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Special Issue Reprint

Microgrids

www.mdpi.com/books/reprint/1925

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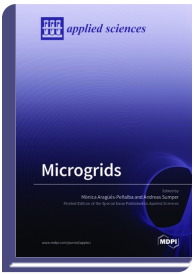
ISBN 978-3-03921-868-4 (Softback)
ISBN 978-3-03921-869-1 (PDF)



Electrical power systems are evolving at the generation, transmission, and distribution levels. At distribution level, small generating and storage units—the so-called distributed energy sources (DERs)—are being installed close to consumption sites. The expansion of DERs is empowering renewable energy source integration and, as a consequence, new actors are appearing in electrical systems. Among them, the prosumer is a game-changer; the fruit of the behavior transformation of the consumer who has not only the ability to consume power but also to produce it. Microgrids can be understood as DER installations that have the capability of both grid-connected and grid-isolated operation. During the last decades, there has been a significant deployment of microgrids (e.g., in countries like the United States, Switzerland, and Denmark) and a consequent increase in renewable energy generation. This is contributing to the decarbonization of electrical power systems. However, the variability and intermittency of renewable sources introduce uncertainty, which implies a more complex operation and control. Taking into account that existing and future planned microgrids are being/going to be interconnected to the current electrical network, challenges in terms of design, operation, and control at power system level need to be addressed, considering existing regulations.

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