

## Grid Code Workgroup Consultation Response Proforma

### GC0100 EU Connection Codes GB Implementation – Mod 1

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 by **5pm on 2 October 2017** to [grid.code@nationalgrid.com](mailto:grid.code@nationalgrid.com).

Please note that any responses received after the deadline or sent to a different email address may not receive due consideration by the Workgroup.

Any queries on the content of the consultation should be addressed to Chrissie Brown at [Christine.brown1@nationalgrid.com](mailto:Christine.brown1@nationalgrid.com)

<b>Respondent:</b>	<i>Christopher Smith – Christopher.smith3@nationalgrid.com</i>
<b>Company Name:</b>	<i>National Grid Interconnector Holdings Ltd</i>
<b>Please express your views regarding the Workgroup Consultation, including rationale.</b> <b>(Please include any issues, suggestions or queries)</b>	<p><i>For reference, the Grid Code objectives are:</i></p> <ul style="list-style-type: none"><li>i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity</li><li>ii. To facilitate 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)</li><li>iii. 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</li><li>iv. 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</li><li>v. To promote efficiency in the implementation and administration of the Grid Code arrangements</li></ul>

### Standard Workgroup Consultation questions

Q	Question	Response
1	Do you believe that GC0100 Original proposal, or any potential alternatives for change that you wish to suggest, better	No comments offered

	facilitates the Grid Code Objectives?	
2	Do you support the proposed implementation approach?	No comments offered
3	Do you have any other comments?	No comments offered
4	Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider?	<i>If yes, please complete a WG Consultation Alternative Request form, available on National Grid's website, <a href="http://www2.nationalgrid.com/uk/industry-information/electricity-codes/grid-code/modifications/forms-and-guidance/">http://www2.nationalgrid.com/uk/industry-information/electricity-codes/grid-code/modifications/forms-and-guidance/</a> and return to the Grid Code inbox at <a href="mailto:grid.code@nationalgrid.com">grid.code@nationalgrid.com</a></i>

### Specific GC0100 questions

Q	Question	Response
1	Removing More Stringent Requirements' concerns have been expressed by some Workgroup members that applying more stringent requirement on newly connecting parties (that fall within this scope of the EU Network Codes for generation, demand and HVDC systems) maybe incompatible with EU law. Do you have any views on this topic that could assist the Workgroup when they are considering the topic in due course?	No comments offered
2	Are you comfortable with using the EU definition of Maximum Capacity instead of the GB definition of "Registered Capacity"?	No comments offered
	<b>Fast Fault Current Injection questions</b>	
3	What are your views on options 1, 2 and 3 as set out in paragraph 4.4 for Fast Fault Current Injection and which option (if any) would you prefer?	As explained below we believe that options 1 and 2 would have a significant impact on the technology provided and would significantly increase CAPEX cost threatening viability. Therefore National Grid Interconnectors Holdings Ltd would strongly support

		option 3. We would also support the setting up of a separate workgroup to consider a wider range of technical and market based solutions to the technical challenge that is being investigated.
4	Do you have any alternative fast fault current injection solutions noting that the requirement applies to the Converter not the wider Power System?	No comments offered
5	In considering the three Fast Fault Current Injection options 1, 2 and 3 in paragraph 4.4 do you have any comments in relation to technology readiness, cost implications, and can they be implemented date within the context of product development timescales?	<p>For HVDC systems the power electronics are the limiting technology. The very short thermal timeconstants in the power electronics results in the equipment being sized for the proposed overload capability, as stated in option 1 and option 2 as a full time rating. As a result, the HVDC equipment will need to be oversized for the rated capacity of the project.</p> <p><u>Example 1</u></p> <p>As an example the 1000MW HVDC links are being delivered with dc voltages of <math>\pm 320\text{kV}</math>. Under option 1 to achieve the overload capability the same 1000MW project would be required to delivered with a <math>\pm 500\text{kV}</math>. This has a number of issues for a developer.</p> <ul style="list-style-type: none"> <li>• Underutilised equipment therefore a loss of cost efficiency.</li> <li>• Larger buildings, for example building heights would move from 20m to 24m. This can have a significant effect on the availability of locations and the ability to achieve planning consent.</li> <li>• Reduced supply chain. The higher the operational voltage the smaller the number of suppliers with suitable experience at that voltage for both cables and converters.</li> </ul> <p><u>Example 2</u></p> <p>The supply chain will be required to create a new product design just for the UK. This could possible include the higher rated devices. This has a number of issues for a developer.</p> <ul style="list-style-type: none"> <li>• UK specific designs will attract a premium from the supply chain.</li> <li>• Potential reduction in number of suppliers as they may not chose to produce new products</li> <li>• Ongoing maintenance issues. Higher spares holdings will be required as supplier standard products are not being used.</li> <li>• Higher downtime as Original Equipment Manufacturer only has a small number of staff trained in the UK unique product.</li> </ul>

		<p>The use of option 3 allows for a market driven solution and a wider variety of solutions to meet the issues.</p> <p>National Grid Interconnectors Holdings Ltd would also highlight that the consultation discusses Energy Storage. As per the Section 10 of the Electricity Act 1989, all licenced TSOs (which include all owners of interconnectors) must be certified as unbundled from generation or supply activities. This process of certification establishes the facts of the relationship between entities, and precludes TSOs from having control (not simply a &gt;50% share holding) over a relevant producer or supplier.</p> <p>As per Ofgem's recent announcement that storage will be licenced as a sub-set of generation, all battery storage is classified as generation. While Section 10 of the Electricity Act does allow Ofgem to exercise some discretion (whereby they can approve certification even if they find that the TSO has control of a producer or supplier) the specific prohibition on exercising this discretion found in Section 10F (9) applies:</p> <p>"(9A) Except where subsection (9B) applies, the Authority may treat one or more of the five tests in this section as passed if...</p> <p>...(9B) This subsection applies where the applicant, or a person who controls or has a majority shareholding in the applicant, controls or has a majority shareholding in a person ("A") who operates a generating station and—</p> <p>(a) A is a relevant producer or supplier; and</p> <p>(b) the generating station is directly physically connected to anything that forms part of the applicant's transmission system or electricity interconnector."</p> <p>This section of the act specifically prohibits Ofgem utilising their discretion to certify where the storage in question is connected to the licensee's interconnector.</p> <p>Therefore, requiring interconnector owners to install battery storage appears incongruent with the</p>
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		regulations.
6	Do you have any evidence to support your views?	See answer to question 5
7	Do you have any views on the specific costs related to the additional requirements?	<p>Whilst National Grid Interconnectors Holdings Ltd cannot provide detailed cost information in the public domain we would highlight the following to the Regulator:</p> <p>The answer Question 5 provided an example 1. The Regulator can use the FPA submissions for IFA2 and NSL to ascertain an order of magnitude increase as follows:</p> <p>Converter Costs: The Converter for a 1000MW IFA2 type link would cost the same as the NSL link.</p> <p>Cable Costs: Whilst more difficult to directly relate a scaled NSL cost for the IFA2 length would provide an approximation.</p> <p>Developers would need to consider if the additional CAPEX would make investment worth while, irrespective of the present Regulatory regimes.</p> <p>National Grid Interconnectors Holdings Ltd would also re-iterate the reference to cost analysis form other TSO's which have indicated that alternative technologies, such as Synchronous Condensers, provide a cost advantage.</p> <p><a href="http://www.eirgridgroup.com/site-files/library/EirGrid/System-Service-Provision-DNV-KEMA-Report-2012.pdf">http://www.eirgridgroup.com/site-files/library/EirGrid/System-Service-Provision-DNV-KEMA-Report-2012.pdf</a></p>
8	Is the current proposed wording for the remote end HVDC and DC Connected Power park modules sufficient to facilitate future new technology?	It would appear that the requirements offshore may result in innovative solutions, such as DC connected windfarms, not being allowed to be implemented.
	<b>Banding questions</b>	
9	What are the specific costs related to the additional requirements?	No comments offered
10	Do you have any views on the banding thresholds for the original and those suggest for the possible alternative?	No comments offered

11	Can you provide any feedback/comments on the associated legal text?	No comments offered No comments offered
	<b>Fault Ride Through</b>	
12	Do you support the fault ride through voltage against time curves If not please state why you disagree, what alternative you would recommend and your justification for any alternative?	No comments offered
13	Do you have any specific views about the proposal to modify the stage 2 under voltage protection for distributed generation interface protection?	No comments offered
	<b>Other questions</b>	
14	Does the Legal drafting contained in annex 2 and 3 deliver the intent of the solution outlined in section 3?	Yes
15	Do you have any information based on the proposed solution in respect of implementation costs?	No comments offered