Control Scheme of Photovoltaic Inverter for Voltage Improvement in Isolated AC Microgrids

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Abstract

This paper presents a control scheme for a PV inverter in isolated three-phase AC microgrids. The proposed control scheme allows performing the voltage regulation by reactive power control of the PV inverters without communication systems. The PV inverter in the microgrid commits to supply the active power generated from the PV array first, and then the remaining capacity of the PV inverter represents the available reactive power that can contribute in the microgrid voltage regulation. The proposed control scheme allows the PV inverters to deliver or to absorb the reactive power depending on the measured voltage at the connection point of the PV inverter and the available reactive power of the PV inverter. The tested microgrid consists of two power inverters, one for interfacing energy storage batteries controlled by a droop control scheme in order to regulate the voltage and the frequency of the microgrid. The second inverter interfacing the PV array controlled by the proposed control scheme in order to support the microgrid by the active power generated from the PV array and the available reactive power. The results obtained from the simulations show that the proposed approach provides the expected voltage regulation in the tested microgrid under different operating conditions. Copyright © 2020 Praise Worthy Prize - All rights reserved.

Keywords
AC Microgrid; Droop Control; Voltage Improvement; Reactive Power

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References


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