

# Nordic System Operation Agreement (SOA) – Annex Load-Frequency Control & Reserves (LFCR)

## Appendix 2B:

Assessment of arrangements for sharing of mFRR capacity between bidding zones DK1 (Western Denmark) and DK2 (Eastern Denmark)

**FINGRID**

**ENERGINET**

 SVENSKA  
KRAFTNÄT

**Statnett**

**kraftnät**  
åland

| Approval date | Entry into force | Revision        |
|---------------|------------------|-----------------|
| 12/05/2020    | 12/05/2020       | Initial version |
|               |                  |                 |

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### 1 Introduction

This document is an appendix to the Annex Load-Frequency Control & Reserves (hereafter referred to as LFCR Annex) to the Nordic System Operation Agreement (hereafter referred to as "Nordic SOA"). This appendix includes the assessment of arrangements for *sharing of mFRR capacity between bidding zones DK1 (Western Denmark) and DK2 (Eastern Denmark) on the Great Belt HVDC interconnector*. The assessment in chapter 2 of this appendix has been approved by RGN on 12 May 2020.

## 2 Assessment

### **Regional Group Nordic**

**Assessment of arrangements for exchange and sharing of FRR capacity between synchronous systems.**

**Arrangement for sharing of mFRR between DK1 and DK2 on Great Belt interconnection.**

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Date: 22<sup>nd</sup> April 2020

Responsible for assessment: Klaus Winther

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# General

## 1. Basic information and a short description of the exchange/sharing arrangement

|   |   |                                  |
|---|---|----------------------------------|
| Exchange  | Sharing<br><br><b>X</b>   | Volume MW<br><br><b>+ 300 MW</b> |
| Nominal size of interconnector<br><br>Great Belt, ± 600 MW  | Specific conditions regarding flow control<br><br>Cannot be regulated continuously in the interval<br><br>- 30 MW < P < 30 MW |                                  |
| <p>Describe the conditions agreed for capacity exchange/sharing</p> <p>Energinet is sharing + 300 MW of mFRR between DK1 and DK2.</p> <p>The amount of mFRR purchased in DK1 is reduced with 300 MW.</p> <p>In case of a fault in DK1 (Reference Incident is 700 MW), resources are in normal situations covered by 300 MW mFRR capacity purchased in DK1 and utilisation of voluntary bids in the regulating power market in addition to 90 MW aFRR in a capacity market.</p> <p>In very rare situations, the need for mFRR can be complemented by additional mFRR purchased in DK2 over the Great Belt interconnector or, as a last option, remedial actions will take place in DK1.</p> <p>The flow direction on the interconnector is normally from west to east (DK1 to DK2). The free capacity is defined on a day to day basis. If reduced capacity or flow in opposite direction, additional mFRR reserves are purchased in DK1.</p> <p>In case of fault in DK2 (Reference incident is 600 MW), resources are covered by 428 MW mFRR capacity purchased in DK2 and 200 MW capacity purchased in DK2 with a longer activation time than 15 minutes, a sharing agreement with SVK of 300 MW mFRR and additional voluntary bids in the regulating power market. The bid margin in the regulating power market in DK2 (contracted capacity and voluntary bids) are normally (1% fractal) more than 600 MW after activation of bids for balancing, which implies that reserves with longer activation times than 15 minutes (200 MW) together with the sharing agreement with SVK of 300 MW mFRR not will be required.</p> <p>In case of simultaneously incidents in both synchronous areas, DK1 and DK2 at the same time and in case of that fully 300 MW mFRR already has been activated in DK2 and “transferred” to DK1, the reference incidents in DK2 (600 MW) is still covered by mFRR in DK2, however some of the reserves have longer activation time than standard mFRR (15 minutes), therefore it is possibly that part of the sharing agreement of 300 MW mFRR between DK2 and SVK will become effective for a shorter period, this in form of a telephone call between Energinet and Svk in cooperation with Statnett.</p> |   |                                  |

Describe the operational procedures for energy activation including information exchange

Control centre staff of Statnett, in the role of LFC Block monitor, in cooperation with control centre staff of Svenska Kraftnät, to be informed by telephone calls

Standard procedure for activation of mFRR is used (Regulating power market). Reserves are accessible in NOIS.

# Sharing

## 2. Evaluation of how the arrangement complies with article 177 in SOGL for sharing

**Nordic synchronous area approved methodology to determine limits on the amount of exchange of FRR/RR between synchronous areas defined in accordance with Article 176(1)/178(1) and the methodology to determine limits on the amount of sharing of FRR/RR between synchronous areas defined in accordance with Article 177(1)/179(1)**

### **Article 4 – Limits for sharing of aFRR and mFRR**

1. The Nordic TSO involved in sharing of FRR is responsible for complying with Article 177 of the SO Regulation;
2. The TSO who intends to exercise the right to implement sharing of FRR with a TSO in another synchronous area shall make an assessment against article 177 and the criteria below. The TSO shall:
  - a. secure that dimensioning requirements in the Nordic LFC block are satisfied
    - i. Disturbances leading to activations of the shared reserves, shall be reported for common Nordic evaluations of Nordic consequences
    - ii. The shared volume may be counted for in the LFC block compliance monitoring for reserve availability as long as b), c), d) and e) below is fulfilled
  - b. secure that the needed availability of grid capacity between source and sink has a probability of at least 99%;
  - c. secure that the needed availability of FRR from the reserve instructing TSO in the other synchronous area has a probability of at least 99%;
  - d. secure that the reduction in positive FRR capacity for disturbances within the Nordic LFC block does not exceed 50% of the size of the positive reference incident in the relevant control area;
  - e. secure that the reduction in negative FRR capacity for disturbances within the Nordic LFC block does not exceed 50% of the size of the negative reference incident in the relevant control area.

**An assessment against SOGL article 177(1) of the operational impact between the synchronous areas, the stability of the FRP of the synchronous area, the maximum reduction of FRR that can be taken into account in the FRR dimensioning in accordance with Article 157 as a result of the FRR sharing, the ability of the synchronous area to comply with the frequency quality target parameters defined in accordance with Article 127 and the FRCE target parameters defined in accordance with Article 128 and the operational security.**

As the sharing agreement only come into force in very rare situations it is not supposed to have any impact on overall stability and frequency quality in the Nordic LFC block.

As for all incidents in the Nordic area, Svk as synchronous area monitor will report the incident and initiate an analyse if required.

**An assessment according to article 4.2(a) above against dimensioning requirements in the Nordic LFC block.**

As the sharing agreement only comes into force in very rare situations and because we do not dimension for N-2 faults and normally have free capacity on the Øresund connection the sharing agreement has no impact on the dimensioning requirements in the Nordic LFC block.

**An assessment according to article 4.2(b) above against requirements for availability of grid capacity.**

The grid capacity is evaluated on a day by day basis, if not 100 % capacity is available on the interconnector, additional procurement of mFRR will take place in DK1. DK2 will be secured by contracted mFRR reserves in DK2.

**An assessment according to article 4.2(c) above for availability of FRR from the reserve instructing TSO**

The availability of FRR from the reserve instructing TSO is secured by using the Nordic regulating power market for activation (NOIS).

**An assessment according to 4.2(d) above for max reduction in positive FRR capacity for disturbances secured for the relevant control area**

The Sharing agreement secure that not more than 50 % of mFRR requirement is shared, defined in article 4 – Limits for sharing of aFRR and mFRR

**An assessment according to 4.2(e) above for max reduction in negative FRR capacity for disturbances secured for the relevant control area**

The Sharing agreement secure that not more than 50 % of mFRR requirement is shared, defined in article 4 – Limits for sharing of aFRR and mFRR

**Comments from NOD on assessment:**

NOD has no specific remarks to this assessment. NOD considers that availability of mFRR and aFRR resources from DK1 and specifications for provision over Great Belt are similar to service provision from inside of the Nordic LFC block.

SOGL has a restriction for reduction of the positive and negative reserve capacity in the LFC block of less than 30%, but this is currently not a realistic concern in the Nordic LFC block. If this should change, the TSOs will have to agree about some arrangement for distribution of reserve reduction in case of sharing with other synchronous systems.

Any changes to the arrangements, described in this assessment, shall be presented to NOD in due time before implementation for common Nordic evaluation.

**Copy of decisions in RGN meeting (from MoM):**

RGN approved NOD proposal on the assessment of arrangement for sharing of mFRR between DK1 and DK2 on Great Belt interconnection.

**Date of approval of assessments in RGN:**

12<sup>th</sup> May 2020