

Special Issue on
**Computational Intelligence and Heuristic Techniques in
Microgrids**

CALL FOR PAPERS

A microgrid is defined as a portion of an electric grid which operates in different layouts and conditions and includes distributed generation renewable power sources (mainly photovoltaic and wind), electrical loads, and batteries. In order to operate safely and uninterrupted, the microgrid is required to be smart, in order to optimize operation and to forecast possible scenarios and predict faults for maintenance, which also involves a wider use of energy storage systems.

The interdisciplinary fields of neural computing, neural engineering, and artificial intelligence are largely employed to microgrids. This is because one of the biggest challenges for smart grid and renewable energy applications will be the handling of massive amounts of data that is expected to be collected from various sources. In this respect, different machine learning techniques such as artificial neural networks, fuzzy systems, evolutionary programming, and other artificial intelligence methods and their hybrid combinations can significantly contribute to solving problems with smart grids and renewable energy.

This special issue will focus on new ideas and explore the inherent challenges in developing future smart grids and renewable energy applications, investigating novel designs and neural-inspired systems. In this context, computational intelligence techniques covering different areas are employable for many applications, including the estimation of exploitable energy, the sizing and management optimization of the microgrid, the application of predictive maintenance, and many other applications.

This special issue encourages the submission of original research and review articles regarding recent developments and ideas in computational intelligence techniques for smart grid systems and renewable power generation.

Potential topics include but are not limited to the following:

- ▶ Modelling and control of integrated renewable power generation systems (genetic algorithms)
- ▶ Estimation, by means of machine learning and neurofuzzy techniques, of the exploitable energy from different power sources in the following time horizons: very short (30 sec to 1 min), short (1 min to 15 min), and midterm (1 day ahead)
- ▶ Load management and optimization, in smart grid, microgrid, or smart buildings
- ▶ Sizing and optimization of the components in the microgrid
- ▶ Predictive maintenance by means of Monte Carlo methods for the evaluation of the reliability of the components
- ▶ Estimation of the remaining useful life and reliability analysis of the components in the power system (batteries, inverters, etc.)
- ▶ Innovative Maximum Power Point Tracking algorithm by means of heuristic techniques

Authors can submit their manuscripts through the Manuscript Tracking System at <https://mts.hindawi.com/submit/journals/jece/power.systems/mgseg/>.

Papers are published upon acceptance, regardless of the Special Issue publication date.

Lead Guest Editor

Emanuele Ogliari, Politecnico di Milano, Milan, Italy
emanuelegiovanni.ogliari@polimi.it

Guest Editors

Minh Quan Duong, University of Danang, Da Nang, Vietnam
dmquan@dut.udn.vn

Trung Hung Vo, University of Danang, Da Nang, Vietnam
vthung@dut.udn.vn

Alessandro Niccolai, Politecnico di Milano, Milan, Italy
alessandro.niccolai@polimi.it

Submission Deadline

Friday, 29 November 2019

Publication Date

April 2020