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DISTRIBUTED GENERATION IN ELECTRICITY MARKETS, ITS IMPACT ON DISTRIBUTION SYSTEM OPERATORS, AND THE ROLE OF REGULATORY AND COMMERCIAL ARRANGEMENTS

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ABSTRACT

The penetration of distributed generation (DG) and electricity from renewable sources (RES) is increasing in most European electricity markets. This new situation can create several problems for distribution networks in terms of operational safety, system protection and stability as well as power quality. Furthermore, growing electricity supply from DG has consequences for both the revenues as well as the expenditure of distribution system operators (DSOs). Whereas the distribution network should be able to accommodate higher peak loads and flows, which may require network reinforcements in some parts of the network, the net outflow may reduce since consumers may use part of the local DG production directly. This latter situation could lead to stranded network assets. At the distribution level, in addition to voltage and flow control, new services could emerge including provision of security of supply and enhancement of overall service quality. By developing new business activities, thereby diversifying the business model, and by transforming operational philosophies from passive into active network management, DSOs can overcome the threats that arise from the increasing penetration of DG. In order for DSOs to embrace such opportunities, regulation also needs to evolve such that it provides DSOs with a wider range of options and incentives in choosing the most efficient ways to run their businesses in the brave new world characterised by increasing penetrations of DG.