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TRIGGERING INVESTMENTS INTO CROSS-BORDER TRANSMISSION CAPACITIES IN THE EUROPEAN ELECTRICITY MARKET

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Overview

Cross-border transmission grids (Interconnectors) play a core role for functioning wholesale electricity markets covering wider geographical regions beyond national borders. In general, the idea of electricity market restructuring worldwide is that the larger an electricity market is the more competitive it shall be (due to the larger amount of competing generators being connected to the grids). A precondition, therefore, is that the market place is not negatively constrained by bottlenecks and other shortcomings of the physical grid infrastructure.

In practise, however, not only the European wholesale electricity markets (but also electricity markets worldwide) face a variety of problems and shortcomings due to lacks of sufficient cross-border transmission capacities. Moreover, the basic economic instruments to overcome bottleneck situations presented in the textbooks of economic theory (congestion-based auctions, merchant transmission investments, etc.) do not result in investments to overcome these problems in practice. Furthermore, beyond technical and economical aspects the public acceptance for extending the grid infrastructure has been decreasing significantly in the last decades.

Methods

The core objective of this paper is to analyze the relevance of cross-border transmission lines for competition in electricity markets and options for enhancing competition by extending cross-border transmission capacities. The economic analyses and the empirical part of the paper are conducted specifically for the case of the European wholesale electricity market, with special emphasis to the Continental European market.

After a discussion of the economic and physical attributes of different types of transmission investments (congestion-based auctions, merchant transmission investments, cost-based regulation of transmission grids, reliability-based criteria for transmission investments, etc.) the status quo of cross-border electricity trading (incl. bottleneck description and analyses) in the European wholesale electricity market is conducted. Then, selected case studies of congested cross-border transmission lines are analysed against the background of the implemented economic (e.g. auctions) and regulatory (e.g. cost-based transmission grid regulation) instruments trying to overcome bottleneck situations. Then, recommendations to improve the bottleneck situations are presented. Finally, policy recommendations are derived to amend the regulatory framework in general.

Results

The major results of this analysis are: In the short-term, some incentives for (limited) investments into an extension of cross-border transmission capacities could be implemented without a fundamental change of the currently implemented regulatory instruments. In the long term, however, existing regulatory instruments – relying mainly on economic instruments (congestion-based auctions, merchant transmission investments) to overcome

bottleneck situations – won't stimulate significant investments into the grid infrastructure and, subsequently, more competition in the wholesale electricity markets. The major reasons, therefore, are (besides others):

- there are no economic incentives for investments into significant new transmission capacities due to uncertainties of investment cost recovery;
- if – due to ongoing mergers in the generation business – on both sides of a border the same company dominates the wholesale market this will hardly stimulate competition;
- furthermore, if excess capacities in the generation sector disappear also the arguments for the contribution of cross-border transmission to competition gradually becomes weaker.

Conclusions:

The major conclusions are that at present in the European wholesale electricity market only one (out of three) dimension of transmission grid infrastructure planning and operation is highlighted, i.e. economic instruments. Since economic criteria don't trigger investments into capital-intensive grid infrastructures (being not depreciated within a few years but decades), the regulatory framework has to be amended increasingly toward cost-based incentive regulation approaches (e.g. revenue cap regulation) in order to guarantee cost recovery for the investor. Finally, it has to be realised again that reliability-based investments (rather being argued within a service area of a single TSO; intra-TSO) and economic-based criteria (i.e. cross-border; inter-TSO) are highly interdependent. Treating several of these three dimensions equally, in the future transmission grid investments will also be realised in practise wherever they are supposed to be the first best solution (compared to alternatives like distributed generation, etc.).