Making a positive difference
for energy consumers

National Grid Electricity System Operator, Electricity Transmission Licensees and other interested parties

Email: calum.watkins@ofgem.gov.uk
Date: 27 September 2024

Dear Colleague,

Frequency Risk and Control Report – 12 July 2024: the Authority's decision

This letter comprises the Authority's[1] decision to approve[2] the Frequency Risk and Control Report 2024[3] (FRCR 2024) and its recommendations. The FRCR 2024 was submitted to us by the National Grid Electricity System Operator (NGESO) on 12 July 2024.

Background

On 9 August 2019, there was a near-simultaneous loss of two large generators and consequential losses of Distributed Energy Resources (DER). These combined power losses went beyond the back-up power generation arrangements that the NGESO had in place to keep the system stable, resulting in a significant frequency event. This triggered the disconnection, loss of power and disruption to more than one million customers.

Both our[4] and the government's Energy Emergencies Executive Committee[5] investigations into the incident required the NGESO, in consultation with industry, to undertake a review of the Security and Quality of Supply Standard (SQSS) requirements for holding reserve, frequency response and system inertia. On 10 December 2020, we approved SQSS modification GSR027[6]

[1] References to the "Authority", "Ofgem", "we", "us" and "our" are used interchangeably in this document. The Authority refers to GEMA, the Gas and Electricity Markets Authority. The Office of Gas and Electricity Markets (Ofgem) supports GEMA in its day-to-day work. This decision is made by or on behalf of GEMA.
[2] This document is notice of the reasons for this decision as required by section 49A of the Electricity Act 1989.
[3] The FRCR 2024 is available on the NGESO's website: https://www.nationalgrideso.com/industry-information/codes/security-and-quality-supply-standards/frequency-risk-control-report
[4] Our report of the 9 August 2019 power outage can be viewed here: https://www.ofgem.gov.uk/publications-and-updates/investigation-9-august-2019-power-outage
[5] The government's Energy Emergencies Executive Committee report on the 9 August 2019 power outage can be viewed here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/855767/e3c-gb-power-disruption-9-august-2019-final-report.pdf
[6] Our decision to approve SQSS modification GSR027 can be found on our website: https://www.ofgem.gov.uk/publications-and-updates/gsr027-review-nets-sqss-criteria-frequency-control-drive-reserve-response-and-inertia-holding-gb-electricity-system

to review the SQSS Criteria for Frequency Control that drive reserve, response and inertia holding on the GB electricity system. GSR027 made changes to sections of the SQSS governing how the NGESO secures against frequency deviations, introducing the requirement for an annual FRCR governing the NGESO policies on securing against frequency deviations. The initial FRCR was submitted to us by the NGESO on 1 April 2021, and we issued our decision to approve this on 12 May 2021[7]. The second FRCR (2022) was submitted to us by the NGESO on 1 April 2022, and we issued our decision to approve this on 23 June 2022[8]. The third FRCR (2023) was submitted to us by the NGESO on 29 March 2023, and we issued our decision to approve this on 9 June 2023[9].

The FRCR 2024

This fourth edition of the FRCR concentrates on three main areas: reviewing the minimum system inertia requirement policy, assessing the costs and benefits of securing inertia beyond current policy on event categories of loss risk, assessing the cost and benefits of holding additional reserve response controls. The focus of the FRCR is to set the optimal balance between risk and cost, ensuring the GB system is effectively and appropriately protected from frequency events for the following year. The FRCR aims to improve transparency across industry and stakeholders, setting out clear and objective criteria by which the NGESO balances risk and cost to ensure the efficient security of supply for end consumers. This year's FRCR focuses on the minimum inertia requirement, mitigating all Balancing Mechanism Unit (BMU)-only infeed and outfeed loss risks, and using frequency response controls to further reduce residual risks to provide better value for consumers.

A significant improvement in system residual risk is evident, when compared with the previous FRCR 2023. Although the inertia levels remain at 120 GVA.s, the residual risk likelihood of the frequency deviation improves from 1-in-17 to 1-in-27 year risk of a 49.2 Hz event and remains at 1-in-30 years for a 48.8 Hz event.

[7] Our decision to approve the initial FRCR 2021 can be found on our website; https://www.ofgem.gov.uk/publications/authority-decision-approve-frequency-risk-and-control-report-april-2021

[8] Our decision to approve FRCR 2022 can be found on our website; https://www.ofgem.gov.uk/publications/authority-decision-approve-frequency-risk-and-control-report-april-2022

[9] Our decision to approve FRCR 2023 can be found on our website; https://www.ofgem.gov.uk/decision/authority-decision-approve-2023-frequency-risk-and-control-report

The Office of Gas and Electricity Markets
10 South Colonnade, Canary Wharf, London, E14 4PU **Tel** 020 7901 7000
www.ofgem.gov.uk

The FRCR 2024 recommendation is to:

1. Maintain the existing minimum inertia requirement at 120 GVA.s.
2. Secure all BMU-only loss risks and do not apply additional actions to mitigate all BMU + Vector Shift (VS) and simultaneous event categories.[10]
3. Consider additional Dynamic Containment (DC-Low) [11] requirement to further reduce residual risks.

The FRCR 2024 findings show the costs and potential savings that the NGESO estimates could be achieved across the different minimum inertia requirements when fully mitigating all BMU-only infeed and outfeed loss risks. The cost of securing BMU-only is shown as well as the additional cost of securing BMU+VS (outage), BMU+VS (intact) and simultaneous events in the latest three years' FRCR reports. Holding additional DC-Low also yields a modest improvement in risk mitigation of 49.2 Hz events.

Using frequency services (DC-Low) in 2024 instead of Balancing Mechanism control as in previous years, results in considerable cost savings for system wide controls and additional BMU+VS and simultaneous events. The NGESO recommendation is that procuring system wide controls for BMU-only events continues to present the best cost-risk balance. Considering the high cost-effectiveness of DC-Low, there is potential to utilise DC-Low to address risks beyond BMU-only events (BMU+VS and simultaneous events) and improve overall system security.

[10] Current policy of securing all BMU-only events still presents the best value according to the NGESO. The NGESO concludes that securing against all BMU+VS and simultaneous events would double the spend on DC and require a significant increase in DC capacity - this is not currently available and would put the current market under significant pressure and increase operational risk. Therefore, the NGESO does not see value in changing the current policy relating to securing all BMU+VS and simultaneous events as it does not provide value for consumers.
[11] Dynamic Containment (DC) Low is a frequency response service which responds to under-frequency events in the electrical transmission system.

The Office of Gas and Electricity Markets
10 South Colonnade, Canary Wharf, London, E14 4PU **Tel** 020 7901 7000
www.ofgem.gov.uk

Industry consultation

The NGESO consulted on the FRCR 2024 from 10 April 2024 to 17 May 2024, receiving five responses. The NGESO acknowledged all comments to the consultation and offered the opportunity to arrange follow-up meetings with relevant specialists to address their concerns regarding the FRCR 2024 consultation responses.

During the consultation, two respondents called for increased transparency of data used for the analysis and a further respondent requested that new risks be considered by NGESO in future FRCRs such as cascade failures. In particular, four respondents noted that there was insufficient information on the NGESO's assessment of the operation of a low inertia system to merit a further reduction in inertia at present.

SQSS Panel recommendation

The SQSS Panel voted by majority to recommend the FRCR 2024 and methodology be submitted to the Authority for approval on 12 July 2024. Of the seven votes, four were supportive of the recommendations with respect to minimum inertia levels and increased DC-Low provision. Two respondents abstained from voting and a further respondent disagreed with the FRCR 2024 recommendations.

We note the reasons given for the abstentions and disagreement following further engagement by the NGESO with the panel members. We also note the commitments made by the NGESO to improve the FRCR transparency and engagement. We strongly advise the NGESO to consult more widely with industry experts and interested stakeholders while developing the FRCR methodology and report for 2025, and rigorously follow the framework as set out in SQSS Appendix H.

The Office of Gas and Electricity Markets
10 South Colonnade, Canary Wharf, London, E14 4PU **Tel** 020 7901 7000
www.ofgem.gov.uk

Our decision

We have considered the issues raised by the FRCR 2024 and its proposals dated 12 July 2024, including taking into account the responses to industry consultation, the SQSS Panel vote and the SQSS Panel recommendation, and conclude that:

- implementation of the FRCR 2024 and its proposals will better facilitate the achievement of objective (i) and (ii) of the SQSS;[12] and
- approving the FRCR 2024 and its proposals is consistent with our principal objective and statutory duties.[13]

We have highlighted the impact on the SQSS objectives in this section alongside our view that consumer interests are appropriately considered.

We note industry's concerns with regards to the stability and operational impacts of reducing system inertia and with respect to the cascading events on 22 December 2023, we also note the subsequent response of the system remained within statutory limits.[14] The NGESO has emphasised that the recommendations of the FRCR 2024 focus on frequency security, and other operational risks, including short circuit level and fault ride through, which can be influenced by inertia[15], are considered and addressed separately by other NGESO workstreams.

Overall, we consider the FRCR 2024 has met the criteria by which the NGESO balances cost and risk of frequency deviations (above 50.5Hz, or below 49.5Hz, 49.2Hz and 48.8Hz). The FRCR 2024 assesses the risk of a discrete list of single events, and a statistical summary of simultaneous events, leading to frequency deviations, and the cost of a mix of options available to the NGESO to prevent, or reduce the likelihood of, such frequency deviations from occurring. Therefore, the analysis set out in the FRCR 2024 quantitatively demonstrates why the FRCR 2024 proposals represent an appropriate balance between the cost and residual likelihood of frequency deviations. We therefore consider that the implementation of FRCR 2024 and its proposals are in the interest of consumers.

[12] The SQSS objectives are set out in chapter 3 of the SQSS Industry Governance Framework, available here: https://www.nationalgrideso.com/industry-information/codes/security-and-quality-supply-standard-sqss/sqss-code-documents

[13] In making its decision, the Authority must act in accordance with its principal objective to protect the interests of existing and future consumers, and its statutory duties. The Authority's statutory duties are detailed mainly in the Electricity Act 1989 (in particular, but not limited to section 3A) as amended.

14 As described in the NGESO Operational Transparency Forum on the 17th January 2024. Available at: https://www.nationalgrideso.com/document/300661/download

[15] For example, due to the inherent inertia provided by synchronous machines providing short circuit level.

The Office of Gas and Electricity Markets
10 South Colonnade, Canary Wharf, London, E14 4PU **Tel** 020 7901 7000
www.ofgem.gov.uk

We consider the FRCR 2024 to better facilitate SQSS objective (i) and (ii) and have a neutral impact on the other objectives.

(i) facilitate the planning, development and maintenance of an efficient, coordinated and economical system of electricity transmission, and the operation of that system in an efficient, economic and coordinated manner;

The FRCR 2024 increases the transparency by which the NGESO balances cost and risk to control system frequency by making explicit in the FRCR 2024, the events that will and will not be secured for[16].

We note that the FRCR 2024 recommends continuing with existing policies, with the exception of increasing DC-Low provision by up to 100 MW. There are no conflicts with other grid stability services in managing system stability whilst implementing the FRCR 2024 recommendations. We therefore consider the recommendations of the FRCR 2024 better facilitate this SQSS objective, in particular better facilitating efficient, economic and coordinated operation of the electrical power system under this minimum inertia requirement. We agree to the NGESO's decision to monitor system conditions and performance at the present 120 GVA.s level for 2024/25 to gain further operational experience ahead of a more comprehensive assessment for FRCR 2025.

(ii) ensure an appropriate level of security and quality of supply and safe operation of the National Electricity Transmission System;

The FRCR 2024 assessed variations in NGESO policy in maintaining frequency stability with respect to the cost and residual likelihood of frequency deviations. In doing so the FRCR 2024 demonstrates that the appropriate balance between cost and risk is achieved. We therefore consider the FRCR 2024 better facilitates this SQSS objective.

[16] The power system is secure when technical parameters such as voltage and frequency are maintained within defined statutory limits.

The Office of Gas and Electricity Markets
10 South Colonnade, Canary Wharf, London, E14 4PU **Tel** 020 7901 7000
www.ofgem.gov.uk

Implementation

In this letter we have set out our decision to approve the FRCR 2024. This decision takes effect immediately. The NGESO proposes maintaining system inertia to 120 GVA.s and increasing DC-Low provision by up to 100 MW. Industry will be informed by the NGESO of the timings and details of changes via the Operational Transparency Forum or similar industry fora. We advise the NGESO to improve stakeholder engagement while developing the FRCR methodology and report for 2025.

Gurpal Singh
Head of Engineering & Profession Lead
Signed for and on behalf of the Authority

The Office of Gas and Electricity Markets
10 South Colonnade, Canary Wharf, London, E14 4PU **Tel** 020 7901 7000
www.ofgem.gov.uk