

Germany Will Limit Exchange of Electricity with Austria

Export from Jutland to Germany often blocked by Engpass Management

The exchange between Germany and Austria often forces Germany to carry out redispatch (or countertrade) due to bottlenecks in the German grid. Redispatch is expensive. Therefore, the German Bundesnetzagentur (Federal Grid Agency) is now considering other measures.

The options are discussed in a 95 pages report in German¹.

Austria expresses concern about the possible loss of trading capacity with Germany.

Engpass Management

The export capacity from Jutland to Germany is already considerably reduced, though there is no congestion at the border. The bottlenecks are elsewhere in the German grid. Germany limits the trading capacity in order to save German cost of redispatch. In German, it is called "Engpass Management" (congestion control).

Though the nominal capacity is more than 1,600 MW, the average available capacity in 2015 was just 236 MW. Several Danish electricity traders regret the poor export capacity.

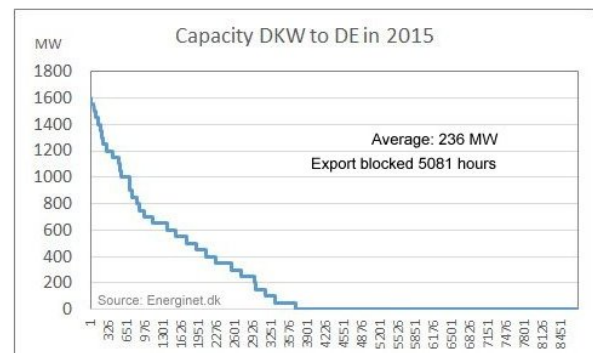


Fig. 1 - Duration curve for export capacity from Jutland to Germany in 2015

Why Austria and Denmark have Different Conditions

Nordpool Spot is the common power exchange for Norway, Sweden, Finland and Denmark. The spot market is based on a division into price zones allowing different spot prices. EPEXSPOT operates a joint power exchange for Germany, Austria and Luxembourg. These three countries are supposed to form one single price zone.

A *Market Coupling* between the two power exchanges has been developed. The market coupling serves the trade between power exchanges, but it does not allow this trade to cause internal overloads in the two grids. Therefore, the trade across the border between Nordpool Spot and EPEXSPOT has low priority. The total resource allocation is far from optimal.

The transmission capacity between Germany and Austria is far from sufficient for the trade requirements. The



Fig. 2 - Nordpool Spot bidding zones

¹ Feststellung des Bedarfs an Netzreserve für den Winter 2016/2017 sowie das Jahr 2018/2019 und zugleich Bericht über die Ergebnisse der Prüfung der Systemanalysen. Bundesnetzagentur, 29. April 2016

result is an increasing countertrade by the four German grid operators.

Rapidly Increasing Cost of Redispatch

The Bundesagentur report specifies the development of cost for four essential measures for maintaining grid security. The cost of the four measures has doubled from 2014 to 2015 (fig. 3). Bundesnetzagentur wants to prevent a similar growth for the winter 2016/17.

The report outlines some possible lines of action for 2016:

1. Engpass management at the border between Germany and Austria. Necessary backup: 1.9 GW
2. Cooperation agreement on redispatch with Austria. Necessary backup: 4.7 GW in Austria and 0.7 GW in Germany.
3. No Engpass management and no Austrian backup. Necessary backup: 7.0 GW.

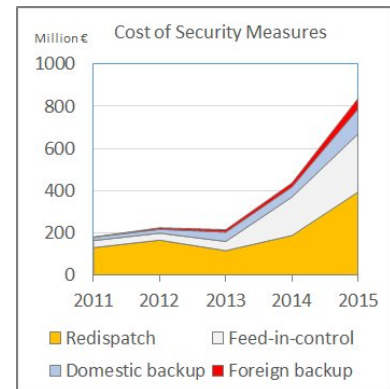


Fig. 3 - Cost of essential security measures

The Bundesnetzagentur prefers the first option. It will reduce the cost of redispatch, but it will not solve the problems. It will cause higher spot prices in Austria, lower spot prices in Germany and increased pressure on the alternative corridors through the neighbouring countries.

Redispatch or Price Zones?

Electricity grids are planned to serve different geographical patterns of demand and supply. The installation of fluctuating power sources makes the possible operational patterns more different and requires additional grid capacity. This seems to have come as a surprise to the energy planners in Germany.

New transmission lines are expensive, and they are not popular. Therefore, it is unrealistic to expand the grid sufficiently for a complete prevention of congestion, and the system operators must have some tools for congestion control.

Redispatch is necessary when a certain area must have the same spot price for each trading period, for instance one hour. Germany, Austria and Luxembourg is one price zone in the European market. The German transmission system does not have the capacity to serve the increasing wind and solar power in North Germany. The result is an increasing cost for redispatch (or countertrade).

The electricity markets have replaced former central load dispatch systems. The market design is supposed to give traders incentives towards an optimal system operation.

The counter trade is a fair solution, but the cross border trading capacity must correspond to the technical limits at the border to make the allocation of resources optimal.

The Nordic electricity exchange, Nordpool Spot, is based on a division in price zones. The price zones are defined, so technical bottlenecks normally occur between price zones. Adjoining zones have different price when there is congestion at the border.

In 2010, Sweden was divided into four price zones. One of the reasons was that the exchange with East Denmark was far from optimal.

Nodal pricing is a variant of price zones where each node in the power grid can have its own spot price. This is in theory the best possible market system, but the trading liquidity in for single nodes can be insufficient for a stable price creation. Therefore, it is necessary also to consider trading liquidity in planning price zones.

Germany's Dilemma

The massive expansion of wind power in North Germany causes a highly fluctuating flow of power from north to south. Germany is often a net exporter of electricity. The physical flow goes further south through Austria. The trade may be between Germany and Austria, but electricity also finds its way through the neighbouring countries west and east of Germany (fig. 4).

The transit through Poland and the Czech Republic will be limited by phase shifting transformers (PST). This will increase flows in the German grid furthermore, and the German grid operators will need even stronger measures to control the flows.

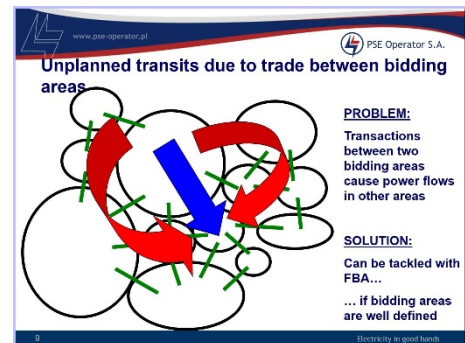


Fig. 4 - Typical European transits, slide by the Polish TSO, PSE Operator S. A.

Germany has plans for large-scale transmission systems from north to south². It is difficult to build such systems in Germany. The new facilities will probably not be available in due time for eliminating the congestion problems.

A Vision for the Future

A division of Germany into a northern and a southern price zone would cause lower spot prices in the north and higher spot prices in the southern zone. In the long term, this would give large electricity consumers incentives to move to the north and contribute to a better overall optimal solution.

Internal congestion problems in the German grid should be solved by adjustment of the price zones and not by limiting the cross border trade. Limitations at the borders with neighbouring market systems, such as Nordpool Spot, should reflect the physical conditions at the borders. The market coupling between market systems (i.e. EPEXSPOT and Nordpool Spot) may need corresponding improvements.

² See for instance my note from 25 March 2015: German Green Paper on the Future Electricity Market