Explanatory document for the Nordic synchronous area Proposal for the 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) of the Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation

1. Introduction

The Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation (hereinafter **"SO Regulation"**) sets out rules on relevant subjects that should be coordinated between Transmission System Operators, as well as between TSOs and Distribution System Operators and with significant grid users, where applicable. The goal of SO Regulation is to ensure provision of an efficient functioning of the interconnected transmission systems to support all market activities. In order to deliver these objectives, a number of steps are required.

One of these steps is to determine the limits for the exchange of FRR between synchronous area. Pursuant to Article 118(1)(z) of the SO Regulation, all Transmission System Operators in the Nordic Synchronous Area shall jointly develop common proposals for the methodology to determine limits on the amount of exchange of FRR between synchronous areas defined in accordance with Article 176(1) and the methodology to determine limits on the amount of sharing of FRR between synchronous areas defined in accordance with Article 177(1). Furthermore, Pursuant to Article 118(1)(aa) of the SO Regulation, all Transmission System Operators in the Nordic Synchronous Area shall jointly develop common proposals for: […] the methodology to determine limits on the amount of exchange of RR between synchronous areas defined in accordance with Article 178(1) and the methodology to determine limits on the amount of sharing of RR between synchronous areas defined in accordance with Article 179(1)".

According to Articles 6(3)(d)(ix) and 6(3)(d)(x) of the SO Regulation the proposals for limits on the amounts of exchange/sharing of FRR/RR between synchronous areas in accordance with Articles 176(1), 177(1), 178(1) and 179(1) (hereafter referred to as "**Proposal**") shall be submitted for approval by the relevant national regulatory authorities (hereinafter "NRAs") no later than 14 September, 2018. The Proposal is submitted for regulatory approval to all NRAs in the Nordic synchronous area. According to Article 6(6) of the SO Regulation the Proposal needs to be submitted to ACER as well, who may issue an opinion on the Proposal if requested by the NRAs.

This document contains an explanation of the Proposal from all TSOs of the Nordic synchronous area (hereinafter **"TSOs"**). It is structured as follows. The legal requirements for the Proposal and the interpretation of the scope are presented in Chapter 2. Chapter 3 describes the objective of the limits on the amount of exchange/sharing of FRR/RR between synchronous areas. Chapter 4 provides an overview of the existing situation. The proposed limits are described in Chapter 5. Chapter 6 provides an outlook and chapter 7 describes the expected impact on the relevant objectives of the SO Regulation. Finally, Chapter 8 provides the timeline for implementation and Chapter 9 describes the public consultation.

2. Legal requirements and interpretation

2.1 Legal references and requirements

Several articles in the SO Regulation set out requirements which the Proposal must take into account. These are cited below.

(1) Article 118(1)(z), 118(1)(aa) and (2) of the SO Regulation constitutes the legal basis that the Proposal should take into account. Article 118 has the following content:

> *"1. By 12 months after entry into force of this Regulation, all TSOs of each synchronous area shall jointly develop common proposals for:[…]*
>
> *(z) the methodology to determine limits on the amount of exchange of FRR between synchronous areas defined in accordance with Article 176(1) and the methodology to determine limits on the amount of sharing of FRR between synchronous areas defined in accordance with Article 177(1); and*
>
> *(aa) the methodology to determine limits on the amount of exchange of RR between synchronous areas defined in accordance with Article 178(1) and the methodology to determine limits on the*

amount of sharing of RR between synchronous areas defined in accordance with Article 179(1).; […]

2. All TSOs of each synchronous area shall submit the methodologies and conditions listed in Article 6(3)(d) for approval by all the regulatory authorities of the concerned synchronous area. Within 1 month after the approval of these methodologies and conditions, all TSOs of each synchronous area shall conclude a synchronous area operational agreement which shall enter into force within 3 months after the approval of the methodologies and conditions."

(2) Article 176(1) of the SO Regulation has the following content:

"1. All TSOs of each synchronous area shall specify in the synchronous area operational agreement a method to determine the limits for the exchange of FRR with other synchronous areas. That method shall take into account:
(a) the operational impact between the synchronous areas;
(b) the stability of the FRP of the synchronous area;
(c) the ability of TSOs 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
(d) the operational security."

(3) Article 177(1) of the SO Regulation has the following content:

" 1. All TSOs of each synchronous area shall specify in the synchronous area operational agreement a methodology to determine limits for the sharing of FRR with other synchronous areas. That methodology shall take into account:
(a) the operational impact between the synchronous areas;
(b) the stability of the FRP of the synchronous area;
(c) 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;
(d) 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
(e) the operational security."

(4) Article 178(1) of the SO Regulation has the following content:

"1. All TSOs of each synchronous area shall define in the synchronous area operational agreement a method to determine limits for the exchange of RR with other synchronous areas. That method shall take into account:
(a) the operational impact between the synchronous areas;
(b) the stability of the RRP of the synchronous area;
(c) 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
(d) the operational security."

(5) Article 179(1) of the SO Regulation has the following content:

"1. All TSOs of each synchronous area shall define in the synchronous area operational agreement a method for determining the limits for sharing of RR with other synchronous areas. That method shall take into account:
(a) the operational impact between the synchronous areas;
(b) the stability of the RRP of the synchronous area;
(c) the maximum reduction of RR that can be taken into account in the RR dimensioning rules in accordance with Article 160 as a result of the RR sharing;
(d) the ability of the TSOs of the synchronous area to comply with the frequency quality target parameters defined in accordance with Article 127 and the ability of the LFC blocks to comply with the FRCE error target parameters defined in accordance with Article 128; and
(e) the operational security.

(6) Article 6(3)(d)(ix) and 6(3)(d)(x) of the SO Regulation states:

"The proposals for the following terms and conditions or methodologies shall be subject to approval by all regulatory authorities of the concerned region, on which a Member State may provide an opinion to the concerned regulatory authority: […]
(d) methodologies, conditions and values included in the synchronous area operational agreements in Article 118 concerning: [...]
(ix) limits on the amount of exchange of FRR between synchronous areas defined in accordance with Article 176(1) and limits on the amount of sharing of FRR between synchronous areas defined in accordance with Article 177(1);
(x) limits on the amount of exchange of RR between synchronous areas defined in accordance with Article 178(1) and limits on the amount of sharing of RR between synchronous areas defined in accordance with Article 179(1);

2.2 Interpretation and scope of the Proposal

The Nordic TSOs apply two types of Frequency Restoration Reserves (FRR), manual FRR (mFRR) and automatic FRR (aFRR). This proposal applies to both mFRR and aFRR. The TSOs currently do not apply Replacement Reserves (RR). Consequently, this proposal does not include limits on the amount of exchange and sharing of RR between synchronous areas.

The dimensioning rules for FRR in accordance with Article 157 of the SO Regulation result in the required FRR capacity to be guaranteed by each TSO. Part of this FRR capacity requirement can be fulfilled by exchanging or sharing FRR with other synchronous systems. The limits on the amount of this exchange and sharing are the scope of this Proposal.

3. Objective of limits for the exchange and sharing of FRR

FRR exchange and sharing contributes to the efficient operation of the electricity system by allocating FRR more efficiently. However, in order to maintain operational security, FRR exchange and sharing cannot be done unlimitly. The objective of the limits on the amount of exchange and sharing of FRR is to guarantee that operational security is maintained.

4. The existing situation

Currently, the Nordic FRR requirements are specified per control area, and each TSO has the obligation to meet their required amount of FRR (in accordance with article 157 of the SO Regulation). For fulfilling part

of their obligation each TSO may exchange or share FRR capacity with one or more TSOs in one or more other synchronous area(s). Since situations may be different for the different HVDC interconnectors, the TSOs do not apply generic rules on limits of the amount of FRR that can be exchanged or shared with TSOs in other synchronous area. The Nordic TSO involved in the exchange or sharing is responsible for assessing and monitoring the impact of the exchange and/or sharing on the available FRR in its own area and the possible impact on other control areas in the synchronous area. Currently the following exchange and sharing arrangements with other synchronous areas exist as shown in Table 1.

Table 1: Existing FRR exchange and sharing arrangements with other synchronous areas (Arrows illustrate the direction of the exchanges).

Involved control areas	Exchange/sharing of	Volumes
Finland ↔ Estonia	mFRR exchange	no limits specified
Finland – Estonia	mFRR sharing	140MW
Finland ← Estonia	aFRR exchange	35 MW
West Denmark – East Denmark[1]	mFRR sharing	300MW
Norway → West Denmark	aFRR exchange	100MW
West Denmark → East Denmark	aFRR exchange	12MW

5. Proposal for limits for the exchange of FRR/RR

The TSOs currently do not apply Replacement Reserves (RR). For this reason, this proposal only specifies rules for exchange of FRR.

The Nordic TSOs are responsible for fulfilling the FRR capacity requirements for their own control area. For fulfilling their obligation each TSO may exchange or share FRR capacity with one or more TSOs in one or more other synchronous area(s). Exchange or sharing shall be physically possible through one or more direct HVDC interconnectors connected to this TSO's control area. Article 157(2)(j and k) of the SO Regulation set limitations to the sharing of aFRR and mFRR which the reserve receiving TSO shall take into account when entering a FRR sharing agreement. The Nordic TSO involved in the exchange or sharing is responsible for assessing and monitoring the impact of the exchange and/or sharing, taking into account the topics listed under paragraph 1(a) to (d) of article 176 or paragraph 1(a) to (e) of Article 177 of the SO Regulation. The FRR exchange/sharing with other synchronous areas shall be approved by all (Nordic) TSOs, which shall not be unreasonably withheld or delayed.

5.1 Summary

The arguments above result in the limits for the exchange of FRR as included in Article 3 and Article 4 of the Proposal:

Article 3 – Limits for the exchange of aFRR and mFRR

1. The Nordic TSO involved in exchange of FRR is responsible for complying with article 176 of the SO Regulation;
2. The FRR exchange arrangements with other synchronous areas shall be agreed by all Nordic TSOs based on a proposal of the exchanging TSO, which shall not be unreasonably withheld or delayed.

[1] Another sharing agreement exist between Sweden (bidding zone SE4) and Denmark East.

Article 4 – Limits for sharing of aFRR and mFRR

1. When entering FRR sharing agreements, the TSO shall take into account the limitations set in Article 157(2)(j and k) of the SO Regulation on the sharing of aFRR and mFRR;
2. The Nordic TSO involved in sharing of FRR is responsible for complying with Article 177 of the SO Regulation;
3. The FRR sharing arrangements with other synchronous areas shall be agreed by all Nordic TSOs based on a proposal of the sharing TSO, which shall not be unreasonably withheld or delayed.

6. Outlook

The Nordic TSOs are planning to increase sharing and exchanging FRR between control areas within the Nordic synchronous area. Consequently, the dependency on each other will increase. This may have impact on sharing of FRR between synchronous areas, which will be clarified in the Nordic Balancing Model development process.

7. Expected impact of the Proposal on the relevant objectives of the SO Regulation

The Proposal generally contributes to and does not in any way hamper the achievement of the objectives of Article 4 of the SO Regulation. In particular, the Proposal serves the objectives to:

- Article 4(1)(d) ensuring the conditions for maintaining operational security throughout the Union; and
- Article 4(1)(h) contributing to the efficient operation and development of the electricity transmission system sand electricity sector in the Union.

Where the objective of maintaining operational security (article 4(1)(d)) may require stricter limits, operational efficiency may increase with limits that are less strict. The Proposal balances the objectives of ensuring the conditions for maintaining operational security and efficient operation of the electricity system.

8. Timescale for the implementation

The proposed limits for the exchange and sharing of FRR are similar to the rules that are currently applied in the Nordic synchronous area. Therefore, the TSOs shall implement the Proposal not later than when Nordic synchronous area operational agreement enters into force in accordance with Article 118 of the SO Regulation.

9. Public consultation

Article 11 of the SO Regulation states that: *"TSOs responsible for submitting proposals for terms and conditions or methodologies or their amendments in accordance with this Regulation shall consult stakeholders, including the relevant authorities of each Member State, on the draft proposals for terms and conditions or methodologies listed in Article 6(2) and (3). The consultation shall last for a period of not less than one month."*

This Proposal will be consulted in the period 1 July to 15 August 2018.