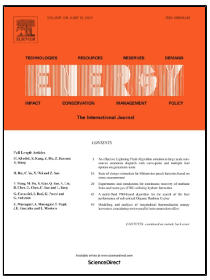
Accepted Manuscript



A cost-emission framework for hub energy system under demand response program

Majid Majidi, Sayyad Nojavan, Kazem Zare

PII:	S0360-5442(17)30995-7
DOI:	10.1016/j.energy.2017.06.003
Reference:	EGY 11007
To appear in:	*Energy*
Received Date:	06 March 2017
Revised Date:	23 May 2017
Accepted Date:	01 June 2017

Please cite this article as: Majid Majidi, Sayyad Nojavan, Kazem Zare, A cost-emission framework for hub energy system under demand response program, *Energy* (2017), doi: 10.1016/j.energy.2017.06.003

A cost-emission framework for hub energy system under demand response program

Majid Majidi, Sayyad Nojavan*, Kazem Zare

Faculty of Electrical and Computer Engineering, University of Tabriz, Tabriz, Iran, Tel-Fax: +98 41 33300829, P.O. Box: 51666-15813

majidmajidi95@ms.tabrizu.ac.ir, sayyad.nojavan@tabrizu.ac.ir, kazem.zare@tabrizu.ac.ir

*corresponding author

Abstract

Based on the kind of fuel consumed by generation unit, each generation system has different generation costs and emits various types of greenhouse gases like CO_2, SO_2 and NO_2 to the atmosphere. So, nowadays in the power system scheduling, emission issue has been turned to be an important factor. In this paper, in addition to economic performance, emission problem of energy hub system has been also investigated. Therefore, a multi-objective optimization model has been proposed for cost-environmental operation of energy hub system in the presence of demand response program (DRP). Weighted sum approach has been employed to solve the proposed multi-objective model and fuzzy satisfying technique has been implemented to select the best compromise solution. Implementation of load management programs presented by DRP shifts some percentage of load from peak periods to off-peak periods to flatten load curve which leads to reduction of total cost and emission of energy hub system. A mixed-integer linear programming has been used to model the cost-environmental performance problem of energy hub system and then, GAMS optimization software has been utilized to solve it. A sample energy hub system has been studied and the obtained results have been compared to validate the effectiveness of proposed techniques.

Keywords: Multi-objective optimization model, multi-carrier energy system, combined heat and power, weighted sum approach, fuzzy satisfying techniques, demand response program.