

Workgroup Consultation Response Proforma

GC0141: Compliance Processes and Modelling amendments following 9th August Power Disruption

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 **30 March 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 Joseph Henry Joseph.henry@nationalgrideso.com or grid.code@nationalgrideso.com

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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 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	Some parts of GC0141 better facilitate the objectives:

	Proposal better facilitates the Applicable Objectives?	<p>1) We support the proposals to clarify the FRT requirements to ensure plant remains connected for 30min after a fault and extend the scope of FRT simulations for large / complex systems. This could avoid a repetition of some of the events on 9th August 2019. However we are concerned that the Grid Code still omits:</p> <ul style="list-style-type: none"> ○ Clarity on the definition of multiple FRT capability; e.g. <ul style="list-style-type: none"> ▪ is it acceptable to ride through a single fault <i>per minute? Per hour? Per day?</i> etc ▪ Are interconnectors and generators and bootstraps subject to the same multiple FRT requirement? ○ Detail on whether these proposals to remain connected also apply to bootstraps (Transmission Owner HVDC systems) <p>2) We are supportive of more detail required for controller models and validation of their accuracy.</p> <p>However, users smaller than the 'Large' MW threshold will avoid these requirements. Therefore unless this change also applies to all distribution and transmission Users then this will be yet another reason for applicants to be sized just below the threshold of 'Large' (e.g. 49.9 MW). These model validation requirements could be a significant barrier for smaller generators / battery owners and if there is a geographic variation, persuade certain generator or storage providers not to connect in certain parts of the country (e.g. Scotland) where there would otherwise have to comply (unless these model validation requirements were also replicated in G99). Therefore NGESO need to be aware that if these changes are only implemented in the Grid Code they risk applying material costs to - and discriminating against - generators on a geographical basis which goes against the intention of the RfG and which may not be legally possible.</p>
2	Do you support the proposed implementation approach?	<p>For FRT changes, these should be implemented immediately.</p> <p>Other changes are more contentious -see comments/responses below</p>

3	Do you have any other comments?	<p>Regarding these terms of reference of the Workgroup:</p> <p>A) <i>“Implementation and Costs”</i></p> <ul style="list-style-type: none"> - It's not clear the w/g has considered the costs of an Independent Engineer or the administrative burden of a 5-yearly re-compliance process as is proposed. <p>E) <i>“Consider interaction with generators that aren't required to comply with the Grid Code”</i></p> <ul style="list-style-type: none"> - It's not clear the workgroup has considered this aspect of the ToR and how these changes would / should affect existing and future Significant Grid Users including, but not limited to, Type C and Type D generators < 50 MW in England and Wales whose compliance is the responsibility of DNOs, yet these changes (that clearly impose costs) <i>would</i> apply to those generators elsewhere in GB. <p>The workgroup needs to consider if these changes are not also reflected in the Distribution Code whether they would be discriminating against generators based on their location and in particular, imposing costs which are disproportionate to the benefit</p> <p>In light of the above it will be necessary for the workgroup to examine what steps need to be taken to prepare for the consequential changes needed to the distribution code to ensure non-discriminatory application of this code change.</p> <p>G) <i>“Consider the testing that should be done after a software update”</i></p> <ul style="list-style-type: none"> - Software updates on converter-connected generation or HVDC converters can be required over the course of the lifetime in order to resolve software bugs or address security issues but the Grid Code is silent in terms of the testing that generators should expect to perform after an update to ensure they remain compliant. A 5-yearly self-certification will not solve this issue and more guidance from NGENSO to Users is required.
4	Do you wish to raise a Workgroup Consultation	<p>Yes:</p> <ol style="list-style-type: none"> 1) To remove the Independent Engineer (IE) requirement for all generators and for the cost to

	Alternative Request for the Workgroup to consider?	<p>NGESO of using an IE (if required) to be included in connection application fees only for very large sites</p> <p>2) A variation to the 5-year re-compliance process that would require:</p> <ul style="list-style-type: none"> - submission of data changes only - generators to present details of their plant change control procedures and internal processes to maintain grid compliance as evidence they follow Good Industry Practice <p>3) A combination of 1 + 2</p>
Modification Specific Workgroup Consultation questions		
5	What should the Independent Engineer's deliverables be with respect to the outcome of the compliance process?	<p>We do not support the concept of an Independent Engineer (IE) <i>for all Users</i> for these reasons:</p> <ul style="list-style-type: none"> • Having to contract an IE would likely double costs for FRT simulation work as the work would need to be effectively duplicated by the IE in order to thoroughly check whether the simulations are correct. • It is not clear who would determine if a person/organisation was suitably qualified to be an IE; if there are only one or two available then the lack of competition amongst IE service providers would greatly increase costs to generators which would flow to consumers. • Ultimately, the responsibility for verifying that FRT simulations cover the correct scenarios can only lie with the ESO; i.e who will check the Independent Engineer has done their job? The User (and IE) could reasonably argue they have done all they can <i>with the knowledge they have</i>. Only the ESO has experience of what types of fault are likely to occur and what outage conditions are possible and if the User has demonstrated compliance. • Whilst it is understandable that more scrutiny should be given to large 1GW+ generators and interconnectors with complex connections it is not clear what benefit an IE would bring for <i>smaller onshore generators</i> that have a single connection point and no auxiliary reactive power equipment. • For example, it is not clear why an IE is needed for the case when an existing 11 MW synchronous generator in the North of Scotland reaches the end of its life and needs replacing

		<p>(as such a generator would due to its location, be considered 'Large' and caught by the Grid Code). In such a case there is a very limited (perhaps only one) set of FRT scenarios that would need modelling and consequently no value would be added from an IE, yet as proposed a full re-compliance under the ECCs would be required for such a generator.</p> <ul style="list-style-type: none"> • Similarly, this degree of scrutiny would impose yet another additional cost on 'Large' < 50 MW generators in Scotland who would be caught by the ECCs as opposed to < 50 MW generators in E&W would are not classified as 'Large' and thereby avoid this requirement (unless the IE requirement was also replicated in G99). • It is not clear that having an IE would have avoided the 9th August trips of Little Barford and Hornsea power stations; <ul style="list-style-type: none"> ○ it's possible an independent review could have highlighted the <i>potential</i> for risk at Hornsea but without detailed understanding of the wind turbine control systems it is not obvious an IE would have identified the problem. ○ Furthermore, an IE would almost certainly have not spotted the risk of trip arising from the difference in speed sensor readings at Little Barford since the cause of this is apparently still unclear. • However what is certain is that an IE would impose a significant cost (> £20k) per generating station for every connection application and subsequent recertification when the generator is replaced. • It is also not clear from the Legal Text how the Independent Engineer verification will be required for existing sites. It is essential that any Independent Engineer only applies to future sites. If not then: <ul style="list-style-type: none"> ○ According to the TEC and Embedded connection registers, there are 461 transmission connected stations and a further 103 distribution connected stations who are defined as 'Large' and would be caught if this change was retrospective.
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6	Should there be specific requirements on the retention of data for the User and/or the ESO?	It would be considered Good Industry Practice for the User to retain the data originally submitted to obtain the FON. However, it is not efficient to require full resubmission of all data every 5 years; only data that has changed should be resubmitted.
7	Should the detailed design stage be more clearly identified within the Grid Code?	The intent of this question is unclear and cannot be determined from the workgroup report.
8	What stages of implementation would the industry believe are appropriate?	<ul style="list-style-type: none"> FRT changes / clarifications – immediately Provision of EMT / RMS models in Powerfactory model – only for new generators (12 month's notice preferable so that it can be included in scope of supply) and explicitly not older generators under the '5-yearly' re-compliance process Provision of shaft stiffness data – only for new generators and explicitly not older generators <i>under the '5-yearly' re-compliance process</i> Sharing of Models with other users; this needs much more thought and discussion with OEMs to understand what's possible Independent Engineer: this should only apply to future projects above a certain size and its cost covered in the connection fee.
9	Should the ESO be required to undertake the responsibilities associated with an independent engineer? Please outline your rationale.	<p>Yes – for most connection applications the ESO should undertake the responsibilities associated with an Independent Engineer.</p> <ul style="list-style-type: none"> It's not clear an IE would have identified the problems that led to the generator trips on 9th August The ESO would inevitably need to deal with any dispute between the IE and generator The ESO would need to assess whether the IE had done their job correctly; how can they

		<p>do this if they do not have the necessary skills because they are sub-contracting the role to IEs all the time?</p> <ul style="list-style-type: none"> - The occasions where the extra scrutiny provided by the IE are likely to be needed would occur only a small minority of (typically very large sites); it is far more economic for the ESO to bring in external support specifically for those large sites rather than require every generator caught by the Grid Code to have to contract the services of an IE. The costs of using IEs for large sites could be managed by modifying the connection application fees for those very large sites.
10	Should there be greater definition be given to “substantial modification” given that the self-certification process places the onerous on the User to make these decisions?	<p>Yes – there is currently no clarity on what ‘substantial modification’ means in practice, particularly when related to hardware / software replacements that are inevitably needed over the course of a generator’s lifetime when parts fail or control software and IT systems age and become unsupportable.</p> <p>Also, NGENSO should be much more proactive in monitoring ongoing compliance of very large generators and their response to minor system disturbances, especially during the commissioning phase. This would identify issues with control systems before a major system fault occurs that would otherwise cause complete trips or unintended responses that result in wider system impacts.</p> <p>This pro-active monitoring would go far further in providing certainty of compliance than any ‘tick box’ exercise by generators to recertify themselves as being compliant every 5 years.</p>
11	Should there be a review of the effectiveness of GC0141 post implementation and after the industry has experience of implementing?	Yes
12	What are your thoughts on the	

<p>workgroup's discussions regarding compliance repeat plan? How would this work in regard to Independent Engineer Verification?</p>	<p>We do not support the proposal for a 5 yearly compliance repeat plan as set out as we do not feel it would lead to improved long-term compliance:</p> <ul style="list-style-type: none"> • The process as proposed would entail significant administrative work to resubmit data that in 99% of cases would be unchanged and that would inevitably become a box-ticking exercise. • Therefore it is not clear what benefit this change will bring, only that it will add substantial administrative cost (and therefore is another reason for Users to size their installations to evade the Grid Code) • Submission of data that has changed is of course necessary but this should already covered by the existing week 28 process • A better approach would be: <ol style="list-style-type: none"> 1. for NGESO to be more proactive in setting up automated monitoring of generator performance in response to <i>minor</i> network faults. This would alert NGESO and the User to potential problems on a site well before a more serious fault occurs. This change could have identified the Large generators that tripped on 9th August as being at risk well before they tripped. 2. It is 'Good Industry Practice' for Users to have robust 'change control' procedures to manage all risks associated with changes to plant. It would be helpful if NGESO provided <i>guidance</i> as to what tests users should expect to perform after any post-FON changes to assure themselves they remain compliant (e.g. changes to communications systems, scada, AVRs, Governors, CTs, VTs etc) • Both changes above would be more likely to ensure active participation by users to maintaining compliance over the long-term than simply resubmitting data that had previously been submitted.
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		Regarding the IE we do not support the concept of an IE for reasons given in response to Question 5.
13	Do you believe that screening processes should be applied ahead of detailed dynamic EMT simulation, and if so, do you believe data exchange should support that?	This requires detailed input from OEMs and NGESO should be explicitly approaching them to understand their concerns given that NGESO have NDAs with some OEMs for model provision.
14	Do you agree that the roles and responsibilities associated with interaction studies should be detailed and clarified, and to what extent?	<p>We agree that roles and responsibilities for interaction studies need to be clarified. Where there is a concentration of HVDC converter stations in a small area, it is hard to see an alternative to the ESO retaining all oversight of interoperability issues. The ESO has ultimately responsibility for the security of the is the only party with access to all data, including fault recording data that could be used to validate results of studies.</p> <p>This is a complex subject area and it will be hard to formulate an arrangement that works in all cases. Therefore we suggest that this subject is separated out of this code modification and considered in its own right as a separate modification proposal (to be brought forward as soon as possible).</p> <p>A requirement for new synchronous generators to provide shaft data should not be difficult to adopt as the cost could be accounted for in any scope of supply and kept low through the competitive tendering that would very likely be used.</p> <p>However where existing synchronous generators are required to submit shaft data then the current approach of 'polluter pays' should hold whereby the new connecting User who is investigating the issue pays the existing generators to obtain the shaft data.</p> <p>Any grid re-compliance at a 5 yearly interval must not be used as a 'back door' by which the ESO can expect to obtain shaft data for existing generators at the generators' cost.</p> <ul style="list-style-type: none"> • We support the aim of the Alternative which restricts the scope to those connected from

		<p>Apr 2015 but the reasoning behind this date is not clear. A more preferable approach would be for it to either apply to all generators caught by the ECCs or better, all <i>future</i> generators where it can be included in the scope of supply from the generator supplier.</p> <ul style="list-style-type: none"> • It is not clear what relevance this change has to the 9th August event and more justification for the need for this change should be given. • We do not support the original proposal which would appear to require every synchronous generator to submit shaft data every 5 years. It is completely unreasonable for generators that may have been on the system for 50+ years (or indeed who pre-date the transmission system) for which no OEM exists to have to bear the cost of obtaining detailed shaft data. (Our reading of the original proposal appears to apply to all generators and those that cannot comply would have to apply for a derogation.) For existing generators, the concept of 'polluter pays' whereby the applying HVDC User is required to pay for data should continue.
15	<p>Do you agree that improved definitions of the types of analysis and definitions suitable analysis environments ahead of the detailed design phase provides useful clarity and minimised project disruption in delivering the principles of this grid code change? Should these form part of legal text or made available with the modification as guidance that may be separately updated from time to time</p>	<p>Intent of question is not clear</p>

16	Do you agree that clarifying roles and responsibility in the management of interaction studies assists more clearly defining the analysis needs of each party, minimising confusion, unnecessary overlap and cost in the design phase?	<p>This and Q17 are complex questions and the detail written in the workgroup report is not clearly written and it is difficult for parties who have not been part of workgroup discussions to understand what is being proposed.</p> <p>Therefore, we suggest that given this issue does not directly relate to the 9th August event, that it is made the subject of a separate grid code modification specifically to look at roles and responsibilities when assessing the risk of SSTI and SSO.</p>
17	Do you agree that small signal analysis supporting the screening of interaction cases should be clearly specified within this grid code change, to better focus the range of EMT studies being discussed, and within the context of existing SSTI and SSO analysis better inform assessment of risks and the need for detailed dynamic simulation which includes shaft data for SSTI?	See reply to Q16
18	What is your view on the separation of the simplified RMS model and EMT model when it comes to confidentiality, distribution and the protection of IP?	This requires detailed input from OEMs
19	As it currently stands, what is your view on the process by which detailed manufacturer EMT-type models are exchanged for necessary studies as	<p>We support the need for provision of RMS / EMT models in the format specified however, we have significant concerns about the proposals for sharing of model data:</p>

	<p>part of project delivery?</p>	<ul style="list-style-type: none"> • It is very unlikely OEMs will agree to permit sharing of their model data with other users in a way that they cannot control • Alternatives 2 & 3 are likely to require the relevant OEMs to have to agree • NGESO should consider Section PC.A8.4 of the Eirgrid Grid Code to see how another TSO manages this issue without breaching confidentiality agreements • NGESO should seek out views of the OEMs to ensure that whatever proposals are put forward are practicable and do not have unintended consequences such as preventing further development of certain technology types which could put at risk decarbonisation targets • There needs to be greater clarity on the need for when a controller model needs to be resubmitted if a site undergoes a control system change; e.g. scada upgrades and replacements of controller hardware of the overall PPM should not trigger the need to resubmit an EMT model • It is not clear how providing these models would have prevented the 9th August event. If this change is unrelated this should be clarified and more substantial reason for the change given <p>The recent cyber-attacks and potential data theft from contractors used by the ESO for power systems analysis work are likely to raise further concerns about the ability of the ESO to adequately protect Intellectual Property held by its 3rd party contractors and provide assurance to wind turbine OEMs that their data will be protected.</p>
20	<p>Are sections PCA.9.8 and PC.A.9.9 better suited to a guidance document and or should they be included, at least partly, within the legal text? Are there any specific concerns with respect to</p>	<p>PCA.9.8 and PC.A.9.9 read more like descriptions of what RMS and EMT models should contain. We believe a better approach would be to have the 'essentials' regarding the models contained in the Grid Code but a separate guidance document giving more description to help OEMs in building the models. (A similar approach was taken with Power Available where a good practice guide for accuracy was issued)</p>

	requirements set out within those sections?	
21	In terms of the requirement for existing users to provide sub-synchronous torsional data for existing plant that may be provided, do you see any issues in regard to the provision of this data?	<p>Where existing synchronous generators are required to submit shaft data then the existing approach of 'polluter pays' should hold whereby the new User pays the existing generators to obtain the shaft data.</p> <p>Any re-compliance self-certification at a 5 yearly interval must not be used as a 'back-door' by which the ESO can expect to obtain shaft data for all existing synchronous generators at the generators' cost. Some synchronous generators have been on the transmission system for over 80 years (in some cases pre-dating the transmission system!) and it's not reasonable they should have to bear the costs arising from new connections.</p> <p>See also response to Q14.</p>
22	Should responsibility for interoperability remain with the generator or the ESO, inclusive of interoperability studies such as control interactions and SSCI/SSTI studies? Please provide your reasoning.	See response to Q14