



# **SQSS Panel**

Wednesday 16 March 2023

Online Meeting via Teams

# WELCOME



# Introductions and Apologies for absence

Apologies

Alternates

Observers / Presenters

# Approval of Panel Minutes

Approval of Panel Minutes from the Meeting held

09 November 2022



# Action Log



# Authority Decisions and Update



The Authority's publication on decisions can be found on their website below:

<https://www.ofgem.gov.uk/publications/code-modificationmodification-proposals-ofgem-decision-expected-publication-dates-timetable>



## **New modifications**



An aerial photograph of a green agricultural field, possibly corn, with several bright yellow diagonal streaks running across it from the bottom left towards the top right. The text is overlaid on the left side of the image.

# Electricity System Restoration Standard

## SQSS Panel Presentation

### 16th March 2023



# Facilitation of the Electricity System Restoration Standard (ESRS)

Special Condition 2.2 of National Grid's Electricity System Operator's Transmission Licence, the Electricity System Restoration Standard (ESRS) was introduced in October 2021 and requires

- a. 60% of electricity demand being restored within 24 hours in all regions;  
and
- b. 100% of electricity demand being restored within 5 days nationally.

The purpose of this direction is to require that the ESO

- a) Ensures and maintains an electricity restoration capability; and
- b) Ensures and maintains the restoration timeframe.
- c) Replace the definition of "Black Start" with "System Restoration"

The aim is to restore the system and supplies as quickly as possible in the most economic manner.

# Grid Code documents reviewed

- Glossary and Definitions
- Planning Code
- Connection Conditions
- European Connection Conditions
- Operating Code 1
- Operating Code 2
- Operating Code 5
- Operating Code 9
- Balancing Code 2
- Balancing Code 4
- Data Registration Code
- General Conditions

# Supplementary Grid Code related documents reviewed

- System Defence Plan
- System Restoration Plan
- Test Plan
- Control Telephony Standard
- Communications Standard
- Distribution Restoration Zone Control System (subject to substantial overhaul)



## Proposed SQSS Changes

- Proposed changes to TO's and OFTO's systems and the connection of new Users to TO's and OFTO's Systems , should be designed and built to be able to operate in a restoration situation with an electrically weak network i.e., considering reactive gain, inertia, inrush and the ability to energise and operate TO's assets with limited generator capability.
- These requirements partly exist within the existing frameworks for TOs, but the SQSS requires further review to ensure requirements are fit for purpose. The framework needs developing/updating to ensure OFTOs have similar requirements to onshore TOs.

## Key Technical elements

- At each Grid Entry Point, the ability for Restoration Contractors to energise part of the Transmission System at 0MW output and subsequently load the generator above the Stable Export Limit (SEL) to feed local demand. This process would rely on Restoration Contractors having sufficient volumes of the reactive power be it from an Anchor Plant or Top Up Plant.
- No Load gain between adjacent substations must be designed so that TO Systems can be energised during System Restoration. (i.e., circuit busbars and associate reactive plant) This would include energising TO Systems from Anchor Plant or synchronising Top Up Plant such that demand can be supplied as part of a Local Joint Restoration Plan or Distribution Restoration Zone Plan. Once a power island is created using Restoration Contractors, it must be possible to synchronise other Users to the network to either offer auxiliary supplies or enable the Synchronising of other Power Islands.

## Key Technical elements

- The ability to deliver reactive compensation in steps of up to 60MVA<sub>r</sub> from a proportion of the reactive compensation equipment thereby enabling utilisation of this equipment during a restoration.
- Compensation equipment, such as Static Compensators or rotary compensators should be energised and used within the initial stages of a restoration.
- The ability to utilise Offshore Networks as part of the Restoration Process.



## SQSS Legal Text

The Legal text for this solution will be developed in line with the legal text drafted for GC0156. As part of this modification, the following sections of the SQSS are expected to require updating.

- Generation Connection Criteria Applicable to an Onshore Transmission System
- Operation of the Onshore Transmission System
- Generation Connection Criteria Applicable to an Offshore Transmission System
- Operation of an Offshore Transmission System
- Additional sections may require review pending review of the above

# Indicative timeline

Milestone	Date	Milestone	Date
Proposal Presented to Panel	16 March 2023	Panel sign off that Workgroup Report has met its Terms of Reference	12 July 2023
Workgroup 1 – Understand / discuss proposal and solution, note the scope and identify any possible alternative solutions, agree timeline and review terms of reference, agree next steps.	03 April 2023	Code Administrator Consultation	17 July 2023 – 07 August 2023
Workgroup 2 – Develop solution(s)/options, identify/asses and vote any possible alternative solutions, Develop WG consultation questions and report	21 April 2023	Draft Final Modification Report (DFMR) issued to Panel	05 September 2023
Workgroup 3 - Review legal texts, Refine WG consultation report and legal texts, agree alternatives, Finalise Workgroup Consultation and legal text	05 May 2023	Panel undertake DFMR recommendation vote	13 September 2023
Workgroup Consultation	12 May 2023 – 05 June 2023	Final Modification Report issued to Panel to check votes recorded correctly (5 working days)	15 September - 22 September 2023
Workgroup 4 - (Post Workgroup Consultation) – Review / assess Workgroup consultation responses and Workgroup Report.	20 June 2023	Final Modification Report issued to Ofgem	25 September 2023
Workgroup 5 – Finalise solution(s) and legal text, agree that Terms of Reference have been met, Review Workgroup Report and hold Workgroup Vote	30 June 2023	Ofgem decision	TBC – Required by Q3 2023
Workgroup Report issued to Panel	04 July 2023	Implementation Date	TBC



## **Inflight modifications update**



# GSR029: Review of Demand Connection Criteria to Align with EREC P2/7

Milestone	Date	Milestone	Date
Modification presented to Panel	13 July 2022	Workgroup Consultation (15 working days)	<del>22 February – 15 March 2023</del> TBC
Workgroup Nominations (15 Working Days)	18 July – 5 August 2022	Workgroup 11 - Discuss consultation responses, refine solution and legal text	TBC
Workgroup 1 - Proposer's presentation, check Terms of Reference, initial review of legal text	8 August 2022	Workgroup 12 - Hold Workgroup vote, Finalise Workgroup Report and Legal text	TBC
Workgroup 2 – Refine Solution	6 September 2022	Showstopper	<del>25 April 2023</del> TBC
Workgroup 3 – Refine Solution	10 October 2022	Workgroup report issued to Panel (5 working days)	<del>02 May 2023</del> TBC
Workgroup 4 – All day Workgroup	7 November 2022	Panel sign off that Workgroup Report has met its Terms of Reference	<del>10 May 2023</del> TBC
Workgroup 5 - Refine Solution	21 November 2022	Code Administrator Consultation	<del>16 May – 16 June 2023</del> TBC
Workgroup 6 - Refine Solution	12 December 2022	Draft Final Modification Report (DFMR) issued to Panel (5 working days)	<del>04 July 2023</del> TBC
Workgroup 7 - Draft Legal Text review	18 January 2023	Panel undertake DFMR recommendation vote	<del>12 July 2023</del> TBC
Workgroup 8 - Discuss Scenarios	9 February 2023	Final Modification Report issued to Panel to check votes recorded correctly	<del>14 July 2023</del> TBC
Showstopper	<del>16 February 2023</del>	Final Modification Report issued to Ofgem	<del>25 July 2023</del> TBC
Workgroup 9 - Discuss Scenarios	24 March 2023	Ofgem decision	TBC
Workgroup 10 - Finalise Workgroup Consultation document	17 April 2023	Implementation Date	TBC – in accordance with Authority timeline

# **GSR031: Introducing Competitively Appointed Transmission Owners**

**Title change**

**Previously - GSR031: Introducing Competitively Appointed Transmission Owners & Transmission Service Providers**

**Revised - GSR031: Introducing Competitively Appointed Transmission Owners**



## Modification tracker





## Frequency Risk and Control Report (FRCR)



# Frequency Risk and Control Report (FRCR)

April 2023 edition

# Agenda

1. Summary of FRCR 2023 recommendation and consultation questions
2. Summary of responses
3. Final recommendations in response to consultation feedback

# Introduction

- FRCR aims to set out the right balance between risk and cost to the consumer.
- This is reviewed and updated annually.
- We consulted on the 2023 version of FRCR between 13<sup>th</sup> February and 24<sup>th</sup> February.
- We received 6 responses.

# Proposal

## Policy recommendation in FRCR 2023:

- Reduce minimum inertia policy to 120GVAs.
- This results in consumer savings of approximately £65m per year.

*We do not recommend any changes to current policy regarding the loss risks categories. Securing simultaneous events still does not represent good value for consumers.*


## Recommendation to maintain current policy of:

- Apply individual loss risk controls to BMU-only events to keep resulting frequency deviations within 49.2Hz and 50.5Hz.
- Do not apply individual loss risk controls to BMU+VS events (intact or outage).
- Do not apply additional system-wide controls to secure simultaneous events.



# Consultation

Milestone	Date
Consultation period	13 <sup>th</sup> February – 24 <sup>th</sup> February 2023
Webinar during industry consultation on combined report and methodology	20 <sup>th</sup> February 2023
SQSS Panel meeting – decision on recommendation of FRCR	16 <sup>th</sup> March 2023
Submission of FRCR to Ofgem	31 <sup>st</sup> March 2023

 We are here

# Consultation questions

#	Question
1	Overall, do you agree that the FRCR represents appropriate development in determining the way that the ESO will balance cost and risk in maintaining security of supply while operating the system?
2	Do you agree that the FRCR has been prepared appropriately? Please elaborate.
3	Do you agree with and what is your feedback on the specific recommendation in the FRCR? <b>Recommendation: Minimum inertia policy</b> Reduce minimum inertia policy from 140GVA.s to 120GVA.s
4	Do you have any suggestions for further areas that can be addressed in future editions of the FRCR?
5	Do you have any other comments?

# Summary of responses

We received six responses from: NGV Interconnectors, Sygensys, Zenobe, EDF, Neuville Grid Data Ltd and Drax. There was broad support for the overall recommendation. The table below summarises the responses received

Consultation question	Summary	ESO action
Overall, do you agree that the FRCR represents appropriate development in determining the way that the ESO will balance cost and risk in maintaining security of supply while operating the system	Four respondents agreed - those that didn't explicitly agree commented on the need for additional information in order to make an informed decision.	Appendix to be added to the final report to provide clarity on points raised.
Do you agree that the FRCR has been prepared appropriately?	Five respondents agreed, with one commenting that there was insufficient information provided on the methodology. Of those that agreed, two of these also commented on the need for additional information and clarity on how reduced inertia may impact other operational requirements.	Appendix to be added to the final report to provide clarity on points raised.
Recommendation: Minimum inertia policy  Reduce minimum inertia policy from 140GVA.s to 120GVA.s	Four respondents agreed. One respondent commented that it was unclear what the impact of reduced inertia would have on power oscillations, and the other respondent was concerned about the societal hazards of reduced inertia and the limitations that inertia measuring tools currently have.	The impact of power oscillations is separate to the minimum inertia on the system. The ESO are considering these system issues in other forums outside of FRCR.
Do you have any suggestions for further areas that can be addressed in future editions of the FRCR	Two respondents provided no further comments. It was suggested that the ESO should consider the impact of smaller frequency deviations on power quality. The need for additional information and underlying data was reiterated by another respondent.	Included in future considerations of the report.
Do you have any other comments?	Three respondents provided no further comments. One respondent commented on the length of the consultation period, another requested a review of ESO historic performance against policy and the final respondent commented on the need to consider 'black swan' events.	

# Summary of responses

	NGV interconnectors	Sygensys	Zenobe	EDF	Neuville Grid Data Ltd	Drax
Overall, do you agree that the FRCR represents appropriate development in determining the way that the ESO will balance cost and risk in maintaining security of supply while operating the system		No	Yes	Yes in principle	Not entirely. Questioned whether the alternative VoLL calculation referenced in 2021 has been applied / defined.	Yes in terms of infeed losses (less clear for other operational requirements).
Do you agree that the FRCR has been prepared appropriately?	Provided no specific responses to consultation proforma, however after a bilateral discussion, confirmed they were broadly comfortable with the proposal	Insufficient information provided on methodology	Yes	Yes, but provided a list of additional information that would be useful to see	Yes	Agree process has been followed based on in-feed and export losses (less clear on how impacts on power oscillations due to remote faults are being considered).
Recommendation: Minimum inertia policy  Reduce minimum inertia policy from 140GVA.s to 120GVA.s		Yes	Support the recommended reduction but only if the ESO intends to procure sufficient DC to avoid restricting the operational interconnectors.	Yes, agree that of the five studied levels, 120GVA.s is the optimal	Concerns that reducing inertia will have a negative impact on system risk and societal hazards. Noted tools for measuring inertia have limitations.	Unclear what impact reducing system inertia will have on magnitude of load oscillations seen in Scotland due to faults in North Wales. Require reassurance that system inertia will not exacerbate these issues.
Do you have any suggestions for further areas that can be addressed in future editions of the FRCR	N/A	More detail on the methodology and underlying data, for both the cost and the risk side	Concern that the ESO is not procuring sufficient DC volumes - reducing the minimum inertia policy could exacerbate this, resulting in more interconnector restrictions.	Other impacts that should be prioritised for inclusion in future reports, include the power quality issue of how smaller frequency deviations impact users, and how often they occur	New methods and means of calculating frequency and inertia estimation are needed and should be addressed through supported research.	N/A
Do you have any other comments?	N/A	Need to consider 'black swan' events	Review against historic performance would be useful	Consultation period was too short	N/A	N/A

# Impact on different technology types

- During early engagement with Ofgem, it was suggested that the ESO summarise potential impacts on different technology types, to support Ofgem when considering the consultation responses and their decision.
- Through the consultation process, the main concern raised regarding technology types was in relation to;
  - *Interconnectors with LCC technology (line-commutated current-sourced converters)*
- During the consultation period, we engaged bilaterally with NGV interconnectors to address their concerns. Primarily, this was a concern that lower inertia = lower fault levels which could impact LCC interconnectors by causing commutation failure.
- **The ESO have processes in place to study the impact of low fault levels in regions where LCC interconnectors connect.**
- These studies are conducted from three weeks ahead through to real time. This means that if any scenario were to manifest that could impact LCC interconnectors, this would be flagged and managed accordingly. In addition, as fault level is a regional issue and inertia is managed nationally, there are no conflicts in meeting both when as they are managed separately when operating the system.



# Key questions to be answered with FRCR 2023

1. What is the **residual system risk profile** with a reduction in minimum inertia requirement for covering different loss risk events?

*Reduce the minimum inertia requirement will not affect the residual system risk profile due to other available controls to manage the frequency risks, i.e Dynamic Containment.*

2. What are the **potential cost savings** associated with different levels of inertia?

*Operating a lower inertia requirement would result in £65 million per year saving on balancing costs.*

3. What is the **recommended minimum inertia requirement** and the consequent policy with respect to different event types (BMU-only, BMU+VS, Simultaneous event).

*The recommendation within this report is to reduce the minimum inertia requirement under the policy from 140GVA.s to 120GVA.s*

*No changes to the current policy regarding loss risks categories including simultaneous events*

# Recommendations

- **Reduce minimum inertia policy from 140GVA.s to 120GVA.s**
- There is no reduction in the overall risk profile of the system from operating at a lower inertia level compared with 140GVA.s. Operating at 120GVA.s also presents a potential balancing cost saving of £65 million per year.
- Reducing below 120GVA.s is currently not recommended as we do not consider it prudent to reduce minimum inertia below this level for the small number of periods where a lower inertia may provide a small consumer benefit.
- We will continue to reassess this conclusion in future versions of FRCR.

# Implementation

- Pending approval from Ofgem, we will implement the policy change in two stages.
- Initially we will reduce to 130GVAs anticipated in Q2 2023/24. We will do this for 1-2 months. and then we will reduce further to 120GVAs.
- This phased implementation gives us and industry time to adapt to the lower inertia and puts us on a glide path to meet our 2025 zero carbon ambition.

# Ask of panel & next steps

- Recommendation of FRCR sought from Panel.
- Submission to Ofgem required by 1<sup>st</sup> April.



**Any Other Business**



## **Next Panel Meeting**

**Modification Proposals to be  
submitted by 17 April 2023**

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**Papers Day – 02 May 2023**

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**10am on 10 May 2023 - Faraday  
House/ Teams**

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