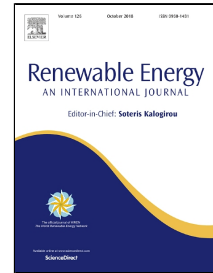


Accepted Manuscript

An Efficient Scenario-Based Stochastic Programming method for Optimal Scheduling of CHP-PEMFC, WT, PV and Hydrogen Storage Units in Micro Grids

Mosayeb Bornapour, Rahmat-Allah Hooshmand, Moein Parastegari



PII: S0960-1481(18)30779-1
DOI: 10.1016/j.renene.2018.06.113
Reference: RENE 10269
To appear in: *Renewable Energy*
Received Date: 14 December 2017
Accepted Date: 29 June 2018

Please cite this article as: Mosayeb Bornapour, Rahmat-Allah Hooshmand, Moein Parastegari, An Efficient Scenario-Based Stochastic Programming method for Optimal Scheduling of CHP-PEMFC, WT, PV and Hydrogen Storage Units in Micro Grids, *Renewable Energy* (2018), doi: 10.1016/j.renene.2018.06.113

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.

An Efficient Scenario-Based Stochastic Programming method for Optimal Scheduling of CHP-PEMFC, WT, PV and Hydrogen Storage Units in Micro Grids

Mosayeb Bornapour¹, Rahmat-Allah Hooshmand², Moein Parastegari²

mbornapour@yu.ac.ir; hooshmand_r@eng.ui.ac.ir; parastegari@eng.ui.ac.ir

1: Electrical Engineering Department, Faculty of Engineering, Yasouj University, Yasouj, Iran

2: Department of Electrical Engineering, University of Isfahan, Isfahan, Iran

Abstract: Nowadays, renewable energy resources are increasingly used to supply electrical loads in micro grids, which these units should be scheduled coordinately. In this paper a stochastic model for coordinated scheduling of renewable and thermal units is proposed. Understudied units consists of fuel cell units with proton exchange membrane which generate heat and power simultaneously (PEMFC-CHP), wind and photovoltaic units. Moreover, the strategy of storing hydrogen is also considered for PEMFC-CHP units. Uncertainties of wind speed, solar radiation and market prices are considered using scenario based method. In the proposed stochastic programming problem, the strategy of storing hydrogen is considered by a mixed integer nonlinear programming (MINP) problem. The uncertainties of parameters convert the MINP problem to a stochastic MINP one. Moreover, optimal coordinated scheduling of renewable energy resources and thermal units in micro-grids improve the value of the objective function. To solve this problem, Modified Teaching-Learning-Based Optimization (MTLBO) algorithm is used and its performance is evaluated on a modified 33 bus distribution network. Simulation results represent that by using MTLBO method, the revenue increases more than 5 percentages in comparison with other optimization methods. In addition, considering CHP increases total profit of the system more than 15%.

Keywords: Micro Grid; Optimal Coordinated Scheduling; Deregulated Electricity Market; Renewable Energy Sources; Proton Exchange Membrane Fuel Cell- Combined Heat and Power; Hydrogen Storage Strategy.

Nomenclature:

Symbol	Description	Symbol	Description
A	active area cell	r_m	membrane specific resistivity
act	activity	T	PEMFC temperature
B	parametric coefficient, used in calculation of concentration losses	V_{con}	over voltage due to concentration

Download English Version:

<https://daneshyari.com/en/article/6763869>

Download Persian Version:

<https://daneshyari.com/article/6763869>

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