

## FRCR Consultation Response Proforma

### FRCR Consultation

Industry parties are invited to respond to this consultation expressing their views and supplying the rationale for those views, particularly in respect of any specific questions detailed below.

Please send your responses to [box.sqss@nationalgrideso.com](mailto:box.sqss@nationalgrideso.com) by **5pm on Friday 24<sup>th</sup> February 2023**. Please note that any responses received after the deadline or sent to a different email address may not receive due consideration.

If you have any queries on the content of this consultation, please contact [box.sqss@nationalgrideso.com](mailto:box.sqss@nationalgrideso.com)

Respondent details	Please enter your details
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Please express your views in the right-hand side of the table below, including your rationale.

FRCR Assessment and Methodology Consultation questions		
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?	No: see comments in Section 2.
2	Do you agree that the FRCR has been prepared appropriately? Please elaborate.	The information provided is insufficient to assess whether the FRCR has been prepared appropriately. Almost no information is given as to how the risk of events has been assessed, apart from the “rule of thumb” assumptions for simultaneous events (1 in 10/20/30 years) and a single figure of 0.36% quoted for the probability of BMU + VS (outage) triggering 49.2Hz events. How this figure of 0.36% was arrived at is a mystery, but this implies that a peak simultaneous event (1 in 30 years) is almost ten times more

		<p>likely than a BMU+VS (outage) triggering a 49.2Hz event (1 in 275 years). This seems implausible.</p> <p>We also have some concerns that the probability of simultaneous events may have been underestimated, due to vulnerabilities which are known, but not well quantified or controlled.</p> <p>Fault ride-through performance has been a significant concern to NGENSO (see GC0151). This has not been fully resolved and will remain an issue in 2023. For example, FRT requirements are not defined clearly within the Grid Code (GC0155).</p> <p>There are currently no specific requirements for vector shift/phase step ride-through and little understanding of the performance of current plant. This issue has been known for many years and was not addressed as part of the Grid Code changes for ALoMCP. I look forward to NGENSO fulfilling the commitment made to take this issue to the Grid Code panel. In the meantime, it remains an unquantified risk.</p>
3	To help structure comments, do you agree with and what is your feedback on the specific recommendation in the FRCR?	Please use the boxes below for the bullet points
4	<p><b>Recommendation : Minimum inertia policy</b></p> <p><i>Reduce minimum inertia policy from 140GVA.s to 120GVA.s</i></p>	<p>The policy of looking to reduce costs by targeting a minimum inertia appears reasonable. This needs to be subject to appropriate regional distribution.</p> <p>The reduction in inertia is justified by increasing DC. Is there a plan in future editions of the report to explicitly state a minimum DC?</p> <p>With the rapid increase in battery energy storage is it possible that costs of synthetic inertia could fall significantly in future years?</p>
5	Do you have any suggestions for further areas that can be addressed in future editions of the FRCR?	More detail on the methodology and underlying data, for both the "Cost" side of the equation (e.g. levels of DC required to offset the reduction in minimum inertia) and the risk side (e.g. scatter-plot or other graphic showing historic incident of frequency events, together with the assumptions being used in the analysis).

		<p>The use of DC to substitute inertia may impact the transient behaviour of the power system for a fault event (short-term frequency and voltage excursions). It would be helpful to give diagrams illustrating this effect.</p> <p>It is good to see that future editions of FRCR are going to look more than 1 year ahead. In future years, smart load control will play a key role in balancing the grid, helping shift demand timing to manage constraints and better match the timing of variable renewable generation.</p> <p>The FRCR analysis should place a significant emphasis on the impact of these smart loads and their control systems. Significant effects may be seen soon due to the rapid growth predicted over the next decade.</p> <p>Well-implemented, there is a significant opportunity for smart loads to reduce system operating costs and lower risks. Poorly implemented, these systems could lead to frequency instability and an increased risk of loss of load events or even cascade failure.</p> <p>For more information on this topic, see our recent NGESO-funded project on the resilience impacts of smart EV charging.  <a href="https://smarter.energynetworks.org/projects/nia2_ngeso006/">https://smarter.energynetworks.org/projects/nia2_ngeso006/</a></p> <p>Also see System Operability Framework 2023  <a href="https://www.nationalgrideso.com/document/273801/download">https://www.nationalgrideso.com/document/273801/download</a>  page 85 “What is the next big operational challenge?”</p>
6	Do you have any other comments?	<p>FRCR could consider the full frequency range which may be seen in exceptional circumstances, 47.5 and 52Hz.</p> <p>There appears to be no consideration of “Black Swan” events within the FRCR. Future versions of FRCR could consider the effectiveness of measures in place to minimise system collapse in the event of the unexpected, the so-called “Black Swan” event.</p> <p>This, for example, could assess the effectiveness of LFDD with increasing penetration of distributed generation and the benefits of mandatory under-frequency response for battery storage systems introduced in G99.</p>

		<p>If this is not going to be considered as part of FRCR, could this limitation on scope be made clear in future editions? Also, is there a separate activity planned to review the forward-looking effectiveness of the System Defence Plan. <a href="https://www.nationalgrideso.com/document/156691/download">https://www.nationalgrideso.com/document/156691/download</a></p> <p>For example, should 4.1.3 be updated to include outfeed losses given the increasing number of interconnectors?</p>
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