
**Nordic synchronous area proposal for additional properties of FCR
in accordance with Article 154(2) of the Commission Regulation (EU)
2017/1485 of 2 August 2017 establishing a guideline on electricity
transmission system operation**

15 March 2018

DISCLAIMER

This document is released on behalf of all TSOs of Nordic synchronous area only for the purposes of the public consultation on additional properties of FCR in accordance with Article 154(2) of the Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation. This version of the proposal for the additional properties of FCR does not in any case represent a firm, binding or definitive TSOs' position on the content.

All TSOs of the Nordic synchronous area, taking into account the following:

Whereas

- (1) This document is the common proposal developed by all Transmission System Operators within the Nordic synchronous area (hereafter referred to as “TSOs”) for additional properties of FCR in accordance with Article 154(2) of Commission Regulation (EU) 2017/1485 establishing a guideline on electricity transmission system operation (hereafter referred to as “SO Regulation”). This proposal is hereafter referred to as “Proposal”.
- (2) The Proposal takes into account the general principles and goals set in the SO Regulation as well as Regulation (EC) No 714/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross border exchanges in electricity (hereafter referred to as “Regulation (EC) No 714/2009”). The goal of the SO Regulation/Regulation (EC) No 714/2009 is the safeguarding of operational security, frequency quality and the efficient use of the interconnected system and resources. Article 118(1)(b) of the SO Regulation sets for this purpose requirements for the TSOs to “jointly develop common proposals for: [...] additional properties of FCR in accordance with Article 154(2);”
- (3) Article 154(1) of the SO Regulation refers to Annex V of the SO Regulation for the properties/minimum technical requirements for FCR that shall be ensured by each reserve connecting TSO. Annex V of the SO Regulation defines the minimum technical requirements for FCR for the Nordic synchronous area:

<i>Minimum accuracy of frequency measurement</i>	<i>10 mHz or the better industrial standard if better</i>
<i>Maximum combined effect of inherent frequency response insensitivity and possible intentional frequency response dead band of the governor of the FCR providing units or FCR providing groups</i>	<i>10 mHz</i>
<i>FCR full activation time</i>	<i>30 s if system frequency is outside standard frequency range</i>
<i>FCR full activation frequency deviation</i>	<i>± 500 mHz</i>

- (4) On top of the minimum technical requirements specified in Annex V of the SO Regulation, Article 154(2) of the SO Regulation gives the TSOs “the right to specify, in the synchronous area operational agreement, common additional properties of the FCR required to ensure operational security in the synchronous area”. Article 154(2) of the SO Regulation further describes that this shall be done “by means of a set of technical parameters and within the ranges in Article 15(2)(d) of Regulation (EU) 2016/631 and Articles 27 and 28 of Regulation (EU) 2016/1388. Those common additional properties of FCR shall take into account the installed capacity, structure and pattern of consumption and generation of the synchronous area. The TSOs shall apply a transitional period for the introduction of additional properties, defined in consultation with the affected FCR providers.” This Proposal covers additional properties of FCR for the Nordic synchronous area (only) and shall be applied by the Nordic TSOs (only).
- (5) Article 15(2)(d) of Regulation (EU) 2016/631 (“network code on requirements for grid connection of generators”) provides a number of requirements (ranges) that shall be met by Type C and Type D power-generating modules “when frequency sensitive mode (‘FSM’) is operating”.

These include ranges of the “*Active power range related to maximum capacity*”, “*Frequency response insensitivity*”, “*Frequency response deadband*”, “*Droop*”, “*Active power frequency response capability*”, “*initial activation of active power frequency response*” and the requirement that “(v) *the power-generating module shall be capable of providing full active power frequency response for a period of between 15 and 30 minutes as specified by the relevant TSO.*”. Furthermore, “(vi) *within the time limits laid down in point (v) of paragraph 2(d), active power control must not have any adverse impact on the active power frequency response of power-generating modules;*”.

- (6) Articles 27 and 28 of Regulation (EU) 2016/1388 (“*network code on demand connection*”) describes requirements for demand units to provide demand response services to system operators, including “*autonomously controlled demand response system frequency control*”. More specifically, Article 28 of Regulation (EU) 2016/1388 stipulates the “*specific provisions for demand units with demand response active power control, reactive power control and transmission constraint management*”. These provisions relate to operating capability across frequency ranges and voltage ranges, requirements related to receiving and executing instructions, controlling and adjusting power consumption, and requirements for maintaining the modification to power consumption.
- (7) The Nordic Frequency Containment Process (FCP) currently applies two types of Frequency Containment Reserves (FCR). FCR for normal operation (FCR-N) is used for continuous imbalances to keep the frequency within the $\pm 100\text{mHz}$ range. In conjunction with a rapid frequency change to 49.9/50.1 Hz, FCR-N shall be up regulated/down regulated within 2-3 minutes. FCR for disturbance situations (FCR-D) is only used in upward direction (upward FCR-D). The purpose of upward FCR-D is to mitigate the impact of incidental disturbances once the frequency is below 49.90Hz. Upward FCR-D shall be fully activated if the frequency stabilises at 49.50Hz. In the event of a frequency drop to 49.5 Hz caused by a momentary loss, FCR-D shall be fully activated within 30 seconds. It has to be noted that the *FCR full activation frequency deviation* of $\pm 500\text{mHz}$ and *FCR full activation time* of 30s that are specified in Annex V of the SO Regulation only apply to FCR-D. Consequently, the TSOs specify the required FCR-N response as additional properties in this Proposal. The other two requirements in Annex V of the SO Regulation apply to both FCR-N and FCR-D.
- (8) In regard to regulatory approval, Article 6(3) 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:*
(iii) *additional properties of FCR in accordance with Article 154(2);*
- (9) According to Article 6(6) of the SO Regulation the expected impact of the Proposal on the objectives of the SO Regulation has to be described and is presented below.
- (10) 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 (1)(c) determining common load-frequency control processes and control structures, (1)(d) ensuring the conditions for maintaining operational security throughout the Union, (1)(e) ensuring the conditions for maintaining a frequency quality level of all synchronous areas throughout the Union and (1)(h) contributing to the efficient operation and development of the electricity

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transmission system and electricity sector in the Union. The Proposal contributes to these objectives by specifying the additional rules for FCR-N and upward FCR-D, which are key reserves that are used in the common Nordic load-frequency control processes. The additional properties are required to maintain the operational security by reducing the risk for automatic Under Frequency Load Shedding (UFLS) and for system blackouts due to under or over frequency. The additional properties balance the impact of both cost for FCR and outage risk and therefore ensure efficient operation of the electricity transmission system.

- (11) The TSOs together operate the Nordic synchronous system. Consequently, the TSOs and all the power consumers, generators, balance service providers and networks directly or indirectly connected to the TSOs' networks, influence the frequency quality level and experience the same frequency level. FCR-N and FCR-D will only be effective if all providers will provide the contracted amounts in accordance with their specifications.
- (12) In conclusion, the Proposal contributes to the general objectives of the SO Regulation to the benefit of all market participants and electricity end consumers.

SUBMIT THE FOLLOWING PROPOSAL TO ALL REGULATORY AUTHORITIES OF THE NORDIC SYNCHRONOUS AREA:

Article 1 - Subject matter and scope

1. The additional properties for FCR described in this Proposal are the common proposal of TSOs in accordance with article 154(2) of the SO Regulation. The Proposal applies solely to the Nordic synchronous area.
2. This Proposal is subject to approval in accordance with Article 6(3) of the SO Regulation.

Article 2 - Definitions and interpretation

1. For the purposes of the Proposal, the terms used shall have the meaning of the definitions included in Article 3 of the SO Regulation.
2. In this Proposal, unless the context requires otherwise:
 - a) the singular indicates the plural and vice versa;
 - b) the headings are inserted for convenience only and do not affect the interpretation of the Proposal; and
 - c) any reference to legislation, regulations, directives, orders, instruments, codes or any other enactment shall include any modification, extension or re-enactment of it when in force.

Article 3 – FCR-N additional properties

1. FCR-N shall be fully activated at $f = 49.9/50.1\text{Hz}$ ($\Delta f = \pm 0.1\text{Hz}$). FCR full activation frequency deviation for FCR-N is $\pm 100\text{mHz}$.
2. In conjunction with a rapid system frequency change to 49.9/50.1 Hz, FCR-N shall be up regulated/ down regulated within 3 minutes.

Article 4 – Upward FCR-D additional properties

1. Upward FCR-D shall be activated at 49.9 Hz and shall be fully activated at 49.5 Hz. It shall increase virtually linearly within a system frequency range of 49.9-49.5 Hz.
2. In the event of a system frequency drop to 49.5 Hz:
 - 50 % of the upward FCR-D shall be regulated upwards within 5 seconds;
 - 100 % of the upward FCR-D shall be regulated upwards within 30 seconds.
3. Agreed automatic load reduction in the event of frequency drops to 49.5 Hz can be counted as part of the upward FCR-D reserve. However: Load reduction can only be used as upward FCR-D in the frequency range of 49.9 Hz to 49.5 Hz, when load reduction meets the same technical requirements set under item 1 of this article.

Article 5 – Publication and implementation

1. The relevant TSOs shall publish (in accordance with Article 8 of the SO Regulation) the Proposal without undue delay after the competent NRAs have approved the Proposal or a decision has been taken by the Agency for the Cooperation of Energy Regulators in accordance with Article 6 of the SO Regulation.
2. 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.

Article 6 - Language

The reference language for this Proposal shall be English. For the avoidance of doubt, where TSOs needs to translate this Proposal into national language(s), in the event of inconsistencies between the English version published by TSOs in Nordic Synchronous Area in accordance with Article 8(1) of the SO Regulation and any version in another language the relevant TSOs shall, in accordance with national legislation, provide the relevant national regulatory authority with an updated translation of the Proposal.