Special Issue List in Section

Feature Papers in Sustainable Energy
Guest Editor: Prof. Dr. Abdul-Ghani Olabi
Deadline: **30 April 2021**

Integration of Theoretical, Laboratory, and Field Studies for Efficient Gas Hydrate Assessment and Acquisition
Guest Editors: Prof. Dr. Richard Coffin, Dr. Bjørn Kvamme, Dr. Tsutomu Uchida, Dr. Shouwei Zhou, Dr. Norio Tenma
Deadline: **15 September 2020**

Waste Heat Recovery System
Guest Editors: Prof. Dr. Steven Lecompte, Prof. Dr. Michel De Paepe
Deadline: **30 September 2020**

Solar Photovoltaics and Solar Thermal Energy Systems
Guest Editor: Dr. Sourav Khanna
Deadline: **23 October 2020**

Green and Smart Energy and the Bid to Reconcile Climate Change and Growth Prospects
Guest Editor: Prof. Dr. Anna Visvizi
Deadline: **31 October 2020**

Transition of Renewable Energy Policy: What Energy Markets Can and Cannot Solve
Guest Editors: Dr. László Szabó, Dr. Gabriella Szajkó
Deadline: **20 November 2020**

Building Energy: Economics and Environment
Guest Editors: Dr. Janusz Adamczyk, Dr. Robert Dylewski
Deadline: **30 November 2020**

Alternative Sources of Energy Modeling, Automation, Optimal Planning and Operation
Guest Editor: Prof. Dr. George S. Stavrakakis
Deadline: **30 November 2020**

Control of Aircraft Electrical Power System
Guest Editor: Prof. Dr. Serhiy Bozhko
Deadline: **10 December 2020**

Sustainable and Efficient Impact in Building: Energy, Economic and Environmental Approach
Guest Editors: Prof. Dr. Maria Manuela Prieto Gonzalez, Dr. Ivan Flores
Deadline: **31 December 2020**

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Section Information:

Sustainable energy is a form of energy that is able to meet the energy demands of today without any detriment to the world and its inhabitants nor be in danger of expiring or becoming depleted, such that it can be reliably used over and over again. Sustainable energy should be widely promoted as it does not cause any harm to the environment and is widely available and free of cost.

Topics of interest for publication include but are not limited to:

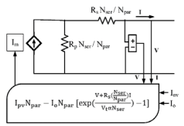
1. Renewable Energy Sources
   - 1.1 Solar Power
   - 1.2 Solar Heating
   - 1.3 Wind Power
   - 1.4 Managing Intermittency of Solar Power and Wind Power
   - 1.5 Hydropower
   - 1.6 Wave, Tide and Ocean Thermal Energies
   - 1.7 Bioenergy
   - 1.8 Geothermal Energy
   - 1.9 Other
2. Sustainable Energy Market and Industry Trends
   - 2.1 Trends for individual technologies
3. Sustainable Energy Policy
   - 3.1 Environmental
   - 3.2 Economic
   - 3.3 Sociocultural
   - 3.4 Socioeconomic and Policy

Featured Papers

DOI: 10.3390/en11020365

Performance Evaluation of Maximum Power Point Tracking Approaches and Photovoltaic Systems

Authors: Haidar Islam, Saad Mekhilef, Noraisyah Binti Mohamed Shah, Tey Kok Soon, Mehdi Seyedmahmousian, Ben Horan and Alex Stojcevski

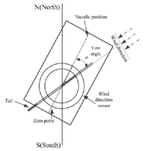


Abstract: This paper elaborates a comprehensive overview of a photovoltaic (PV) system model, and compares the attributes of various conventional and improved incremental conductance algorithms, perturbation and observation techniques, and other maximum power point tracking (MPPT) algorithms in normal and partial shading conditions. Performance evaluation techniques are discussed on the basis of the dynamic parameters of the PV system. Following a discussion of the MPPT algorithms in each category, a table is drawn to summarize their key specifications. In the performance evaluation section, the appropriate PV module technologies, atmospheric effects on PV panels, design complexity, and number of sensors and internal parameters of the PV system are outlined. In the last phase, a comparative table presents performance-evaluating parameters of MPPT design criterion. This paper is organized in such a way that future researchers and engineers can select an appropriate MPPT scheme without complication.

DOI: 10.3390/en11030553

Data-Driven Method for Wind Turbine Yaw Angle Sensor Zero-Point Shifting Fault Detection

Authors: Yan Pei, Zheng Qian, Bo Jing, Dahai Kang and Lizhong Zhang



Abstract: Wind turbine yaw control plays an important role in increasing the wind turbine production and also in protecting the wind turbine. Accurate measurement of yaw angle is the basis of an effective wind turbine yaw controller. The accuracy of yaw angle measurement is affected significantly by the problem of zero-point shifting. Hence, it is essential to evaluate the zero-point shifting error on wind turbines on-line in order to improve the reliability of yaw angle measurement in real time. Particularly, qualitative evaluation of the zero-point shifting error could be useful for wind farm operators to realize prompt and cost-effective maintenance on yaw angle sensors. In the aim of qualitatively evaluating the zero-point shifting error, the yaw angle sensor zero-point shifting fault is firstly defined in this paper. A data-driven method is then proposed to detect the zero-point shifting fault based on Supervisory Control and Data Acquisition (SCADA) data. The zero-point shifting fault is detected in the proposed method by analyzing the power performance under different yaw angles. The SCADA data are partitioned into different bins according to both wind speed and yaw angle in order to deeply evaluate the power performance. An indicator is proposed in this method for power performance evaluation under each yaw angle. The yaw angle with the largest indicator is considered as the yaw angle measurement error in our work. A zero-point shifting fault would trigger an alarm if the error is larger than a predefined threshold. Case studies from several actual wind farms proved the effectiveness of the proposed method in detecting zero-point shifting fault and also in improving the wind turbine performance. Results of the proposed method could be useful for wind farm operators to realize prompt adjustment if there exists a large error of yaw angle measurement.

DOI: 10.3390/en11030633

A Novel Statistical Method to Temporally Downscale Wind Speed Weibull Distribution Using Scaling Property

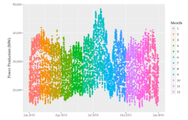
Authors: Ju-Young Shin, Changsam Jeong and Jun-Haeng Heo

Abstract: To improve our capacity to use available wind speed data, it is necessary to develop a new statistical temporal downscaling method that uses one or a few input variables of any temporal scale for mean wind speed data to obtain wind statistics at finer temporal resolution. In the present study, a novel statistical temporal downscaling method for wind speed statistics and probability distribution is proposed. The proposed method uses the temporal structure to downscale the wind speed statistics to a fine temporal scale without the use of additional variables. The Weibull distribution of the hourly and 10-min mean wind speed data is obtained by the downscaled wind speed statistics. The proposed method provides the downscaled Weibull distribution of fine temporal wind speed data using coarse temporal wind statistics. Particularly, the use of sub-daily mean wind speed data in the downscaling of the wind speed Weibull distribution leads to good estimation precision. The Weibull distribution downscaled by the proposed method successfully reproduces the wind power density based on the wind potential energy estimation.

DOI: 10.3390/en11030650

Performance Indicators of Electricity Generation at Country Level—The Case of Italy

Authors: Michel Noussan, Roberta Roberto and Benedetto Nastasi



Abstract: Power Grids face significant variability in their operation, especially where there are high proportions of non-programmable renewable energy sources constituting the electricity mix. An accurate and up-to-date knowledge of operational data is essential to guaranteeing the optimal management of the network, and this aspect will be even more crucial for the full deployment of Smart Grids. This work presents a data analysis of the electricity production at the country level, by considering some performance indicators based on primary energy consumption, the share of renewable energy sources, and CO^2 emissions. The results show a significant variability of the indicators, highlighting the need of an accurate knowledge of operational parameters as a support for future Smart Grid management algorithms based on multi-objective optimization of power generation. The renewable share of electricity production has a positive impact, both on the primary energy factor and on the CO^2 emission factor. However, a strong increase of the renewable share requires that the supply/demand mismatching issues be dealt with through appropriate measures.