M. Papapetrou, G. Kosmadakis, A. Cipollina, U. La Commare, G. Micale, Industrial waste heat: Estimation of the technically available resource in the EU per industrial sector, temperature level and country, *Applied Thermal Engineering* (2018), doi: <https://doi.org/10.1016/j.applthermaleng.2018.04.043>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



New procedure for determination of availability and reliability of complex cogeneration systems by improving the approximated Markov method

M. H. Khoshgoftar Manesh¹, M. Pouyan Rad¹, M. A. Rosen²

1. Division of Thermal Sciences and Energy Systems, Department of Mechanical Engineering, Faculty of Technology & Engineering, The University of Qom, Qom, Iran

2. Faculty of Engineering and Applied Science, University of Ontario Institute of Technology, Oshawa, Ontario, L1H 7K4, Canada

Abstract:

There are two procedures to solve reliability problems: analytical techniques and stochastic simulation. Each has advantages and disadvantages. One of the important analytical techniques for repairable systems is the Markov method. This method uses state space to consider all states that may occur. To use this method for complex systems, the model of the system must be simplified. For this purpose, many states are removed from the space state. In this way, although the probabilities of the states are calculated, these probabilities are often not accurate. In the present work, a new approach is proposed that considers both the simplified system and the calculation of the probability of each state accurately. The new method can calculate the probabilities by taking into account minimum states. Site utility systems are used to illustrate the procedure for applying this method. Site utilities have several repairable components (e.g. steam turbine, gas turbine, HRSG, de-aerator, boiler). So, this system can generate a large and complex state space for which it is difficult to calculate the probability. The new procedure can reduce the number of states and aggregates of the exploded state space due to the high number of components. The results show that the new procedure can predict state probabilities with high accuracy.

Keywords: Utility systems, Reliability, Availability, Space State, Markov Model

Download English Version:

<https://daneshyari.com/en/article/7045234>

Download Persian Version:

<https://daneshyari.com/article/7045234>

[Daneshyari.com](https://daneshyari.com)