ENERGITILSYNET
Danish Energy Regulatory Authority

TENDER FOR OFFERS

21 April 2016
Wholesale &
Transmission

STUDY ON CAPACITY REDUCTIONS ON THE GERMAN – WESTERN DANISH BORDER (DE-DK1)

DERA

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1 CLIENT

The Danish Energy Regulatory Authority (DERA) is independent of the government. The tasks of DERA are stipulated in the supply acts for electricity, natural gas and heat.

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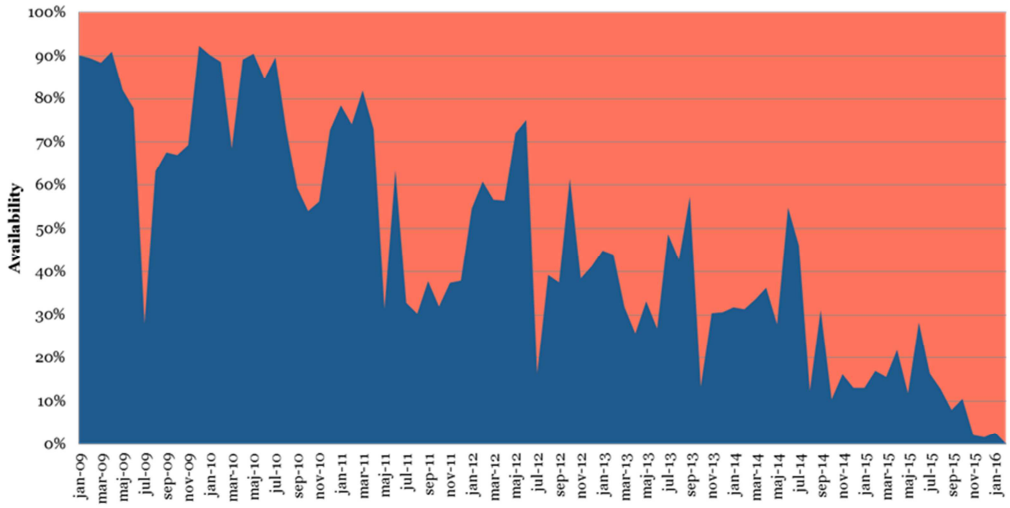
2 BACKGROUND

Cross-border capacity on the border between western Denmark and Germany has steadily decreased in the past years. The below figure shows the monthly average NTC as a percentage of the total capacity of 1780 MW in the southward direction.

MONTHLY AVERAGE NTC AS PART OF TOTAL TRANSFER CAPACITY (2009-2016)



Data from Energinet.dk

Strong continuous increase in RES in the Nordics and Northern Germany, the German Energiewende including the nuclear phase out, infrastructure investments and other factors have led to serious challenges for the German transmission grid in order to balance production and load. As a consequence the net

transfer capacity (NTC) of the DK1-DE interconnection that is available for the day-ahead market is regularly reduced by the German TSO TenneT TSO GmbH.

The reductions have significant effects on different elements of the socioeconomic welfare in the different member states. Producers, in Western Denmark and the other Nordic bidding zones experience a loss through less export opportunities and lower prices. Nordic consumers gain through lower prices. South of the DK1-DE border effects are reversed. Though in total reduced trade leads to lower welfare.

Several studies have analyzed the socioeconomic effect of the NTC reductions in some way. Namely a study conducted by EI[1] (2015) as well as a study by the IAEW/RWTH Aachen[2] (2014)commissioned by the Energinet.dk and TenneT TSO GmbH.

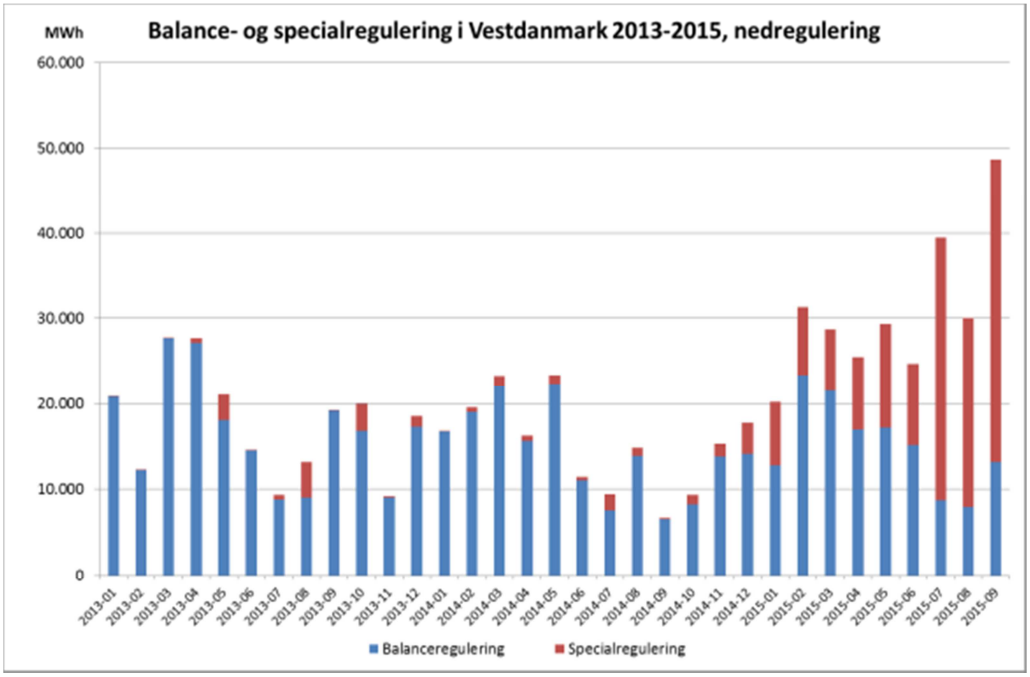
The IAEW study analyses a model where the NTC curtailments are reduced or avoided by a so-called countertrade or cross-border redispatch model. In such a model TSOs use downward regulation in the balancing timeframe or selling of energy in the intraday timeframe to solve the physical challenges that export from DK1 might lead to.

Recent data show that Tennet is using so-called “specialregulering” in Western Denmark to purchase downward regulation, ie. selling German energy surplus in Western Denmark. These volumes have increased significantly since late 2014. This indicates that there is significant downward regulation potential in Western Denmark for TenneT to make use of.

[1] http://ei.se/Documents/Publikationer/rapporter_och_pm/Rapporter%202015/Ei_R2015_12.pdf

[2] https://www.energinet.dk/SiteCollectionDocuments/Engelske%20dokumenter/El/Report_TenneT_Socio_Economic_DK1_DE_interconnector%20PDF.pdf

DOWNREGULATION WESTERN DENMARK (DK1) 2013-2015



Source:Energinet.dk

The IAEW study concluded that (based on 2012 data) roughly 14.000 MWh downward regulation would be would be needed on a monthly basis in order to secure a minimum capacity of 1.000 MW in the southward direction of DK1→DE.

European Legislation

The primary legal framework for dealing with congestion problems is **Regulation (EC) no. 714/2009** which defines the term "congestion" in article 2(2)(c) as "a situation in which an interconnection linking national transmission networks cannot accommodate all physical flows resulting from international trade requested by market participants, because of a lack of capacity of the interconnectors and/or the national transmission system concerned".

Article 16(1) provides that network congestion problems shall be addressed with non-discriminatory market-based solutions which give efficient economic signals to the market participants and transmission system operators involved. Further, it is stated in Article 16(3) that maximum capacity of the interconnections and/or the transmission networks affecting cross-border flows shall be made available to market participants, complying with safety standards of secure network operation.

In respect to article 18(4) guidelines on the management and allocation of available transmission capacity of interconnections between national systems are laid down in Annex I.

In particular, it is important to highlight point 1.7, which provides that TSOs shall not limit interconnection capacity in order to solve congestion inside their own control area, save for the [principals of cost-effectiveness and minimization of negative impacts on the internal market] and reasons of operational security.

In September 2015 ACER (*The Agency for the Cooperation of Energy regulators*) issued an opinion[3] on the compliance of National Regulatory Authorities' (NRAs) decisions approving the methods of allocation of cross-border transmission capacity in the Central-East Europe (CEE) region. This opinion deals with the compliance of the Single German-Austrian bidding zone with regulation 714 and can be used as an additional background.

3 OBJECTIVE OF THE STUDY

The objective of the study is to clearly depict the different socio-economic effects of a countertrade model with the aim to increase cross border capacity that is available to the day-ahead market compared to the situation today with heavy curtailments.

A countertrade/redispatch model shall be understood as any model where TSOs offer a higher NTC capacity to the day-ahead market and after closing of the day-ahead market sell and buy energy in order to solve possible grid congestions.

The study shall analyze how an increase in cross border capacity, by increased countertrade/redispatch on the DK1-DE border affects socio-economic welfare. The analysis shall be broken down into at least consumer surplus, producer surplus and congestion rent for the European countries affected by the model.

Important elements to further consider and analyze include the need for upward and downward regulation for different scenarios and costs for upward/downward regulation.

All assumptions that are made for the calculations shall be described in detail, for example the assumed prices for upward and downward regulation.

Lastly the study shall deliver insights into the relationship between increased NTC and operational security in Germany and Denmark.

The newest available data shall be used as input data, also taking into account relevant foreseeable developments that will affect the German grid to the extent possible. Such developments are for example future increase in RES production, i.e. the starting of operation of the new 288MW offshore wind park in Schleswig-

[3] http://www.acer.europa.eu/Media/News/Pages/ACER-Opinion-No-09-2015.aspx

Holstein in the end of 2015, shutdown of nuclear power plants and infrastructure investments.

While there have been reductions in cross-border capacity in both directions, this study shall only cover reductions in the direction from Western Denmark towards Germany (DK1 → DE).

4 SCOPE OF THE STUDY

The study's scope is divided in 3 deliverables. Offers shall include individual, independent offers for all 3 deliverables. If synergies apply, this shall be mentioned in the offer.

First deliverable:

The study shall in general terms describe what different possible model designs (technical setups) that could be used for a so-called countertrade/redispatch model.

The different designs shall be compared qualitatively in a general way. The study shall make rough approximations about expected differences with regards to social welfare, costs, feasibility market conformity and other relevant aspects.

Second deliverable:

The study shall investigate different scenarios where the availability of the DK1-DE border is increased, using increased countertrade and redispatch to keep the system in balance/within security standards.

The effects to overall welfare, producer surplus, consumer surplus, congestion income and countertrade volumes and costs, prices for up- and downward regulation, shall be made visible, compared to the situation today with heavy curtailments. The countertrade/redispatch model should be comparable to the model described in the IAEW study (2014).

In addition, the following sub-questions should be described in detail:

- The development in required up- and downward regulation in the different scenarios
- The development in cost of up- and downward regulation in the different scenarios
-The development in congestion rent should be described in detail in the different scenarios
-The development in the day-ahead price in DK and DE in the different scenarios
-The incurred costs to up-and downward regulation should be compared to congestion income on the German side and the price effects in Germany in the different scenarios

Scenarios:

Consultants shall analyze six scenarios with a fixed minimum NTC value on the DK1-DE border. The scenarios shall assume a minimum available capacity of respectively 200 MW, 400 MW, 600 MW, 800 MW, 1000 MW and 1200 MW.

For these calculations a base case shall be designed, that reflects the relevant European power production and grid situation today.

All calculations shall focus on welfare for Germany and Denmark as well as for Europe as a whole and its individual member states (as far as relevant).

Third deliverable (optional)

Consultants shall propose a method of evaluating the level of operational security for the different scenarios in deliverable #2. Operational security shall be understood as defined in regulation EC 714/2009 Annex 1.7 and the CACM guideline Article 2 (7).

The study shall analyze how increased NTC capacities influence operational security and shall be based on specific detailed knowledge on the German power grid as well as production and load location.

5 BUDGET

DERA has a budget of around 65.000€ (excl. VAT) for the study.

6 PLANNING

The overall duration of the study is expected to be finalized by the mid - September 2016. Preliminary results shall be available and presented after 8-12 weeks from the assignment.

DERA expects a startup meeting as wells as presentations of the preliminary and final results.

At least one of the meetings shall take place in Valby, Denmark, while the others could be arranged via video conference or at another location.

7 DELIVERABLES TO BE INCLUDED IN THE OFFER LETTER

All relevant material of the offer shall be provided in English. All material can be sent electronically.

Consultants shall present:

- Their ability to model the German and European power grid to the relevant degree, in order to identify and assess the need for countertrade or redispatch.
- Their ability to model market outcomes, i.e. the relevant elements to calculate the described welfare elements and the expected countertrade and redispatch costs.
- Their experience with modelling relevant elements that potentially feed into a countertrade model, for example bids in the German and Danish balancing markets (deliverable 1)
- Propose their basic approach to model and calculate deliverable 2.
- Propose a simple method to evaluate the level of operational security as described in deliverable 3 (optional).
- The offer shall present the consultants expertise with the required calculations
- The offer shall present the project team that will be designated to the study
- The offer shall break down costs for the different deliverables.

8 ANNOUNCEMENT

The tender is announced on the webpage udbud.dk

9 TIME SCHEDULE FOR SELECTION

Preliminary time schedule for the process:

Activity	Time
Online announcement	April 21st
Submission deadline	25 days from announcement (May 16th)
Possible clarifications	1 week after submission deadline (May 23rd)
Duration of tenders commitment	Minimum 30 days after submission date (June 15th)

Evaluation	3 weeks from submission deadline (June 6th)
Selection of bid and information to bidders	Right after the end of the evaluation period.

10 EVALUATION

DERA will evaluate the different offers based on criteria relating to both price and quality of the offer, choosing the economically most advantageous tender.

Economic criteria used:

- Price for deliverable 1
- Price for deliverable 2
- Price for deliverable 3 (optional)

Qualitative criteria used:

- Consultants ability to model the German and relevant European power grid in order to assess the need for countertrade or redispatch.
- Consultants ability to model market outcomes, i.e. the relevant elements to calculate the described welfare elements and the expected counter-trade and redispatch costs.
- Their experience with modelling relevant elements that potentially feed into a countertrade model, for example bids in the German and Danish balancing markets as required in deliverable 1
- Consultants approach to model and calculate social welfare, as required in deliverable 2
- Consultants approach to model and calculate operational security, as required in deliverable 3
- Consultants relevant experience and project team

For each criteria, offers can get a maximum score of 100 points and a minimum score of 50 points. Prices will be converted to points, in order to find the best overall offer, using a linear point model. For every deliverable the lowest price of all offers will be rewarded maximum points (100). We use a linear point model where the lowest price plus 50% will lead to 50 points.

Criteria are weighted differently. The different weights are given in Annex1 “Evaluation of offers”.

Offers including 2 deliverables will be compared to offers including 3 deliverables. Different weights for the deliverables apply for the 2 cases. See annex 1 for details.

11 CONTRACT

A draft contract will be sent to interested parties on request.

12 QUESTIONS

Questions with regards to the tender material or process can be posed to Markus Hübner (marh@energitilsynet.dk); phone: +45 41715378 and Kimmie Byriel Laage-Petersen (kblp@energitilsynet.dk); phone: +45 4171 5377