

What is a microgrid?

Microgrids (MGs) represent one outcome of this transformation. The MG represent a compact power system comprising of independent renewable energy resources (RERs), energy storage systems (ESSs), and loads operating as a unified control system to generate power for localized areas within the range of 10-100 MW [3,4].

What makes a microgrid different from traditional power systems?

Unlike traditional power systems, which are relatively centralized and well-structured, microgrids integrate diverse energy resources, including renewable generation, energy storage systems, and controllable loads, each with unique operational characteristics and control requirements.

What are power electronic converters in microgrids?

Power electronic converters in microgrids use various topologies, according to different applications. Based on the input and output power, power electronic converters can be classified as DC/DC converters and DC/AC converters. DC/DC converters convert the input DC voltages and currents into controlled output DC voltages and currents.

Are microgrids Compact Power Systems?

The concept of microgrids (MGs) as compact power systems, incorporating distributed energy resources, generating units, storage systems, and loads, is widely acknowledged in the research community. G...

By integrating power electronics, control theory, and stability analysis, this chapter provides a practical framework for understanding and improving microgrid operation, offering ...

The involvement of power electronic devices is inevitable to guarantee the steady functioning of the utility grid system and bolster smart grid capabilities. Major renewable energy ...

The evolution of microgrid control strategies has led to notable improvements in system performance and resilience. Adaptive and AI-driven controls have demonstrated superior capabilities ...

Prospective authors are invited to submit original contributions or survey papers for publication in Electronics. Topics of interest for this Special Issue include, but are not limited to, the ...

Abstract: This article focuses on intelligent energy management in microgrid systems, providing a comprehensive control engineering perspective on power electronics-based operation. ...

The flexible controllability of power electronic converters in microgrids also enables high-level computation and optimization of the microgrid operation and management [7, 8]. Typical power ...

The ANN-PSO controller is integrated within a PV-battery microgrid system and enables efficient tracking of the maximum power output while minimizing oscillations.

Power converters are the main components in the microgrid. To meet evolving grid codes and ensure compatibility with existing infrastructure, control strategies are becoming more intelligent ...

A microgrid (MG) is a stand-alone or grid-connected hybrid renewable system that uses distributed renewable and nonrenewable energy sources and energy storage systems (ESSs) to supply power ...

The newly developed power electronics interface as well as the controls are incorporated into a test microgrid to demonstrate the advantages brought about by the proposed M3PE-HUB.

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