

## Workgroup Consultation Response Proforma

### GC0137: Minimum Specification Required for Provision of GB Grid Forming (GBGF) Capability (formerly Virtual Synchronous Machine/VSM Capability)

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](mailto:grid.code@nationalgrideso.com) by 5pm on **30 April 2021**. Please note that any responses received after the deadline or sent to a different email address may not receive due consideration by the Workgroup.

If you have any queries on the content of this consultation, please contact Kavita Patel [Kavita.patel@nationalgrideso.com](mailto:Kavita.patel@nationalgrideso.com) or [grid.code@nationalgrideso.com](mailto:grid.code@nationalgrideso.com)

Respondent details	Please enter your details
<b>Respondent name:</b>	Eric Lewis
<b>Company name:</b>	Enstore
<b>Email address:</b>	ericlewis@coldmail.co.uk
<b>Phone number:</b>	07837517062

### For reference the Applicable Grid Code Objectives are:

- To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity*
- 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);*
- 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;*
- 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*
- To promote efficiency in the implementation and administration of the Grid Code arrangements*

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

Standard Workgroup Consultation questions		
1	Do you believe that the GC0141 Original Proposal better facilitates the Applicable Objectives?	No
2	Do you support the proposed implementation approach?	Yes
3	Do you have any other comments?	I consider that two Edits are needed based on work carried out are the consultation was issued  The proposed Edits are after the Specific Workgroup Consultation questions
4	Do you wish to raise a Workgroup Consultation Alternative Request for the Workgroup to consider?	No
Modification Specific Workgroup Consultation questions		
5	Do you believe it is appropriate specify GB Grid Forming as a non-mandatory requirement in the Grid Code and be accessed by future market arrangements rather than as a mandatory requirement?	Yes  But the question is missing a “to” before specify
6	Do you believe the current proposal is sufficiently flexible and facilitates a range of technologies? If not, please state why you feel this to be the case and what type of technologies have been excluded?	Yes
7	Do you believe the proposal will result in excessive equipment costs? This excludes development costs whilst recognising plant can be also be de-loaded?	No
8	Do you believe the proposed Grid Code	No

proposals sit better in the Planning Code, Connection Conditions / European Connection Conditions and Compliance Processes / European Compliance Processes bearing in mind the proposals are non-mandatory or do you think it would be better to have a new standalone section	
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### Proposed edits to the proposed Grid Code from Enstore.

#### ***Edit topic 1. The Proposed Grid Code needs two H values***

There are changes needed in three parts of the proposed **Grid Code**.

These changes are needed following the use of **ROCOF Response Power** in the proposed **Grid Code**.

The change is that a **GBGF- I** inverter now needs two inertia values **H** and **He**.

If needed a different symbol can be used for **He**.

The **H** is the traditional value and this defines the resonant frequency of the systems **NFP** plot.

The **He** value is what defines the effective inertia for predicting a **RoCoF** value by the Equation **RoCoF = (Grid power transient in MW x - 25) / (He x Rated installed MVA)**.

#### ***This is the existing data part 1.***

There is not a clear definition of **H** in the existing **Grid Code** definitions,

The text "**Inertia constant (for whole machine), MWsecs / MVA**" is used in many parts of the existing **Grid Code**.

#### ***This is the proposed data part 1.***

This would all be added in the proposed **Grid Code** definitions.

<b>Inertia constant H</b>	For a <b>GBGF-S</b> generator this is MWsecs / MVA. For a <b>GBGF- I</b> inverters this is the MWsecs / MVA produced by the <b>Real Inertia Power</b> and is used in the production of NFP plots.
<b>Inertia constant He</b>	For a <b>GBGF- I</b> inverters this is the MWsecs / MVA produced by the <b>ROCOF Response Power</b> .

***This is the existing data part 2.***

This is in Table ECC.6.3.19.3.2

Inertia Constant using equation 1	<b>H</b>
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***This is the proposed data part 2.***

This is in Table ECC.6.3.19.3.2

<u>Inertia Constant using equation 1</u>	<u>H</u>
<u>Inertia Constant using equation 2</u>	<u>He</u>

***This is the existing data part 3 from below Table ECC.6.3.19.3.2***
$$H = (\text{ROCOF Response Power at 1 Hz} / \text{s} \times \text{System Frequency}) / (\text{Installed MVA} \times 2)$$

Equation 1

***This is the proposed data part 3 to go below Table ECC.6.3.19.3.2.***
$$H = (\text{Real Inertia Power at 1 Hz} / \text{s} \times \text{System Frequency}) / (\text{Installed MVA} \times 2)$$

Equation 1

$$H = (\text{ROCOF Response Power at 1 Hz} / \text{s} \times \text{System Frequency}) / (\text{Installed MVA} \times 2)$$

Equation 2

***Edit topic 2. The Grid Code needs different Peak Current Rating data.******This is the existing data.***

<b>Peak Current Rating</b>	<p>For a <b>GBGF-I Plant</b> this is the larger of either the: -</p> <ul style="list-style-type: none"> <li>Maximum current to supply the <b>ROCOF Response Power</b> plus the <b>Defined Damping Active Power</b>; or.</li> <li>The maximum current to supply the <b>Phase Jump Angle limit power</b>, or.</li> <li>The maximum current defined by the <b>User</b> or <b>Non-CUSC Party</b>.</li> </ul>
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***This is the proposed data.***

<b>Peak Current Rating</b>	<p>For a <b>GBGF-I Plant</b> this is the larger of either the: -</p> <ul style="list-style-type: none"> <li>Maximum current to supply the <u>Rated Continuous Power plus the ROCOF Response Power</u> plus the <b>Defined Damping Active Power</b>; or.</li> <li>The maximum current to supply the <u>Rated Continuous Power plus the Phase Jump Angle limit power</u>, or.</li> <li>The maximum current defined by the <b>User</b> or <b>Non-CUSC Party</b>.</li> </ul>
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