

Improved regulatory approaches for the remuneration of electricity distribution utilities with high penetrations of Distributed Energy Resources

J. D. Jenkins; J.I. Pérez Arriaga

Abstract-

Under increasing penetration of distributed resources, regulators and electricity distribution utilities face greater uncertainty regarding the evolution of network uses and efficient system costs. This uncertainty can threaten revenue adequacy and challenges both cost of service/rate of return and incentive/performance-based approaches to the remuneration of distribution utilities. To address these challenges, this paper proposes a novel methodology to establish allowed utility revenues over a multi-year regulatory period. This method combines several ‘state of the art’ regulatory tools designed to overcome information asymmetries, manage uncertainty, and align incentives for utilities to cost-effectively integrate distributed energy resources while taking advantage of opportunities to reduce system costs and improve performance. We use a reference network model to simulate a large-scale urban distribution network, demonstrate the practical application of this regulatory method, and illustrate its performance in the face of both benchmark and forecast errors.

Index Terms- Regulatory Economics, Network Regulation, Electricity Distribution, Distributed Energy Resources, Incentive Regulation, Managing Uncertainty

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