

Efficient cost allocation in capacity remuneration mechanisms: applying cost causation to resource adequacy

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Abstract-

Capacity Remuneration Mechanisms (or CRMs) have become widespread in liberalised power systems as a regulatory tool to ensure resource adequacy. As these mechanisms have grown in importance, so have the associated costs. However, the methods used to allocate CRM costs remain far too simplistic, failing to provide electricity consumers with adequate economic signals. In this article, we propose allocating CRM costs based on cost causation by calculating each consumer's negative marginal impact on the system's reliability standard. This methodology results in the definition of hourly cost-allocation factors that can ultimately be used to allocate CRM costs to any demand profile. We quantitatively evaluate the methodology through two case studies: a stylised study to illustrate the underlying concepts and a full-scale study inspired by the Spanish power system. These case studies demonstrate that CRM costs should not be allocated exclusively to peak demand; rather, they should be distributed across each hour according to the impact that an additional unit of demand in that hour would have on the system's reliability metric.

Index Terms- Resource adequacy; Capacity mechanisms; Cost allocation; Firm supply; Demand response

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