

Accepted Manuscript

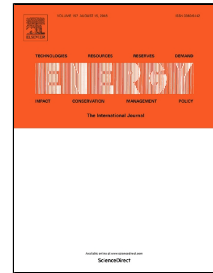
Predictive Management of Cogeneration-Based Energy Supply Networks Using Two-stage Multi-Objective Optimization

Tetsuya Wakui, Kento Sawada, Ryohei Yokoyama, Hirohisa Aki

PII: S0360-5442(18)31604-9
DOI: 10.1016/j.energy.2018.08.072
Reference: EGY 13548
To appear in: *Energy*
Received Date: 21 April 2018
Accepted Date: 08 August 2018

Please cite this article as: Tetsuya Wakui, Kento Sawada, Ryohei Yokoyama, Hirohisa Aki, Predictive Management of Cogeneration-Based Energy Supply Networks Using Two-stage Multi-Objective Optimization, *Energy* (2018), doi: 10.1016/j.energy.2018.08.072

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.



Predictive Management of Cogeneration-Based Energy Supply Networks Using Two-stage Multi-Objective Optimization

Tetsuya Wakui ^{*a}, Kento Sawada ^a, Ryohei Yokoyama ^a, Hirohisa Aki ^b

^a Department of Mechanical Engineering, Osaka Prefecture University
1-1 Gakuen-cho, Naka-ku, Sakai, Osaka 599-8531, Japan

^b Faculty of Engineering, Information and Systems, University of Tsukuba
1-1-1 Tennodai, Tsukuba, Ibaraki 305-8573, Japan

* Corresponding author: PHONE:+81-72-254-9232 FAX:+81-72-254-9904

E-mail: wakui@ese.me.osakafu-u.ac.jp

Abstract

A predictive management system for cogeneration unit-based energy supply networks using two-stage multi-objective optimization was developed to tackle a trade-off between energy savings and operating cost reduction. The developed system integrated support vector regression-based energy demand prediction, MILP (mixed-integer linear programming)-based schedule planning, and rule-based operation control. The contribution is to develop two-stage MILP-based multi-objective schedule planning, which is extension of an ε -constraint method, and operation control rule of multiple cogeneration units. In the first-stage schedule planning, primary energy consumption in the prediction horizon is minimized, and a reduction rate of primary energy consumption is calculated. In the second-stage schedule planning, an operating cost is minimized additionally subject to satisfaction of partial achievement of the reduction rate of primary energy consumption calculated in the first stage. An energy-saving achievement rate is regarded as a decision-making parameter to control a trade-off between energy savings and cost reduction, of which definition is quantitatively apprehensible for decision makers.

Download English Version:

<https://daneshyari.com/en/article/11007382>

Download Persian Version:

<https://daneshyari.com/article/11007382>

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