

Helping all generations of photo-voltaic inverters ride-through voltage sags

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Abstract-

The late Spanish grid code established that, to avoid island operation, renewable power sources have to be disconnected from the grid in the case of a voltage sag. This would threaten the system stability in case of massive penetration of renewable sources and motivated a recent revision of the code. The new code establishes strict ratios between active and reactive currents during the sag and requests that the plant must quickly resume its normal operation, when the voltage sag ends. Existing installations are also affected if they want to enjoy the premiums associated with renewable generation. When full upgrading of existing installations is not practical, this study proposes a plug-in shunt-connected power electronics device to help solar plants comply with the new grid code, without modifying the solar inverters. The device and its control algorithm are explained in this study and experimental results using photo-voltaic inverters without low-voltage ride-through capability are presented. Solar inverters remain unaware of the voltage sag and they can be led quickly and smoothly back into the grid when the sag is over.

Index Terms- power generation control; photovoltaic power systems; invertors; power supply quality

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