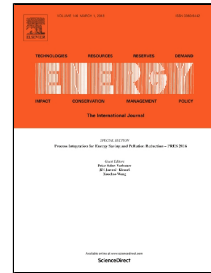


# Accepted Manuscript

A practical model for energy dispatch in cogeneration plants

Maria Izabel Santos, Wadaed Uturbey



PII: S0360-5442(18)30465-1  
DOI: 10.1016/j.energy.2018.03.057  
Reference: EGY 12515  
To appear in: *Energy*  
Received Date: 16 June 2016  
Revised Date: 28 February 2018  
Accepted Date: 09 March 2018

Please cite this article as: Maria Izabel Santos, Wadaed Uturbey, A practical model for energy dispatch in cogeneration plants, *Energy* (2018), doi: 10.1016/j.energy.2018.03.057

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.

# A practical model for energy dispatch in cogeneration plants

Maria Izabel Santos<sup>a</sup>, Wadaed Uturbey<sup>b</sup>  
<sup>a</sup> Graduate Program in Electrical Engineering  
<sup>b</sup> Electrical Engineering Department  
Federal University of Minas Gerais  
Av. Antônio Carlos 6627, Pampulha  
CEP: 31270-010  
Belo Horizonte – MG, Brazil  
izabel.mics@gmail.com  
wadaed@cpdee.ufmg.br

## Correspondence author:

Wadaed Uturbey  
Electrical Engineering Department  
UFMG - Federal University of Minas Gerais  
Av. Antônio Carlos 6627, Pampulha  
Belo Horizonte – MG, Brazil  
CEP: 31270-010  
wadaed@cpdee.ufmg.br

## Abstract

This paper focuses on the development of a dispatch model for cogeneration systems in industrial plants. The proposed model schedules thermal and electrical outputs of the cogeneration units by minimizing total operating costs in the plant while satisfying operational constraints. The work presents a practical model that depends on easily available data in the industrial environment, i.e., efficiency data available from equipment manufacturers or machine tests. The power to heat ratio is modeled using equipment efficiency data that depends on the cogeneration unit output. This approach allows to represent feasibility regions and supplementary firings without complex thermodynamic relations that require additional data. In order to illustrate the application of the model in real systems, a potassium production plant in Brazil is studied. This case study involves two cogeneration units with supplementary firings and a boiler. Results indicate that the model allows obtaining a dispatch strategy with reduced operating costs when compared with the traditional planning used by plant operators. Three scenarios are simulated and cost savings obtained with the optimised strategy vary between 2.0% and 4.0%, when compared with the corresponding unplanned strategy.

*Keywords: cogeneration cost model; combined heat and power; economic dispatch; power to heat ratio*

Download English Version:

<https://daneshyari.com/en/article/8071742>

Download Persian Version:

<https://daneshyari.com/article/8071742>

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