

TECHNOLOGICAL CONTROL CAPABILITIES OF DER TO PROVIDE FUTURE ANCILLARY SERVICES

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ABSTRACT

With the aggregation of distributed generators and loads, a Virtual Power Plant (VPP) can participate on electricity markets and provide ancillary services. This paper describes technological control capabilities of distributed energy resources (DER) to provide future ancillary services for distribution and transmission network operation. The analysed future ancillary services comprise frequency control, voltage control, congestion management, improvement of voltage quality, network restoration, islanded operation and optimisation of grid losses. In addition, the capability to provide fault-ride-through is looked at. Special focus is given to wind turbine generators, photovoltaic systems, hydro power plants and combined cooling, heat and power plants. Also distributed loads and storage units are included into the performed assessment. The results of the study show substantial technological potentials of DER within the framework of VPPs. Especially, inverter-coupled units can provide various ancillary services. Although many of these features would have economic benefits most of them are not used at present. With their application, DER integrated in VPPs are expected to build a supporting role of the future electricity supply and the future network operation.