

Melting-pots and salad bowls: the current debate on electricity market design for RES integration

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European wholesale markets have not been designed to ensure efficiency of operations and investment in power systems featuring a large share of intermittent Renewable energy Sources (RES). Technical tools are already available to cope with the low-predictability and the variability featured by these resources. However, the rights incentives must be implemented to ensure their development in an efficient way. In this study, we review, confront, and discuss the main arguments developed in key recent publications on the integration of renewables into electricity markets is provided.

In this paper we distinguish two paradigms of RES integration. On the one hand, as RES technologies get more mature, integration can be conceived as a “melting-pot”, i.e. the convergence towards a single set of rules for both RES and programmable generators. On the other hand, it is sometimes argued that due to their fundamental differences, RES integration can only be “salad-bowl” integration, with different set of rules for different kinds of generators. We review the arguments for both options and show that only the lack of dynamic retail pricing can justify salad-bowl rather than melting-pot integration.

The development of RES also generates new needs for flexibility in electricity markets. A first consequence will be the need to revisit product definitions: temporal granularity will have to get finer to reflect the value of flexibility, while price boundaries should be extended to deliver accurate scarcity signals. A second consequence will be the growing importance of balancing markets. Inter-temporal consistency of rules from day-ahead to real-time will then be crucial as the products exchanged in each market will be substitutes. This could justify joint optimisation by a single system operator. Finally, the requirement for capacity remuneration mechanisms (CRMs) is sometimes presented as a third consequence of the need for flexibility. However, such CRMs should present a level of details sufficient to ensure adequate operational abilities.

The large-scale development of renewables will also generate more variable network flows. As the congestion patterns get more complex, accurate locational

granularity reflecting physical realities at all times will be needed. The variability of generation and the greater need to avoid high-cost locations will hence constitute a strong justification for locational pricing. In parallel, two options have been discussed in order to cope with variable generation by geographically dispersed RES: an extension of the historical paradigm featuring large power units connected to load-centres through transmission lines, or a new paradigm based on local management by real distribution “system operators”. The latter option would require a major evolution of the role played by DSOs and of the corresponding regulatory framework.