Large-scale integration of renewable and distributed generation of electricity in Spain: current situation and future needs

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Abstract-

Similarly to other European countries, mechanisms for the promotion of electricity generation from renewable energy sources (RES) and combined heat and power (CHP) production have caused a significant growth in distributed generation (DG) in Spain. Low DG/RES penetration levels do not have a major impact on electricity systems. However, several problems arise as DG shares increase. Smarter distribution grids are deemed necessary to facilitate DG/RES integration. This involves modifying the way distribution networks are currently planned and operated. Furthermore, DG and demand should also adopt a more active role. This paper reviews the current situation of DG/RES in Spain including penetration rates, support payments for DG/RES, level of market integration, economic regulation of Distribution System Operators (DSOs), smart metering implementation, grid operation and planning, and incentives for DSO innovation. This paper identifies several improvements that could be made to the treatment of DG/RES. Key aspects of an efficient DG/RES integration are identified and several regulatory changes specific to the Spanish situation are recommended.

Index Terms- renewable and distributed generation, network regulation, electricity markets

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Citation:
Cossent, R.; Gómez, T.; Olmos, L. "Large-scale integration of renewable and distributed generation of electricity in Spain: current situation and future needs", Energy Policy, vol.39, no.12, pp.8078-8087, December, 2011.