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PERFORMANCE INCENTIVES IN CAPACITY MECHANISMS: CONCEPTUAL CONSIDERATIONS AND EMPIRICAL EVIDENCE

Paolo Mastropietro [a, *], Pablo Rodilla [a], Carlos Batlle [a, b]

[a] Institute for Research in Technology, Comillas Pontifical University, Sta. Cruz de Marcenado 26, Madrid, Spain.

[b] Also with MIT Energy Initiative, 77 Mass. Av., Cambridge, US and Florence School of Regulation, Florence, Italy

[*] Corresponding author. IIT, Comillas Pontifical University, Sta. Cruz de Marcenado 26, Madrid, Spain.
Tel.: +34 91 542 2800 ext. 2746. E-mail: <Paolo.Mastropietro@comillas.edu>

EXECUTIVE SUMMARY

Capacity mechanisms are regulatory instruments designed to reinforce the investment signal provided by electricity markets. They aim at attracting new resources in order to guarantee the security of supply in liberalised power sectors. However, in order to achieve this objective, they also have to ensure that these resources are available at times of system stress, when their contribution is much needed. This requires a properly designed performance incentive that couples the remuneration obtained through the capacity mechanism to the contribution of each resource during scarcity conditions.

Capacity mechanisms are edging up on the political agenda in nearly all liberalised power systems. In North and South America, where they were included in the original market design or implemented soon after restructuring, capacity mechanisms are being intensely reworked to improve their outcomes in light of the new challenges facing these systems. In Europe, where many regulators opted for the so-called energy-only market when liberalising the industry, capacity remuneration mechanisms are now being implemented or are under design in several countries (United Kingdom, France, Italy and Ireland, among others) to respond to local or regional issues. Many of these reforms are giving renewed importance to performance incentives, which proved to be essential for capacity mechanisms to guarantee the security of electricity supply.

This article compiles empirical evidence (particularly from Colombia, ISO New England, PJM, United Kingdom, and France) in order to identify current trends in enhancing short-

term performance in capacity mechanisms. Performance incentives can be introduced in practice by means of two different (but non-conflicting) approaches. First, performance incentives can be linked to constraints on tradable quantities (the so-called firm capacity or firm energy), which limit the amount of "reliability" that a given resource may trade in the mechanism, and which may be recalculated penalising potential underperformances. Second, they can be implemented as financial penalties for failure to comply with the commitments foreseen in the capacity contract. This second methodology is gaining relevance, as demonstrated by the pay-for-performance reforms in ISO New England and PJM.

The key elements of these performance incentives have been indentified in the article in the critical period indicator, which identifies stress events during which performance from each resource is assessed, and whose selection heavely impacts the incentive itself; the penalty rate for non-compliance, which is the actual performance signal that is supposed to encourage investments that improve the reliability and availability of resources with capacity commitments; the overperformance payments, which may be envisaged to supplement underperformance charges through a symmetrical remuneration in case the resource delivers above its commitment during scarcity conditions; and the exemptions and penalty caps, which may be introduced to reduce the risk exposure of resources committed to a capacity mechanism, but which should be minimised so as not to significantly attenuate the performance incentive signal. All these design elements are analysed for the power systems under study in this article and the different alternatives are summarised in the last section. Only careful refinement of the design elements discussed in this article can guarantee the expected performance of resources participating in a capacity mechanism. This constitutes a lesson worth learning for European regulators, especially in the present context of widespread institution of capacity mechanisms.