



Reactive power management in photovoltaic installations connected to low-voltage grids to avoid active power curtailment

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Photovoltaic (PV) inverters are traditionally designed to operate with unity power factors. In order to use reactive power capabilities of smart inverters, there are two main options: limiting the amount of active power delivered or oversizing the inverter. The first of these options implies a reduction in the PV production and therefore, it would lead to reduced earnings for the PV system owner. On the other hand, oversizing the PV inverter allows to have reactive power compensation capabilities, while delivering full power output from its PV field. Of course, oversizing the inverter has an extra cost that needs to be taken into account, although the differences in prices are not large enough to become an obstacle in the decision. The simplest mitigation method provided by PV inverters is the active power reduction or curtailment. This strategy can be implemented in different ways, such as fixing a maximum point to active power or basing the reduction on a reference signal, as the voltage at the PCC.

The high R/X ratios in LV networks makes this measure quite effective in voltage reduction. However, active power curtailment also suppose an effective power spilling, and the PV generation will be less than it could be for the available solar irradiance. This affects the overall economic viability of the PV system. While from the perspective of the Distribution System Operator (DSO) this measure has clear advantages, this strategy has a cost for PV system owners, hence this is a point of contention that needs to be fixed for a successful application.



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