

Grid Code Modification Proposal  
Form

# GC0154

## Incorporation of interconnector ramping requirements into the Grid Code as per SOGL Article 119

**Overview:** Article 119 (1) (c) of the System Operator Guideline (SOGL) relating to the Load Frequency Control (LFC) block operational methodology requires ramping arrangements for active power output of HVDC interconnectors to be codified.

## Modification process &amp; timetable

- 1 • **Proposal form**  
• 16 December 2021
- 2 • **Workgroup Consultation**  
• 20 June 2022 - 08 July 2022
- 3 • **Workgroup Report**  
• 25 August 2022
- 4 • **Code Administrator Consultation**  
• 01 September 2022 - 30 September 2022
- 5 • **Draft Code Modification Report**  
• 19 October 2022
- 6 • **Final Code Modification Report**  
• 07 November 2022
- 7 • **Implementation**  
• TBC

**Status summary:** The Proposer has raised a modification and is seeking a decision from the Panel on the governance route to be taken.

**This modification is expected to have a:**

**High impact** on interconnectors as the relevant SOGL Article refers to the HVDC interconnector ramping restrictions for active power.

**Modification drivers:** This modification is driven by EU Compliance and direction from Ofgem. The Compliance is in line with SOGL Article 119 1 (c) as retained in UK Law under SI 2019, no. 533. Ofgem directed us to incorporate the provisions of the approved intermediate methodologies into the Grid Code or National Electricity Transmission System Security and Quality Supply Standard (NETS SQSS).

<b>Proposer's recommendation of governance route</b>	<p><b>Please find further guidance on governance route criteria at the end of the document.</b></p> <p>The obligations set out in Article 119 (c) require approval from the authority, therefore the Proposer recommends that this modification be assessed by a Workgroup and follow the standard governance route.</p>	
<b>Who can I talk to about the change?</b>	<p><b>Proposer:</b> Louise Trodden, National Grid ESO</p> <p><a href="mailto:Louise.trodden@nationalgrideso.com">Louise.trodden@nationalgrideso.com</a></p> <p>Phone: 07866 165538</p>	<p><b>Code Administrator Chair:</b> Sally Musaka, National Grid ESO</p> <p><a href="mailto:Sally.Musaka@nationalgrideso.com">Sally.Musaka@nationalgrideso.com</a></p> <p>Phone: 07814045448</p>

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## What is the issue?

The System Operator Guideline ([SOGL](#)) is one of the European Network Codes that has been retained in British law following the EU-exit. SOGL Article 119 required NGESO as the responsible GB Transmission System Operator (TSO) to write and have approved by Ofgem, operational methodology texts which included ramping arrangements for the active power output on High Voltage Direct Current (HVDC) interconnectors. This included an LFC Block Operational Agreement (which covers A119 and is [here](#) with an accompanying supporting document [here](#)).

The methodology texts were submitted to Ofgem and approved however, Ofgem in their [Decision Letter](#)<sup>1</sup> set out that interconnector ramping arrangements should be incorporated into the Grid Code to allow clarity for stakeholders. (Ofgem states in their decision letter that *'the intermediate methodology is designed so that obligations detailed within its articles will be incorporated within the Grid Code or NETS SQSS, thus providing an opportunity if necessary, to add further details.'*)

It is NGESO's intention in this modification to address the need to set out provisions for interconnector ramping into the Grid Code as instructed.

### Why change?

Article 119 (1) (c) refers to ramping restrictions for active power output in accordance with Article 137 (3) and (4).

Article 137 (3) refers to active power output of HVDC interconnectors and Article 137 (4) refers to power generating modules and demand units.

Ramp rate limits are currently specified in BC1.A.1.1 of the Grid Code, but only apply to Balancing Mechanism Units (BMUs) and therefore Balancing Mechanism participants. This section demonstrates compliance to Article 137 (4). Interconnector ramp rate limits are not therefore covered in the same way as generators. Currently, ramp rates applicable to interconnectors are specified within respective tri-lateral agreements (the Interconnector

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<sup>1</sup> [https://www.ofgem.gov.uk/sites/default/files/docs/2019/08/article\\_118\\_and\\_119\\_final\\_decision.pdf](https://www.ofgem.gov.uk/sites/default/files/docs/2019/08/article_118_and_119_final_decision.pdf)

Operating Protocols). Such agreements are between the two connected System Operators and the Interconnector Operator. To fulfil the requirements of Ofgem's decision letter and the obligations in Article 137 (3), a solution is required to incorporate interconnector ramping in the Grid Code.

Currently, interconnector ramping limits in GB have been set by a historic precedent in bilateral connection agreement at 100MW/minute, however these rates are no longer operationally feasible. It is expected in 2022 that there will be five interconnectors connecting Great Britain (GB) to continental European Union (EU) markets. This could represent a maximum combined ramp rate of 500MW/min and (when considering full import to export) an interconnector profile change of up to 12GW within a settlement period. NGESO often encounters scenarios where cross border markets react to the same price signals simultaneously, leading to rapid changes in interconnector flow and frequency deviations. Additionally, interconnectors' final positions are typically only confirmed 65-70 minutes prior to real time. This highlights that a change needs to be considered to ensure that system security measures can be appropriately controlled and accessed ahead of time and that the right balance is struck between operational flexibility and cost to consumers.

### Background and history of work to date

On 14 September 2017, Ofgem published a [decision](#) which assigned obligations in Article 119 of SOGL to NGESO.

Within the Article 119 proposals, there are some sections which specifically require approval from the Authority. They are:

*(c) ramping restrictions for active power output in accordance with Article 137(3) and (4)<sup>2</sup>*

*(h) the Frequency Restoration Reserve (FRR) dimensioning rules defined in accordance with Article 157(1).*

*(q) coordination actions aiming to reduce Frequency Restoration Control Error (FRCE) and defined in Article 152(14).*

*(r) measures to reduce the FRCE by requiring changes in the active power production or consumption of power generating modules and demand units in accordance with Article 152(6).*

A full review of all obligations took place and led to submission of mapping documents and intermediate methodologies to Ofgem in 2019. The mapping included the SOGL obligations which were already covered in the relevant GB codes (the Grid Code NETS SQSS). This was inclusive of articles (h), (q) and (r), mentioned above. These articles have been acknowledged by Ofgem as meeting the provisions set out within the Article. The [Intermediate GB LFC Block Operational Methodologies<sup>3</sup>](#) were developed to outline the remaining obligations not covered by the GB codes. A supporting [document<sup>4</sup>](#) was also developed to accompany the methodology text.

Ofgem approved the intermediate methodology in August 2019, acknowledging that most obligations mapped to the Grid Code and NETS SQSS covered most of the requirements

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<sup>2</sup> Article 119 within the SI removes the reference to article 137 (3), however, 137 (3) is retained in GB law. NGESO has discussed this inconsistency with BEIS and we have clarity that this is a discrepancy in the legislation which will be updated at an appropriate time.

<sup>3</sup> <https://www.nationalgrideso.com/document/127201/download>

<sup>4</sup> <https://www.nationalgrideso.com/document/127196/download>

within 119, but outlined necessary steps that must be taken to ensure full compliance. In order to provide clarity to stakeholder requirements, Ofgem's [Decision Letter<sup>5</sup>](#) requests NGESO to publish the intermediate methodologies (in accordance with Article 8(1) of SOGL) until mapping to the Grid Code and the NETS SQSS is completed for the outstanding areas. The expectation was also that the ESO would expedite this work.

The remaining obligation refers to item (c). Whilst the approved methodology highlights that NGESO has the right to determine ramping arrangements, further work is required to set this out within the GB frameworks. This will allow development of a solution to enable ramping arrangements for active power output of each HVDC interconnector to be mapped to the Grid Code within Balancing Code 1 (BC1), and the accompanying Annex of this section of the code.

Since the publication of the decision in August 2019, GB has left the EU. A set of Statutory Instruments (SI)<sup>6</sup> were published, including [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(amendment etc.\) \(EU Exit\) Regulations 2019](#). This SI has been reviewed against the pre-EU exit SOGL European Network Code (which originally placed requirements on NGESO through articles mentioned in this proposal paper). This review was carried out to assess whether the obligations are still relevant and retained in GB law. The review confirmed that the only outstanding SOGL reference which requires mapping and subsequent implementation to the codes is:

A119 (c) ramping restrictions for active power output in accordance with Article 137(3) and (4).

The Grid Code already specifies ramping rates for power generating modules and/demand units within BC1 demonstrating compliance for Article 137 (4). It is important to note this modification is only seeking to address Article 137 (3) (as detailed below)

*3. All connecting TSOs of an HVDC interconnector shall have the right to determine in the LFC block operational agreement 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 by agreeing on ramping periods and/or maximum ramping rates for this HVDC interconnector. Those common restrictions shall not apply for imbalance netting, frequency coupling as well as cross-border activation of FRR and RR over HVDC interconnectors. All TSOs of the GB synchronous area shall coordinate these measures within the synchronous area.*

To comply with the outstanding requirements of SOGL Article 119, a code change is required. This will allow the ESO to implement and map the outstanding approved methodologies (referred to above) within the relevant codes as directed by Ofgem. This will be done through agreeing and defining interconnector ramping and appropriately incorporating it into the Grid Code.

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<sup>5</sup> [https://www.ofgem.gov.uk/sites/default/files/docs/2019/08/article\\_118\\_and\\_119\\_final\\_decision.pdf](https://www.ofgem.gov.uk/sites/default/files/docs/2019/08/article_118_and_119_final_decision.pdf)

<sup>6</sup> Statutory Instruments (SIs) are a form of legislation which allow the provisions of an Act of Parliament to be subsequently brought into force or altered without Parliament having to pass a new Act.

## What is the Proposer's solution?

The requirements of SOGL Article 119 (c) refer to the ramping restrictions on active power output of each HVDC interconnector. To address this, the Proposer suggests all existing and new GB interconnector ramping requirements are included in the Grid Code.

Given the complexity of ramping, and the need to consider more resilience to the increase in interconnector connections, more consideration how NGESO could solve the outstanding compliance requirements and the operational challenges that result from current interconnector ramping arrangements are required.

Several solutions proposed to fully address this are summarised below;

- Include current bespoke ramping arrangements, as they are, in the Grid Code.
- Apply current BMU ramping rates to the interconnectors as per BC1.A.1.1.
- Ensure NGESO holds sufficient response and reserve to facilitate unrestricted interconnector ramping.
- Dynamic ramping rate - based on an assessment, NGESO will decide if any ramp rate limit needs to be amended.
- Develop additional services with the interconnector and EU Transmission System Operators (TSOs) to mitigate ramping e.g., slow or delay.
- Changes to the GB wholesale market design to be more compatible with cross border capacity markets.
- Change cross border capacity markets.
- Apply a reduced static interconnector ramp rate limit.

These options are not exhaustive or definitive. The Proposer suggests that solutions are developed with industry stakeholders within a Grid Code working group, and that as part of their considerations the group should also look at how this code change will impact other cross border discussions and the ongoing work in relation to the Trade Cooperation Agreement (TCA). It also needs to be considered how this will be implemented retrospectively for existing interconnectors, for in progress interconnector connections and for future interconnector connections.

## Draft legal text

Legal text will be drafted as the solution is developed in the workgroup. It is envisaged that the legal text will form part of Balancing Code 1 (BC1), and the accompanying Annex of this section of the code.

## What is the impact of this change?

### Proposer's Assessment against Grid Code Objectives

Relevant Objective	Identified impact
(a) To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity	<b>Positive:</b> Defining and updating ramping rates which reflect the current market participants' capabilities

(b) Facilitating effective competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity)	<b>Positive:</b> Having a clear set of ramping rates within the code will aid transparency across generation types
(c) Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole	<b>Positive:</b> A more complete consideration of ramping will address its impact on security of supply
(d) To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency	<b>Positive:</b> Compliance with SOGL Article 119 as retained in GB law
(e) To promote efficiency in the implementation and administration of the Grid Code arrangements	<b>Positive:</b> By including ramping rates for interconnectors, this will fill a gap in the Grid Code and improve the Code's operability

### Impact of the modification on the stakeholder / consumer benefit categories

#### Proposer's assessment:

Stakeholder / consumer benefit categories	Identified impact
Improved safety and reliability of the system	<b>Positive:</b> Interconnectors are a key part of the drive to net zero and in facilitating an efficient solution to ramping issues this will aid overall operability.
Lower consumer bills	<b>Positive:</b> By finding the right balance between flexibility for interconnector owners and the operational costs that are incurred by NGESO optimum value for consumers will be enabled.
Benefits for society as a whole	<b>Positive:</b> Reduced overall cost, better participation by interconnectors.
Reduced environmental damage	<b>Positive:</b> As above – interconnectors are a key part of the drive to net zero.
Improved quality of service	<b>Positive:</b> As above – interconnectors are a key part of the drive to net zero.



**When will this change take place?****: Implementation date:**

Ideally it should be 10 days after approval by authority, however this will depend upon the solution developed and approved by the authority.

**Date decision required by:**

No specific deadline but requirement after Ofgem decision letter dated August 2019.

**Implementation approach:**

To be discussed during the workgroup. This section is to be updated when a solution is defined. Depending on the possible solution/s developed by the workgroup, potentially this could result in changes to NGESO and interconnectors systems and/or processes.

**Interactions**

- |   |   |   |                                |
|---|---|---|--------------------------------|
| <input type="checkbox"/> CUSC                                 | <input type="checkbox"/> BSC  | <input type="checkbox"/> STC                    | <input type="checkbox"/> SQSS  |
| <input checked="" type="checkbox"/> European<br>Network Codes | <input checked="" type="checkbox"/> EBR Article 18<br>T&Cs <sup>7</sup> | <input type="checkbox"/> Other<br>modifications | <input type="checkbox"/> Other |

This modification is driven by SOGL, which is a European Network Code. There is the possibility that this modification will need to follow the EBR Article 18 approach due to possible changes to the Balancing Code.

**Acronyms, key terms and reference material**

Acronym / key term	Meaning
BM	Balancing Mechanism
FCR	Frequency Containment Reserve
BMU	Balancing Mechanism Units
FRCE	Frequency Restoration Control Error
FRR	Frequency Restoration Reserve
HVDC	High Voltage Direct Current
LFC	Load Frequency Control
NGESO	National Grid Electricity System Operator
NETS SQSS	National Electricity Transmission System Security and Quality of Supply Standard
RR	Replacement Reserves
SI	Statutory Instrument
SOGL	System Operator Guidelines
TCA	Trade Cooperation Agreement
TSO	Transmission System Operator

<sup>7</sup> If your modification amends any of the clauses mapped out in Annex GR.B of the Governance Rules section of the Grid Code, it will change the Terms & Conditions relating to Balancing Service Providers. The modification will need to follow the process set out in Article 18 of the Electricity Balancing Regulation (EBR – EU Regulation 2017/2195). All Grid Code modifications must be consulted on for 1 month in the Code Administrator Consultation phase, unless they are Urgent modifications which have no impact on EBR Article 18 T&Cs. N.B. This will also satisfy the requirements of the NCER process.

**Reference material:**

1. [Intermediate GB LFC Block Operational Methodologies](#)
2. [Article 118 and 119 Decision Letter](#)
3. [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(amendment etc, \(EU Exit\) Regulations 2019.](#)
4. [Ofgem decision to assign TSO obligations under SOGL within GB](#)
5. [System Operator Guidelines \(SOGL\) COMMISSION REGULATION \(EU\) 2017/1485](#)

**Guidance on governance routes**

[Section to be removed by Code Admin following submission]

**Self-Governance**

The modification is unlikely to discriminate between different Grid Code Parties and is unlikely to have a material effect on:

- i. Existing or future electricity customers.
- ii. Competition in the generation, distribution, or supply of electricity or any commercial activities connected with the generation, distribution or supply of electricity.
- iii. The operation of the National Electricity Transmission System.
- iv. Matters relating to sustainable development, safety or security of supply, or the management of market or network emergencies.
- v. The Grid Code Panel's governance procedures or the Grid Code Panel's modification procedures.

**Fast Track Self-Governance**

The modification is a housekeeping modification required as a result of an error or factual change, such as:

- i. Updating names or addresses listed in the Grid Code.
- ii. Correcting minor typographical errors.
- iii. Correcting formatting and consistency errors, such as paragraph numbering.
- iv. Updating out of date references to other documents or paragraphs.

**Urgency**

Ofgem's current guidance states that an urgent modification should be linked to an imminent issue or a current issue that if not urgently addressed may cause:

- i. A significant commercial impact on parties, consumers or other stakeholder(s).
  - ii. A significant impact on the safety and security of the electricity and/or gas systems.
  - iii. A party to be in breach of any relevant legal requirements.
-