Frequency Risk & Control Report v2023
NGESO – SQSS Panel
Project Update

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Background

- ESO raised SQSS modification GSR027 following the 09 August 2019 power cuts
- This introduced the new Frequency Risk and Control Report (FRCR)

FRCR 2021

Scope

- The first edition of FRCR focused on establishing the FRCR process to deliver a clear, objective, transparent process for assessing reliability vs cost to ensure the best outcome for consumers.
- It assessed the cost vs. risk from the inadvertent operation of Loss of Main protections, delivery of Dynamic Containment and Accelerated Loss of Mains Change Program (ALoMCP), the frequency standard that various size loss risks are held to, and the impact of transmission network outages on radial connection loss risks.

Policy Recommendation

- Minimum inertia at 140GVAs.
- 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 control to BMU+VS events (under system outage or intact conditions).

Background

FRCR 2022

Scope

- The second edition of FRCR assessed the value in taking additional actions to secure simultaneous losses noting the role this event category played during the 09 August 2019 power cuts.

Policy Recommendations

- Minimum inertia at 140 GVAs.
- 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 (under either intact or outage system conditions).
- Do not apply additional system-wide controls, e.g buy inertia and buy response, to secure simultaneous events.

Scope of FRCR 2023

1. Minimum Inertia Policy

Recent system development makes it possible to operate at a lower inertia level. This is due to

1) The ALoMCP reduces the consequential LoM risks results in a smaller largest aggregate loss,
2) The steady growth of Dynamic Containment (DC) supply, DC-L cleared over 1000MW for the first time in July 2022

The cost spent in BM to access inertia is expect increase given the increased renewable penetration and the current energy crisis. Options of relaxing the Minimum Inertia Policy from 140GVAs level to 130/120/110/100GVAs respectively are under investigation with the equivalent system security.

2. Updates in Model Assumptions

- Update ALoMCP LOM risk profile, up-to-date 0.125Hz/s and 0.2Hz/s ROCOF and VS risks are included in the model.
- Update cost for Dynamic Containment to reflect price differences due to 1) time of use and 2) total required volume.
- Update cost for assessing inertia in BM using typical inertia unit and cost for marginal unit in BM.
- Align the delivery plan of Stability Pathfinder Phase 1[1] inertia with the FRCR model.

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[1] Stability Pathfinder Phase 1 - the first contract started in July 2020, the last contract will start in February 2023.

Scope of FRCR 2023

3. Policy Review

- System risk profile

To update set of "1-in-x year" likelihoods for each frequency impact 48.8Hz, 49.2Hz, 49.5Hz, 50.5Hz based on recommended policy

- Simultaneous loss

To re-assessment value of securing simultaneous losses based on recommended policy

Future Considerations

FRCR 2023 is aimed to cover the period from April 2023 - March 2024. Scope will be expanded in future FRCR, which aligns with ESO BP2 commitment aimed to submit by end of Q4 2023/24.

Methodology / Model

Setup

Starting with current policy as a baseline:

- Define control scenarios e.g. *Dynamic Containment, LoM capacity*
- Define Events and loss risks e.g. *BMU only, BMU+VS risks*

For each Control scenario

Apply 'System-Wide' Controls

These are the frequency response, inertia and LoM loss size controls.

- Determine required quantity of additional controls
- Calculate cost of controls
- Calculate allowable loss sizes for each impact e.g. *49.2Hz, 50.5Hz*

Apply 'Individual Loss Risk' Controls

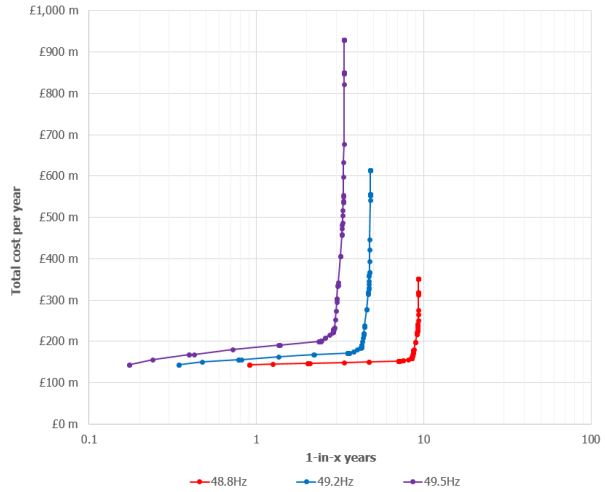
This is the BMU loss size control, and is applied after the "system-wide" controls

- Determine required quantity of additional controls
- Calculate cost of controls
- Calculate risk reduction for each impact

The FRCR results are based on time-series (at settlement period granularity) of generation, demand and inertia overlaid with system-wide controls including a range of frequency response products.

Allowable losses are calculated based on 48.8Hz, 49.2Hz, 49.5Hz and 50.5Hz impacts and targeted controls are applied per settlement period to any flexible BMU that exceeds a given allowable loss. The cost of mitigating a specific risk is compared against the corresponding risk reduction.

Determine overall cost vs. risk vs. impact curve for the scenario



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Consumer Value

Minimum Inertia Policy

- Approximately £100m in the last year in offer-bid costs to access inertia in the BM to meet 140GVAs Minimum Inertia Policy
- Potential saving of around £70m across 2022 if relaxing the Minimum Inertia Policy to 120GVAs, which takes around 20% of the costs for system-wide controls (i.e. total spending on response and additional inertia)
- This potential savings are expected to increase in 2023 due to the increased renewable penetration and the current energy crisis.

Timeline

Key Project Milestones

- November/December 2022: Internal sign off within the ESO, Draft report
- January 2023: Consults on Methodology & Report
- End of February2023: Submit final report to SQSS panel for approval
- Early March 2023: Submit final report to Ofgem