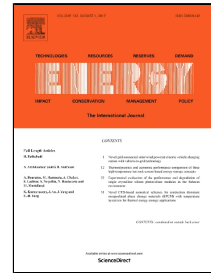


Accepted Manuscript

Novel standalone hybrid solar/wind/fuel cell/battery power generation system

Hassan Fathabadi



PII: S0360-5442(17)31473-1
DOI: 10.1016/j.energy.2017.08.098
Reference: EGY 11467
To appear in: *Energy*
Received Date: 12 December 2016
Revised Date: 20 August 2017
Accepted Date: 22 August 2017

Please cite this article as: Hassan Fathabadi, Novel standalone hybrid solar/wind/fuel cell/battery power generation system, *Energy* (2017), doi: 10.1016/j.energy.2017.08.098

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.

Novel standalone hybrid solar/wind/fuel cell/battery power generation system

Hassan Fathabadi

School of Electrical and Computer Engineering, National Technical University of Athens (NTUA),

Athens, Greece. Email: h4477@hotmail.com

Tel/Fax: +30-210-7722018

Abstract

A novel standalone hybrid solar/wind/fuel cell (FC)/battery power generation system is designed and constructed. It consists of a photovoltaic (PV) array, a wind energy conversion system (WECS), a FC system, a battery bank, three unidirectional DC/DC converters, a bidirectional DC/DC converter, a unified maximum power point tracking (MPPT) controller, a control unit, and a DC/AC inverter. The contribution of this work is that the standalone hybrid solar/wind/FC/battery system presented in this work is the only large-scale constructed hybrid system reported in the literature that combines two renewable resources (solar and wind) with a battery bank and a fuel cell system used as standby power sources, and moreover, it maximally converts solar and wind energies into electric energy because it uses a novel fast and highly accurate unified MPPT technique that concurrently tracks the maximum power points of both PV system and WECS. Other works usually combine solar energy with wind energy, and are mostly simulation based works, and moreover, there is not any new MPPT consideration in them. It is experimentally verified that the constructed system is a perfect standalone hybrid solar/wind/FC/battery power source that efficiently produces electric energy under different environmental conditions such as cloudy sky, and so can be widely used in remote areas.

Keywords

Download English Version:

<https://daneshyari.com/en/article/5475425>

Download Persian Version:

<https://daneshyari.com/article/5475425>

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