Intermittent RES-E, cycling and spot prices: the role of pricing rules

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Abstract— Variable energy resources (VER) penetration increases the cycling operation of conventional thermal plants, inducing an operating costs increase. In some cases, due to its impact on O&M costs, the cost of each start can significantly raise.

The impact of this effect on spot prices depends on the pricing rules implemented: in some cases (non-linear pricing rules), these costs are compensated via discriminatory side payments and thus not included in the price formation while in others (aka linear) a single price per MWh is calculated to remunerate every single unit that is producing.

These two alternative designs result lead for instance to a different remuneration for base-load plants. The first objective of this paper is to explore to what extent this remuneration difference might turn to be relevant as VER (and specifically solar PV) deployment develops. To do so, we also analyze the importance of properly allocating medium-term O&M costs in the short term, a hot topic in the regulation of a number of power markets today. We propose a way to properly calculate the start-up cost-adder component due to O&M and how this cost-adder is affected by cycling operation.

Index Terms— Power generation dispatch; O&M cost; Cycling; Electricity markets; Marginal prices; Pricing rules

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