

Review of AJ draft “Initial RfG National Parameter Selection” handout  
issued at GC0048 meeting 6, 17<sup>th</sup> December 2014

Article	JD Comment on AJ draft proposal	National Grid Comments
General	AJ draft document is based on consideration of Grid Code. Similar review of D-Code is required. <u>As far as I’m aware there are no national parameters referred to in RfG that only occur in the D Code; ie I think all that are there are inherited from the G Code. We’ll do a quick check.</u>	Agree with Mike but a checks needs to be undertaken to ensure consistency. There should already consistency between the Grid Code and G59.
<b>Type A</b>		
8.1(a)	No comment	
8.2	Since there is no specified value for this parameter in the GB Grid Code and it is under consideration by GC0079, it is not necessary (and it would be inappropriate) for GC0048 to propose a value greater than 0Hz/s until another value is proposed by GC0079. <u>I agree with this.</u>	The only comment I would add is that GC0048 has proposed a value of 1Hz/s for protection settings for Asynchronous plant. As part of the frequency response compliance tests ±1Hz/s tests or equivalent are applied to check the robustness of the Governor Control System to system islanding conditions.
8.3	<p>The draft RfG does not require a national parameter to be set for activation time.</p> <p>Considering the proposed value “Activation time: 2 seconds” seems reasonable and should encompass the capabilities of existing generators. However, is it sufficient given the onerous conditions which the SOF 2014 envisages if such activation delay is common in future (SOF table 7 and footnote 8)?</p> <p>Activation time should be ignored by GC0048 and further considered by GC0087. <u>Agree all of this.</u></p>	<p>Based on current code as published on 14<sup>th</sup> January 2014 this text could change as it is in yellow, but agree a National Parameter of 2 seconds is not explicitly specified.</p> <p>This is more of an issue for plant operating in frequency sensitive mode and providing primary response but nonetheless important for Limited Frequency Mode of operation. Agree 2 seconds seems reasonable but dependant on study work plant mix and inherent system inertia.</p> <p>Agree unless subject to RfG text changes. The issue is more critical for plant operating in frequency sensitive mode covered under Article 10.2(c).</p>
8.4	No national parameter is required.	Agree
8.5	No comment	
8.7	<p>The RfG says “<i>The Relevant TSO shall define...</i>”</p> <ul style="list-style-type: none"> <li>“<i>Frequency ranges, within which an automatic connection is admissible, and a corresponding delay time</i>” PARAMETER</li> </ul>	Under the GB Grid Code we do not permit automatic reconnection of Generation unless notified in advance to National Grid. These requirements are covered under BC2 of the Grid Code. Under normal operational conditions, BM

	<p>DEFINITION (AND OTHER CONDITIONS) REQUIRED. Is this covered in the D-Code / G59 for embedded generators? <u>Not explicitly. It simply assumes in 11.5.8 of G59 that when parameters are restored to those that don't violate protection settings, the DG may reconnect.</u></p> <ul style="list-style-type: none"> <li>• "maximum admissible gradient of increase of Active Power output" parameters already defined in BC1.A.1.1. No further definition required</li> </ul>	<p>participants are required to synchronise to the System within <math>\pm 5</math> minutes of the times notified to NGET. For normal operational conditions the frequency range for connection would be defined through the synchronising requirements which would be covered under the Relevant Electrical Standards.</p> <p>Agree</p>
<b>Type B</b>		
9.3(a)	<p>Regarding asynchronous PGMs, on what basis do you "suggest the same values as current GB Offshore requirements"?</p> <p>RfG FRT requirements apply at Connection Point which is a significant departure from GB Grid Code with respect to embedded generators. Agree further study is required.</p> <p>The requirement for each TSO to define pre-fault and post-fault conditions for FRT applies to all PGMs (synch and asynch) and is new for all GB PGMs</p> <p>Requirements will have to be applied to generators not presently required to comply with GB Grid Code. How? Though D-Code?</p>	<p>This is a good point and should be re-phrased. I have taken this point into account and rephrased the comments in the parameter table. The Offshore voltage duration curve (Figure 6) was developed based on manufacturer capability and to provide a suitable benchmark for them to undertake type tests and studies. It is suggested that a similar approach could be adopted but would need input / study work from manufacturers, DNOs , TO's and NGET.</p> <p>Agree</p> <p>Agree – This is being discussed as part of GC0062 but will be an inherent feature of the new requirements.</p> <p>This will require input with the DNO's.</p>
9.3(b)	<p>Do we need better definition of asymmetrical FRT for GB?</p> <p>Although not stated as applying at Connection Point, this would be preferable for consistency with Article 9.3(a)</p>	<p>Agree.</p> <p>Agree but think this requires further discussion. There may (although this is questionable) be some additional guidance from ENTSO-E.</p>

	<p>Requirements will have to be applied to generators not presently required to comply with GB Grid Code. How? Through D-Code?</p> <p>Although no mention is made of pre-fault and post-fault conditions, this would be preferable for consistency with Article 9.3(a)</p>	<p>Agree but further working group discussion / agreement required.</p> <p>Agree but further working group discussion / agreement required.</p>
9.4(a)	<p>Conditions definitions required by Relevant TSO</p> <p>Is this covered in the D-Code / G59 for embedded generators? <u>As above- suspect if not for this EU NC, then for possibly one of the Operations codes, we'll need a substantial debate on this.s</u></p> <p>Compatibility with G-Code BC2.5.2?</p>	<p>See above response to 8.7 – The current requirements for re-connection of plants captured under the BM are covered under BC2. For Smaller Embedded Plant discussions need to be held with the DNO's and NGET. A mechanism needs to be established as to how the data from Embedded Generation is fed to NGET as NGET have responsibility for control of system frequency. Agree with Mike – substantial debate is required on this.</p> <p>Agree – see above but requires further discussion.</p>
9.5	<p>Systems for coordination and agreement required. Adequacy of existing systems wrt RfG?</p> <p>Systems for information exchange required. Adequacy of existing systems wrt RfG?</p>	<p>Existing practices and procedures would be expected to apply. We can discuss this further if required.</p> <p>Under the Grid Code information exchange and operational metering is covered under CC.6.5.6 with specific details being covered under the Bilateral Agreement.</p> <p>This issue also needs to be picked up on the DNO side and additionally the possibility of sharing Embedded Generation data between the DNO and NGET . Further discussion will be required in this area.</p>
<b>Type C</b>		
10.2(a)	<p><i>"...The Relevant Network Operator or the Relevant TSO shall define the period within which the adjusted Active Power set point must be reached. The relevant TSO shall define within a tolerance (subject to the availability of the prime mover resource) applying to the new Setpoint and the time within which it shall be reached...."</i></p>	<p>Existing Grid Code (CC.6.3.6 / CC.6.3.7 / CC.A.3 / BC2 / BC3) and Distribution Code (?) provisions would be expected to apply. Requires further discussion.</p>

	<p><i>... The Relevant Network Operator or the Relevant TSO shall notify the period within the adjusted Active Power set point is to be reached and the tolerance level to the National Regulatory Authority..."</i></p>	
10.2(b)	<p>The draft RfG does not require a national parameter to be set for activation time.</p> <p>Considering the proposed value "Activation time: 2 seconds" seems reasonable and should encompass the capabilities of existing generators. However, is it sufficient given the onerous conditions which the SOF 2014 envisages if such activation delay is common in future (SOF table 7 and footnote 8)?</p> <p>Activation time should be ignored by GC0048 and further considered by GC0087.</p> <p>Let's be careful not to confuse "activation time" and "initial activation delay"</p>	<p>Agree unless subject to RfG text changes</p> <p>Agree – see above comment under 8.3 but note LFSM-U is a new requirement for the GB Code.</p> <p>LFSM-U is a new requirement for the GB Code and will need to be included in the drafting but would need to be consistent with the values developed from GC0087.</p> <p>Agree</p>
10.2(c)	<p>The draft RfG does not require a national parameter to be set for activation time for generators with inertia but does allow the Relevant TSO to specify a shorter activation time for generators without inertia.</p> <p>Considering the proposed value "initial delay t1: 2 seconds" seems reasonable for generators with inertia and should encompass the capabilities of existing generators. However, is it sufficient given the onerous conditions which the SOF 2014 envisages if such activation delay is common in future (SOF table 7 and footnote 8)?</p> <p>initial delay t1 for generators with and without inertia should be ignored by GC0048 and further considered by GC0087.</p>	<p>Agree but note as this is highlighted text it could be subject to change.</p> <p>Agree – Further assessment and study work may be required.</p> <p>Agree</p>
10.2(f)	<p><i>"The Relevant Network Operator and the Relevant TSO shall define while respecting the provisions of Article 4(3) additional signals to be provided..."</i></p>	<p>At this stage it is unlikely that additional signals would need to be provided. We will already have to update the ASBMON spec to cover the minimum signals</p>

		required by RfG.
10.6(b)	Various instrumentation settings	Further discussion required but NGET already have requirements for Dynamic System Monitoring, Power Quality Monitoring and fault recording. Some work will be required to ensure consistency between RfG requirements and current GB practice. This issue has already been highlighted internally.
10.6(e)	<p><i>“The Relevant Network Operator in coordination with the Relevant TSO shall define while respecting the provisions of Article 4(3) minimum and maximum limits on rates of change of Active Power output...”</i></p> <p>parameters already defined in BC1.A.1.1. No further definition required</p>	Agreed
<b>Type D</b>		
11.2(a)	I thought $\geq 132\text{kV}$ tolerance was $\pm 10\%$ in ESQCR? If so, no problem.	In Grid Code and SQSS for voltages below 132kV the permitted voltage range is $\pm 6\%$ . Under RfG nominal voltages above 110kV are permitted to have a range of $\pm 10\%$ . If ESQCR advises a wider range below 132kV then we will need to have a discussion on this.
11.3	<p>RfG FRT requirements apply at Connection Point which is a significant departure from GB Grid Code with respect to 132kV embedded generators. Further study is required.</p> <p>The requirement for each TSO to define pre-fault and post-fault conditions for FRT applies to all PGMs (synch and asynch) and is new for all GB PGMs</p> <p>Requirements may have to be applied to generators not presently required to comply with GB Grid Code (e.g. 132kV connected in England &amp; Wales &lt;50MW). How? Though D-Code?</p>	<p>Agreed</p> <p>Agreed – this point is being included as part of the GC0062 discussions but is thought to be a welcome addition.</p> <p>Agreed – This will require discussion with the DNO’s and amongst the working group.</p>
12.2(a)	<p>“With regard to Reactive Power capability the Relevant Network Operator shall have the right to define...”</p>	Already defined in GB Code. Discussion required with DNO’s.
12.3	<p>Post fault active power recovery is a significant concern of Eirgrid and could become a material consideration for GB during periods of low system inertia.</p> <p>Determination of suitable parameters</p>	Agreed – will require further study work and input from GC0087, GC0062 and SOF work.

	should be the responsibility of GC0087	Agreed – see above but GC0062, GC0087 would need to determine before conclusion of RfG.
13.2	Is RfG compatible with existing national parameters?	Not quite. RfG specifies reactive capability at the Connection Point where as Grid Code specifies the requirements at the Generator Terminals. RfG also specifies the requirements in terms of Q/Pmax rather than Power Factor. There are similarities between RfG and GB requirements but they are not the same.
15.2	Is RfG compatible with existing national parameters?	No – RfG is much more specific than current GB requirements. Significant analysis and study work required.
15.3	Post fault active power recovery is a significant concern of Eirgrid and could become a material consideration for GB during periods of low system inertia.  Determination of suitable parameters should be the responsibility of GC0087	Agreed – Further analysis required and input necessary from SOF and GC0087.
16.3	Is RfG compatible with existing national parameters?	The requirement is broadly the same but RfG specify the requirements in a very different way to GB.
16.3(d)	SHEPD and SPD (and any other DNO choosing to require voltage control of embedded generators) should codify their V-control requirements according to article 4(3)	This requires discussion amongst the working group and with all the DNO's not necessarily just the Scottish DNO's.
16.3(e)	NG and DNOs to agree and define globally or on a case by case basis?	This is a tricky one. This will require further analysis and study work.