FLOW BASED METHODOLOGY: EFFECT ON PRICES, VOLUMES, EXPORT AND WELFARE

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Abstract. The introduction of the Flow Based methodology in the CWE region brings along different effects on prices, volumes, export and welfare. This paper aims to analyze the evolution of these indicators and compare them to the preconceived effects.

Keywords: CWE, Flow-Based, Market Coupling, Power exchange, Welfare

INTRODUCTION

European power trading platforms are undergoing major changes nowadays. National power exchanges are being coupled with neighboring countries on a European scale. Belpex, the Belgian exchange market for day-ahead and intraday transactions was introduced in November 2006. Simultaneously, TLC or Trilateral Market Coupling, was brought into practice to enforce market integration. Market coupling between France, Belgium and the Netherlands is a price coupling mechanism where cross border trade is organized taking into account the order books of the three countries to calculate the optimal trading schemes. The TLC algorithm is based on the Available Transfer Capacity (ATC) between the different countries, determining the maximal possible commercial flow between neighboring countries on a yearly, monthly and daily base.

In November 2010, the price coupling was extended to Germany, combined referred to as the Central Western Europe or CWE region. At the same time Interim Tight Volume Coupling (ITVC) was introduced to create a volume coupling with the Scandinavian countries. Here the order books of all countries are used to calculate independent volume offers, which are included in the order books of the Netherlands and Germany before the price coupling of CWE takes place. As the name indicates, this volume coupling methodology is an interim solution which will be replaced by a price coupling mechanism. In the projected planning the price coupling methodology will be extrapolated in February 2014 to Luxembourg, Denmark, Sweden, Finland, Norway, Estonia and the U.K., referred to as the North West Europe or NWE region.

FLOW BASED

Another major change will be the introduction of the Flow Based market coupling algorithm in the CWE region, which is scheduled for June 2014. With the Flow Based methodology, the calculation of the commercial available flows will be conducted in a completely different manner from the current ATC based methodology. The input of the Flow Based calculation methodology for each TSO is a forecast file, the mapping of the import or export position under the circumstances where generation is altered in a specific region. All critical branches are identified under the N or N-k outages situation, taking into account remedial actions as defined by local procedures. Also the operational limits that have to be respected and the reliability margins are communicated. [1]

The advantages of the Flow Based methodology that are proclaimed, should be investigated by comparing market result of the Flow Based and current ATC based methodology. The Flow Based feasibility report [1] claims increased capacity offered to the market, increased Security of Supply concerning unusual market directions, improved cooperation and coordination between TSOs and improved transparency.

The indicators that are studied to compare the functioning of ATC to Flow Based are the following: Day Ahead Market Welfare (which is defined as the sum of the consumer surplus, the producer surplus and the congestion rent), the market clearing volumes, price convergence, price divergence, base load price, frequency of non-intuitive situations, comparison of isolated prices versus coupled prices, hour-to-hour net position volatility, computation time, market resilience and capacity parameter sensitivity.

It is stated [2], [3] that there will be more capacity available and the social welfare will increase. More transparency is proclaimed, e.g. which congestions limit market activity, without threatening grid security. The Flow Based methodology is supposed to reduce price volatility and price divergence compared to the ATC

market coupling. [4] A higher occurrence of price coupling, same price, no congestion, is preconceived. More stable prices and a higher traded volume is promised. Might it be that the results of the parallel run don't reinforce these promises, the focused indicators are welfare, price convergence and transparency.

ANALYZED INDICATORS

The parallel run results for the Flow Based methodology are available to investigate on the CASC website [5]. The goal of the paper is to analyze whether the proposed evolutions are realized. The analysis can be separated in four main areas, price, volume, export volume and congestion.

Price
- Convergence between the whole region or between mutual countries.
- Mean prices compared to the prices with infinite capacity
- The presence and frequency of price spikes
- The shape of the histograms of prices, e.g. maximum, minimum, division

Volume
- Mean volumes compared to the volumes with infinite capacity
- The shape of the histograms of volumes, e.g. maximum, minimum, division

Export Volume
- Volume of international trading compared to ATC
- Comparison of the international trade with infinite capacity

Congestion
- Is it possible to create a price difference without congestion
- How often are the interconnections congested
- Does the congestion rent decrease

CONCLUSIONS

The Flow Based methodology enhances welfare, converges prices and diminishes price divergence. Most of the proposed effects can be verified by the analysis of the simulation data. Other data is needed to analyze every proposed effect of the Flow Based methodology.

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