
**Amended Nordic LFC block methodology for ramping restrictions
for active power output in accordance with Article 137(3) and (4) of
the Commission Regulation (EU) 2017/1485 of 2 August 2017
establishing a guideline on electricity transmission system operation**

2 December 2021

All TSOs of the Nordic LFC block, taking into account the following:

Whereas

- (1) This document is the common methodology developed by all Transmission System Operators within the Nordic LFC block (hereafter referred to as “TSOs”) for ramping restrictions for active power output in accordance with Article 137(3) and (4) of Commission Regulation (EU) 2017/1485 establishing a guideline on electricity transmission system operation (hereafter referred to as “**SO Regulation**”). This methodology is hereafter referred to as “**Methodology**”. The Methodology is an amended version of the methodology ‘*Amended Nordic synchronous area proposal for ramping restrictions for active power output in accordance with Article 137(3) and (4) of the Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation*’ of 22 October 2020 that was approved by the NRAs in November 2020. The TSOs sent a proposal for amendment of the methodology, dated 8 April 2021. This document also implements the Request for Amendment by All Regulatory Authorities in the Nordic LFC block, dated 1 October 2021.
- (2) The Methodology takes into account the general principles and goals set in SO Regulation as well as Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on conditions for access to the network for cross-bidding-zone border exchanges in electricity (hereafter referred to as “Regulation (EU) 2019/943”). The goal of the SO Regulation/Regulation (EU) 2019/943 is the safeguarding of operational security, frequency quality and the efficient use of the interconnected system and resources. Article 119(1)(c) of the SO Regulation sets for this purpose requirements for the TSOs to “*jointly develop common proposals for: [...] ramping restrictions for active power output in accordance with Article 137(3) and (4);*”
- (3) Article 137(3) and (4) of the SO Regulation define the scope of this Methodology. Article 137(3) states that “*All connecting TSOs of an HVDC interconnector shall have the right to determine [...] common restrictions for the active power output of that HVDC interconnector to limit its influence on the fulfilment of the FRCE target parameter of the connected LFC blocks [...]*”. The TSOs will make use of this right. Article 137(4) states that “*All TSOs of an LFC block shall have the right to determine in the LFC block operational agreement the [...] measures*” related to “*power generating modules and/or demand units [...]*”. The TSOs will also make use of this right.
- (4) The existing ramping restrictions for HVDC interconnectors and production and the existing possibilities for the TSOs to coordinate ramping between production plans limit FRCE and frequency deviations in such a way that the current target on frequency quality will be fulfilled. Consequently, the TSOs conclude that it is required to keep ramping restrictions and coordination possibilities.
- (5) Similar to the requirement for the existing HVDC interconnectors, the ramping restrictions shall also apply to new interconnectors. The Methodology therefore enlarges the applicability of Article 3 with the new HVDC interconnector North Sea Link between Norway and Great Britain (NO2-GB). This interconnector entered Trial Operation on 1 October 2021. Furthermore, the Methodology adds the Kriegers-Flak cable to the interconnection between Eastern Denmark (DK2) and Germany.

- (6) The TSOs have studied different measures to reduce the total ramping on all HVDC interconnectors to the Nordic LFC block or to a single bidding zone or several bidding zones. The TSOs concluded that ramping restrictions on HVDC interconnectors in itself are an efficient measure from a socioeconomic welfare perspective. The studies also confirm that a more flexible allocation of the ramping restrictions by using combined restrictions could even increase the efficiency. In response to the public consultation of previous ramping restriction proposal, many stakeholders suggested the implementation of combined ramping restrictions instead of the individual ramping restrictions. This will be investigated further towards new restrictions after mACE and 15 minutes Imbalance Settlement Period.
- (7) 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: [...]
(e) methodologies and conditions included in the LFC block operational agreements in Article 119, concerning: [...]
(i) ramping restrictions for active power output in accordance with Article 137(3) and (4);”
- (8) According to Article 6(6) of the SO Regulation the expected impact of the Methodology on the objectives of the SO Regulation has to be described and is presented below.
- (9) The Methodology 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 Methodology contributes to these objectives by specifying ramping restrictions for HVDC interconnectors and production plans. These ramping restrictions are required to maintain the operational security by reducing the risk for automatic Low Frequency Demand Disconnection (LFDD) and for system blackouts due to under or over frequency. Furthermore, the ramping restrictions are required to maintain the frequency quality level of the synchronous areas involved.
- (10) In conclusion, the Methodology contributes to the general objectives of the SO Regulation to the benefit of all market participants and electricity end consumers.

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SUBMIT THE FOLLOWING AMENDED METHODOLOGY TO ALL REGULATORY AUTHORITIES OF THE NORDIC LFC BLOCK:

Article 1 - Subject matter and scope

1. The ramping restrictions described in this Methodology are the common methodology of TSOs in accordance with article 137(3) and (4) of the SO Regulation. The Methodology applies solely to the Nordic LFC block.

The Nordic LFC block covers transmission systems of East-Denmark (DK2), Finland, Sweden and Norway.

This Methodology has been developed by Energinet, Fingrid Oyj, Kraftnät Åland AB, Svenska kraftnät and Statnett SF.

2. This Methodology is subject to approval in accordance with Article 6(3) of the SO Regulation.

Article 2 - Definitions and interpretation

1. For the purposes of this Methodology, the terms used shall have the meaning of the definitions included in Article 3 of the SO Regulation and in Article 2 of Commission Regulation (EU) 2017/2195.
2. For the purpose of this Methodology, a HVDC interconnector means one or more HVDC cables between a bidding zone in the Nordic LFC block and a bidding zone in another LFC block.
3. In this Methodology, 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 Methodology; 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 – Ramping restrictions for the active power output of HVDC interconnectors

In order to fulfil the FRCE target parameters for the LFC block as referred to in article 128 of the SO Regulation, the following ramping restrictions apply:

1. For the NorNed, Estlink 1, Estlink 2, Vyborg, Konti-Skan, Kontek/Kriegers-Flak, Great Belt, Baltic Cable, NordBalt, NordLink, North Sea Link, SwePol Link and Skagerrak HVDC interconnectors the maximum gradient for change in flow is 30 MW/min;
2. The changes to the trading plans from one hour to the next in the energy market shall be not more than 600 MW on each of the following HVDC interconnectors: NorNed, Estlink, Vyborg, Kontek/Kriegers-Flak, Great Belt, Baltic Cable, NordBalt, NordLink, North Sea Link, SwePol Link, Skagerrak and Konti-Skan;
3. The changes to the trading plans from one hour to the next in the energy market shall be not more than 1200 MW for the sum of the NordLink, NorNed and Skagerrak HVDC interconnectors;

4. The TSOs may increase the maximum gradient for change in flow from 30 MW/minute in Article 3(1) and the limit of 600 MW for the changes of the trading plans from one hour to the next in the energy market in Article 3(2) for the NordLink, NorNed and Skagerrak HVDC interconnectors if the following conditions apply:
 - a) The combined ramping restriction in Article 3(3) has been implemented and covers the concerned HVDC interconnector;
 - b) The maximum gradient for change in flow and ramping period of the HVDC interconnector can be physically and operationally adapted to facilitate this change;
 - c) The change does not cause local network security problems;
 - d) The TSO connecting the other end of the HVDC interconnectors approves the change.
5. The TSOs shall follow the process below when increasing the limit for changes to the trading plans from one hour to the next in the energy market specified in Article 3(4):
 - a) The TSO confirms with the TSO on the other end of the HVDC interconnectors that all conditions in Article 3(4) have been fulfilled;
 - b) The TSO issues a market message at least one month before the change;
 - c) In coordination with the TSO on the other side of the HVDC interconnector, NEMOs and other relevant parties, the ramping restriction are changed in the Day-Ahead market systems, Intraday market systems and internal TSO systems.
6. If one of the TSOs mentioned in Article 3(4) considers that the limit for changes to the trading plans from one hour to the next in the energy market shall be reduced after they have been increased in accordance with Article 3(4), the TSOs shall follow the process below:
 - a) The TSOs connecting the HVDC interconnectors agree on a new restrictions. It is noted that the Nordic TSOs shall not apply tighter restrictions than indicated in Article 3(1) and Article 3(2);
 - b) The TSO issues a market message at least one month before the change;
 - c) In coordination with the TSO on the other side of the HVDC interconnector, NEMOs and other relevant parties, the ramping restriction are changed in the Day-Ahead market systems, Intraday market systems and internal TSO systems.
7. In accordance with Article 137(3) of the SO Regulation, the restrictions in this article shall not apply for imbalance netting, frequency coupling as well as cross-border activation of FRR and RR over HVDC interconnectors. .

Article 4 – measures to support the fulfilment of the FRCE target parameter of the LFC block and to alleviate deterministic frequency deviations, taking into account the technological restrictions of power generating modules and demand units

In order to fulfil the FRCE target parameters for the LFC block as referred to in article 128 of the SO Regulation, the following ramping restrictions apply:

1. When the hourly production plan of balance responsible parties representing power generating modules in Finland, Norway and Sweden changes more than 200 MW at hour shift, these balance responsible parties need to reschedule their plan with quarterly steps 15 minutes before hour shift, at hour shift and 15 minutes after hour shift in order to adjust the plans to better correspond to the consumption pattern. In Norway, the steps can be applied 30 minutes before the hour shift until 30 minutes after the hour shift. This obligation is not relevant in Denmark East due to the physical characteristics for production;
2. In case that planned production changes and planned HVDC exchanges around hour shift will impact the frequency in a way that cannot be entirely handled by control centres in the minutes before and after operating hour, the TSOs are allowed to request balance responsible parties that represent power generating modules to advance or delay parts of planned production steps at the hour shift. The power schedules may be changed from 30 minutes before hour shift till 30 minutes after the hour shift.

Article 5 – Publication and implementation

1. The relevant TSOs shall publish (in accordance with Article 8 of the SO Regulation) the Methodology without undue delay after the competent NRAs have approved the Methodology 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. Article 3 has been amended with respect to adding North Sea Link and Kriegers-Flak in Article 3(1) and 3(2) and including Article 3(3), 3(4), 3(5) and 3(6). Furthermore, the combined restriction for the interconnectors Konti-Skan and Skagerrak has been removed from the methodology. The full implementation will take place without undue delay as soon as the required update of the XBID system is completed, which is expected by the 2nd half of 2022. Without undue delay after the NRA approval, the TSOs will fully implement Article 3(1), 3(5) and 3(6) and partly implement Article 3(2), 3(3) and 3(4) by replacing the existing combined restriction on Skagerrak and Konti-Skan by a temporary combined restriction of 900 MW/hour from one hour to the next for the HVDC interconnectors NordLink and NorNed and implement a temporary restriction of the changes to the trading plans from one hour to the next in the energy market of 450 MW on each of the following HVDC interconnectors Skagerrak and North Sea Link.

Article 6 - Language

The reference language for this Methodology shall be English. For the avoidance of doubt, where TSOs need to translate this Methodology into national language(s), in the event of inconsistencies between the English version published by TSOs in Nordic LFC block 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 Methodology.