

Modelling and assessing the impacts of self supply and market-revenue driven virtual power plants

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Abstract— Distributed generation will make up for more than half of the installed electric generation capacity in 2020 in Spain. The major part of this generation is renewable-energy based and intermittent. This provokes important challenges in the operation of the electric energy system: The number of generators increases, the size of generators decreases and more variability as well as uncertainty will exist in the operation of the electric system. To ensure a viable operation, an option which bears a high potential is the aggregation of many small generators as well as demands into one entity: a so-called Virtual Power Plant (VPP). This article will treat the techno-economic impact of the massive integration of small generators and demands into VPPs both on the system functioning and on the outcome of demands and generators within these VPPs. We will analyse and compare several strategies of VPPs.

Index Terms— Virtual Power Plants; Demand response; Electricity system operation; Demand shifting; Optimisation; Distributed energy resources

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