

Towards a future with large penetration of distributed generation: Is the current regulation of electricity distribution ready? Regulatory recommendations under a European perspective

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Abstract— The European Energy Policy promotes renewable energy sources and energy efficiency as means to mitigate environmental impact, increase security of supply and ensure economic competitiveness. As a result, the penetration levels of distributed generation (DG) in electricity networks are bound to increase. Distribution networks and distribution system operators (DSOs) will be especially affected by growing levels of DG. This paper reviews the current regulation of distribution in the European Union Member States, focusing on those aspects that might hinder the future integration of DG. Several regulatory issues that may hinder a successful integration of DG have been identified. Recommendations to improve the current situation are proposed. Regarding economic signals sent to DG, connection charges and cost-reflective use-of-system charges together with incentives to provide ancillary services are the key aspects. Concerning DSOs regulation, unbundling from generation and supply according to the European Electricity Directive, incentives for optimal planning and network operation considering DG, including energy losses and quality of service, and innovation schemes to migrate to active networks are the most relevant topics.

Index Terms— Distribution system operator; Distributed generation; Regulation

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