

Editorial

Modeling, Simulation and Control of Wind Diesel Power Systems

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Wind diesel power systems (WDPS) are isolated microgrids which combine diesel generators (DGs) with wind turbine generators (WTGs). WDPS are on many cases the result of adding WTGs to a previous existing diesel power plant located in a remote place where there is an available wind resource. By means of the WTGs supplied power, the fuel consumption and the CO₂ emissions are reduced [1]. WDPSs are isolated power systems with low inertia where important system frequency and voltage variations occur [2]. WDPS dynamic modeling and simulation allows short-term simulations to obtain detailed electrical variables transients, so that the WDPS stability and power quality can be tested. The main subject of this Special Issue in the *Energies* journal is about WDPS dynamic modelling and simulation. The topics included in the main subject were: the simulation and control of different architectures of WDPS, the dynamic modelling of the different WDPS components, the consideration of the different modes of operation of WDPS: diesel only, wind–diesel [3] and wind only [4]; the advantages and drawbacks of using WTG of fixed speed [5] or variable speed [6] types in WDPS, and the use of energy storage systems (ESS) based on batteries [7], flywheel [8], ultracapacitors [9], etc., and the benefits that ESSs provide to the WDPS power quality, stability and reliability [10]. Additionally, the related topics of logistic simulation of WDPS or studies about the sizing of the WDPS different components are also included. WDPS are isolated microgrids, so the dynamic simulation of related AC isolated microgrids such as those with hydro-turbines [11], photovoltaics, ship microgrids [12], etc., can be also part of this Special Issue.

The Special Issue was closed on 30 April 2021 with seven articles published on it. The article that most follows the “spirit” of the Special Issue is “Review on Dynamic Simulation of Wind Diesel Isolated Microgrids” [1]. I would recommend the potential readers of this Special Issue to start with this article. Two more articles deal strictly with WDPS: “Flywheel Energy Storage and Dump Load to Control the Active Power Excess in a Wind Diesel Power System” [8] presents dynamic simulations of a WDPS which includes a flywheel energy storage system (FESS) and shows how the FESS stabilizes the microgrid and improves the system power quality, and “Study of the Intelligent Control and Modes of the Arctic-Adopted Wind–Diesel Hybrid System” [13] shows the architecture of an advanced control system with different control options for WDPS located in the arctic area, and how to tackle the very low temperatures and the icing of the blades of the WTGs. Another two articles also present dynamic simulations of isolated microgrids: “Study and Simulation of a Wind Hydro Isolated Microgrid” [11] deals with the modeling of a high penetration wind–hydro microgrid and its main simulation is a transition from the wind only operation to the wind–hydro operation, and “An Adaptive Control Scheme for Variable Speed Wind Turbines Providing Frequency Regulation in Isolated Power Systems with Thermal Generation” [14] presents an adaptive control that commands variable speed WTGs to support frequency in an isolated system with controlled thermal generators, minimizing the WTGs mechanical and electrical efforts. Finally, two articles show logistic simulations: “Long-Range Integrated Development Analysis: The Cuban Isla de la Juventud Study Case” [15] studies the 25% and 100% scenarios of renewable



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energy penetration in the Cuban island of “la Juventud”, and “Taking into Consideration the Inclusion of Wind Generation in Hybrid Microgrids: A Methodology and a Case Study” [16] presents a methodology to facilitate the addition of wind power generation to photovoltaic–diesel isolated microgrids.

I hope that this Special Issue be helpful to students, researchers, and professors.

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