

Self-fulfilling or self-destroying prophecy? The relevance of de-rating factors in modern capacity mechanisms

P. Brito Pereira; P. Rodilla Rodríguez; P. Mastropietro; C. Batlle López

Abstract-

Capacity mechanisms aim at enhancing mid- to long-term reliability by adding an extra income for generation and demand response resources, based on their firm capacity, a parameter commonly defined by the regulator. The firm capacity is often calculated by multiplying the installed capacity by a de-rating factor, to reflect the expected capability of the resources to contribute to system reliability. Computing de-rating factors is quite a challenging and pivotal task, for any error in its determination can seriously affect the performance of the capacity mechanism.

In this paper, using a two-step model that simulates both the capacity auction and the short-term market, we show that the ex-ante definition of firm capacity influences investment decisions, altering the resulting resource mix and, in the end, the very contribution to the system reliability of the resources. Being aware of this potential mismatch caused by the definition of the firm capacity is fundamental for regulators to avoid paying for something that may be unable to contribute to meet the desired reliability target, or which could even deteriorate system adequacy.

**The discussion is illustrated with a case example, focusing on the impact of the definition of solar **

Index Terms- Capacity mechanisms; Reliability; Security of supply; De-rating; Firm capacity; Capacity auctions

Due to copyright restriction we cannot distribute this content on the web. However, clicking on the next link, authors will be able to distribute to you the full version of the paper:

[Request full paper to the authors](#)

If your institution has an electronic subscription to Applied Energy, you can download the paper from the journal website:

[Access to the Journal website](#)

Citation:

Brito, P.; Rodilla, P.; Mastropietro, P.; Batlle, C. "Self-fulfilling or self-destroying prophecy? The relevance of de-rating factors in modern capacity mechanisms", Applied Energy, vol.314, pp.118939-1-118939-13, May, 2022.