

Energy

TRANSMISSION CAPACITY MANAGEMENT IN THE NATURAL GAS MARKET

WHAT CAN WE LEARN FROM THE ELECTRICITY MARKET?



Gas transmission capacity management suffers from a number of inefficiencies with respect to (1) the allocation of capacity rights and (2) the use of existing capacity. Possible solutions that would increase economic efficiency can be derived from an existing practice in the electricity market: the simultaneous auctioning of transmission capacity rights and commodity nominations (known as implicit auctioning). Implementation of

such a market-based system would improve the functioning of the European internal gas market.

Inefficiency in gas transmission capacity management

The transmission of natural gas, especially through interconnectors [1], suffers from two major inefficiencies: (1) inefficient allocation methods, and (2) inefficient use of existent capacity.

Firstly, the allocation of gas transmission capacity rights is mostly based on distributive (e.g., first-come first-served, pro-rata) allocation methods, and not on market based allocation methods (e.g., auctioning or nodal pricing)[2]. The drawbacks of the former two allocation methods are that the valuation of capacity rights by gas shippers is not made explicit and, more importantly, that scarce capacity is not allocated efficiently. In the absence of a liquid and well-functioning secondary market for capacity rights, shippers with highest willingness to pay for these rights are not generally expected to obtain them.

Secondly, there is contractual congestion of gas interconnectors between EU member states, while there is no physical congestion of these pipelines. Contractual bottlenecks are created through *capacity hoarding*: the strategic buying and withholding of transmission capacity rights by shippers with the purpose of gaining a competitive edge in supplying 'tight' gas markets [3]. This phenomenon prevents the optimal usage of existing capacity for arbitraging price differences between two interconnected markets. Anti-hoarding rules (e.g., use-it-or-lose-it) are generally in place but prove to be largely ineffective. The costs of contracting more gas transmission capacity rights than physically needed plus possible additional penalties does not outweigh the financial benefits obtained by the acquired strategic market position.

Transmission capacity management in the electricity market

The management of interconnector transmission capacity in the electricity market is further advanced. The preferred allocation method for interconnector

capacity in Europe is auctioning [4]. In general, two types of capacity auctioning methods exist: explicit auctioning (capacity only) and implicit auctioning (capacity and commodity [5]). The simplest form of implicit auctioning is mono-directional. For multi-directional congestion, market splitting or market coupling can be applied. In the former, there is one international power exchange that manages the interconnector flows between transmission systems, whereas the latter involves co-operating national power exchanges that manage interconnector flows [6]. The system ensures that existing capacity is efficiently allocated, and that contractual congestion only occurs during physical congestion. Moreover, since the power exchange has full information on the capacity and commodity bids and offers, optimal price arbitrage can take place. The Scandinavian electricity market (NordPool) has successfully adopted market splitting whereas the Belgian, Dutch and French regulators aim to implement a market coupling mechanism on electricity interconnectors. A system based on implicit auctioning seems to be superior for capacity allocation and capacity and commodity trading than the one currently applied in the natural gas market.

The electricity market as example for the natural gas market

De Joode et al. (2006) argue that explicit auctioning of gas transmission capacity rights improves the efficiency of gas market transmission operations. However, it was noted that explicit auctioning could be risky for gas traders and shippers, since an unsuccessful bid for capacity rights would possibly lead to financial losses on the commodity trade. Without capacity entitlements, they would be forced to sell their gas spot on a – until now – very illiquid commodity spot market, running the risk of receiving unfair prices. Implicit auctioning would remedy this problem. Moreover, it would, through enhanced transparency of simultaneous commodity and capacity rights bids, result in optimal arbitrage between markets.

Conclusion

The market for the transmission of natural gas suffers from several inefficiencies (inefficient allocation of capacity rights, hoarding of capacity rights) that could be effectively dealt with by implementing a system of implicit auctioning. Combining trade in commodity and capacity rights ensures effective usage of existing interconnector capacity, which leads to a higher degree of arbitrage between neighbouring gas markets. All in all, implementation of such a market-based system would improve the functioning of the European internal gas market.

Notes

1. In defining interconnectors we follow the definition of the European Commission (EC 2003): “‘interconnector’ means a transmission line which crosses or spans a border between Member States for the sole purpose of connecting the national transmission systems of these Member States”.
2. The UK is so far the only country to have adopted an auctioning mechanism for the allocation of transmission capacity rights.
3. An extreme example is the Interconnector UK between the UK and Belgium where gas flows are sometimes observed to flow towards the lower priced Continental gas market instead of the tight UK gas market.
4. Moreover, the (proposed) binding Congestion Management Guidelines under Regulation 1228/2003 explicitly prescribe explicit and implicit auctions as the only congestion management method allowed (EC

- 2006).
5. Thus the energy and capacity bids are combined in a single package (De Vries, 2004).
 6. In theory, market coupling and market splitting generally lead to identical market outcomes regarding price and electricity flows.

References

- De Joode, J., H.M. De Jong and L.J. De Vries (2006), Congestion management in meshed gas networks: can the electricity market serve as an example?, proceedings of the IAEE Annual International Energy Conference 2006, Potsdam, Germany, 7-10 June 2006.
- De Vries, L.J. (2004). Securing the public interest in electricity generation markets: the myths of the invisible hand and the copper plate. Dissertation, Delft University of Technology.
- European Commission (2003) Directive 2003/55/EC of the European Parliament and of the Council, of 26 June 2003, concerning common rules for the internal market in natural gas and repealing Directive 98/30/EC.
- European Commission (2006). Draft Commission Decision on amending the Annex to Regulation (EC) No 1228/2003 on conditions for access to the network for cross-border exchanges in electricity.

16.09.2006

Jeroen de Joode, PhD Candidate, Delft University of Technology
