

Code Administrator Consultation Response Proforma**GC0163: GB Grid Forming (GBGF) - Removal of Virtual Impedance restriction**

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 grid.code@nationalgrideso.com by **5pm** on **02 May 2024**. 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 Elana Byrne Elana.Byrne@nationalgrideso.com or grid.code@nationalgrideso.com.

Respondent details	Please enter your details	
Respondent name:	Ben Marshall	
Company name:	National HVDC centre, owned and operated by SSEN-Transmission on behalf of GB TOs and ESO	
Email address:	Benjamin.Marshall@sse.com	
Phone number:	07553023150	
Which best describes your organisation?	<input type="checkbox"/> Consumer body <input type="checkbox"/> Demand <input type="checkbox"/> Distribution Network Operator <input type="checkbox"/> Generator <input type="checkbox"/> Industry body <input type="checkbox"/> Interconnector	<input type="checkbox"/> Storage <input type="checkbox"/> Supplier <input type="checkbox"/> System Operator <input checked="" type="checkbox"/> Transmission Owner <input type="checkbox"/> Virtual Lead Party <input checked="" type="checkbox"/> Other

I wish my response to be:

(Please mark the relevant box)

☒ **Non-Confidential** (*this will be shared with industry and the Panel for further consideration*)

☐ **Confidential** (*this will be disclosed to the Authority in full but, unless specified, will not be shared with the Panel or the industry for further consideration*)

For reference the Applicable Grid Code Objectives are:

- a) *To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity*
- 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);*

- 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;*
- 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; and*
- e) *To promote efficiency in the implementation and administration of the Grid Code arrangements*

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

Standard Code Administrator Consultation questions		
1	Please provide your assessment for the proposed solution(s) against the Applicable Objectives?	<p>Mark the Objectives which you believe the proposed solution(s) better facilitates:</p> <p>Original <input type="checkbox"/>a) <input checked="" type="checkbox"/>b) <input checked="" type="checkbox"/>c) <input type="checkbox"/>d) <input type="checkbox"/>e)</p> <p>This modification improves upon the original conception of Grid forming by providing the OEM greater flexibility in how the objectives of grid forming performance are met without diluting that performance. The proposal has been carefully drafted to preserve clarity in testing and modelling of such approaches also to avoid hidden variables of grid forming behaviour within such control approaches.</p>
2	Do you have a preferred proposed solution?	<p><input checked="" type="checkbox"/>Original <input type="checkbox"/>Baseline <input type="checkbox"/>No preference</p> <p>Click or tap here to enter text.</p>
3	Do you support the proposed implementation approach?	<p><input checked="" type="checkbox"/>Yes <input type="checkbox"/>No</p> <p>yes</p>
4	Do you have any other comments?	<p>Grid forming controls are a relatively new development whose deployment should naturally inform codification based on experience. This modification provides an excellent foundation to this, however there are further steps beyond it. In our opinion, this should extend to 1) examining how the “handshake” between initial inertial action and frequency response informs the energy density requirements of the energy store behind the grid forming device (for example taking account of international definitions to tests which are more piecewise</p>

	<p>over time than those currently in place in GB). 2) consideration of the optimal deployment of secondary damping controls to support both frequency stabilisation and elimination of inter-area modes, 3) examining guidance on the programmed inertia of such devices over the time of an event (it need not be the same value and indeed there will be advantages from approaches where it is varied) 4) examining providing advice on the network interface criteria for switching between grid forming and grid following mode (e.g. a new definition of steady operating state enabling this) 5) considering the value of mandating Grid forming modes of operation in the future 6) consideration of its use within HVDC systems both via interconnectors (and hybrids) where a maximum extent of grid forming may be necessary to define, and co-ordinated HND solutions where grid forming priorities between onshore and offshore systems will need to be defined. In our opinion at the national HVDC centre these areas can be addressed in future work informing future updates to the existing guidance notes as experience develops to support growing industry adoption, but may in turn re-visit aspects of the virtual impedance definition and its relation to the programmable inertia constant over the time of event response.</p>
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