



Customer Connections *Agora*
15th February 2023

Introduction

The Customer Connection Agora Sessions are aiming to:

- ✓ provide an opportunity to learn about a variety of subjects such as Connection Processes, Codes and Policy Changes, Network Operability, Operational Compliance, Security and Liabilities, Cancellation Charges and more;
- ✓ increase the visibility of the Electricity Connections Team to our customers, stakeholders and the wider electricity market;
- ✓ facilitate updates on our key workstreams and initiatives, as well as enable engagement and interaction via the Questions and Answers segment.

Next Agora

22 March 2023

10.00am - 10.45am

Connections Reform – BP2 Outlook

February 2023 Agora presented by

Biniam Haddish

Electricity Connections Compliance
Manager
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- Arnaldo Rossier
- Yuan Chen
- Natheer Al-Ashwal
- Sami Abdelrahman

Agenda

- GC0141 – Compliance Process and Modelling Grid Code Modification
- Questions and Answers

Please ask all questions in the chat. We aim to get through as many questions as possible.

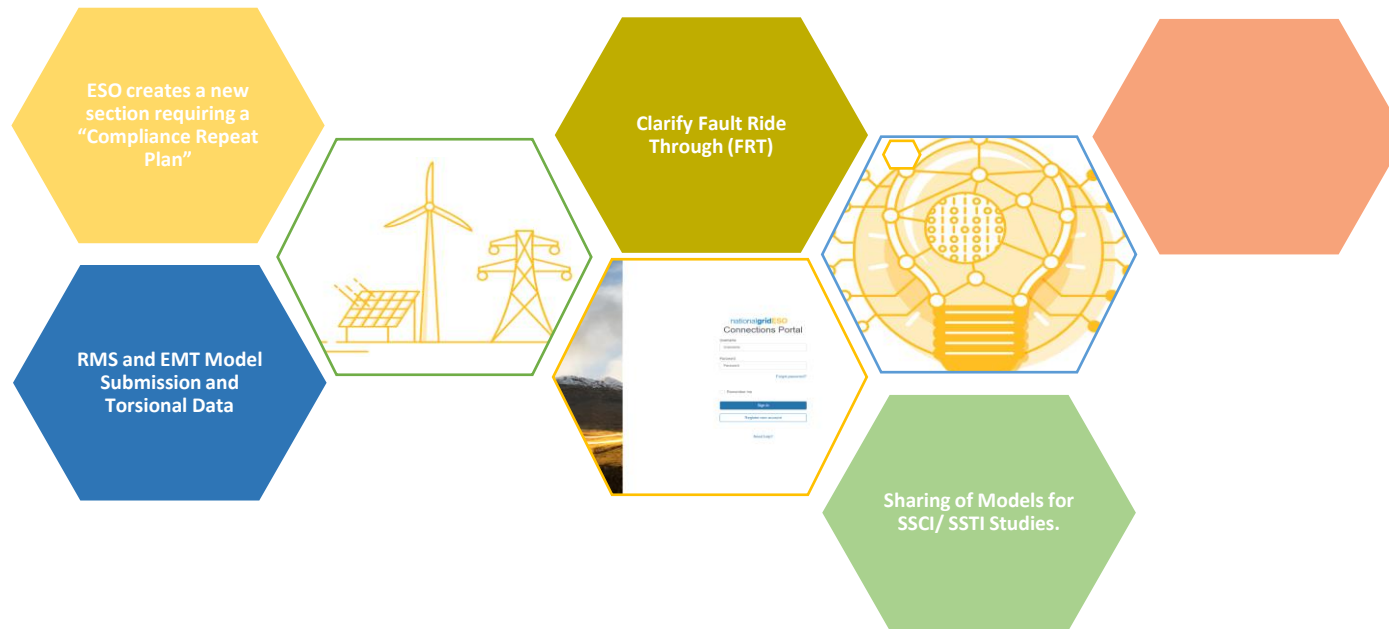


GC0141 – Compliance Process and Modelling Grid Code Modification

Agora
15 February 2023

Introduction

GC0141 Grid Code modification intends to improve modelling, clarify Fault Ride Through (FRT) compliance requirements and improve the compliance process for complex connections.



Decision Brief

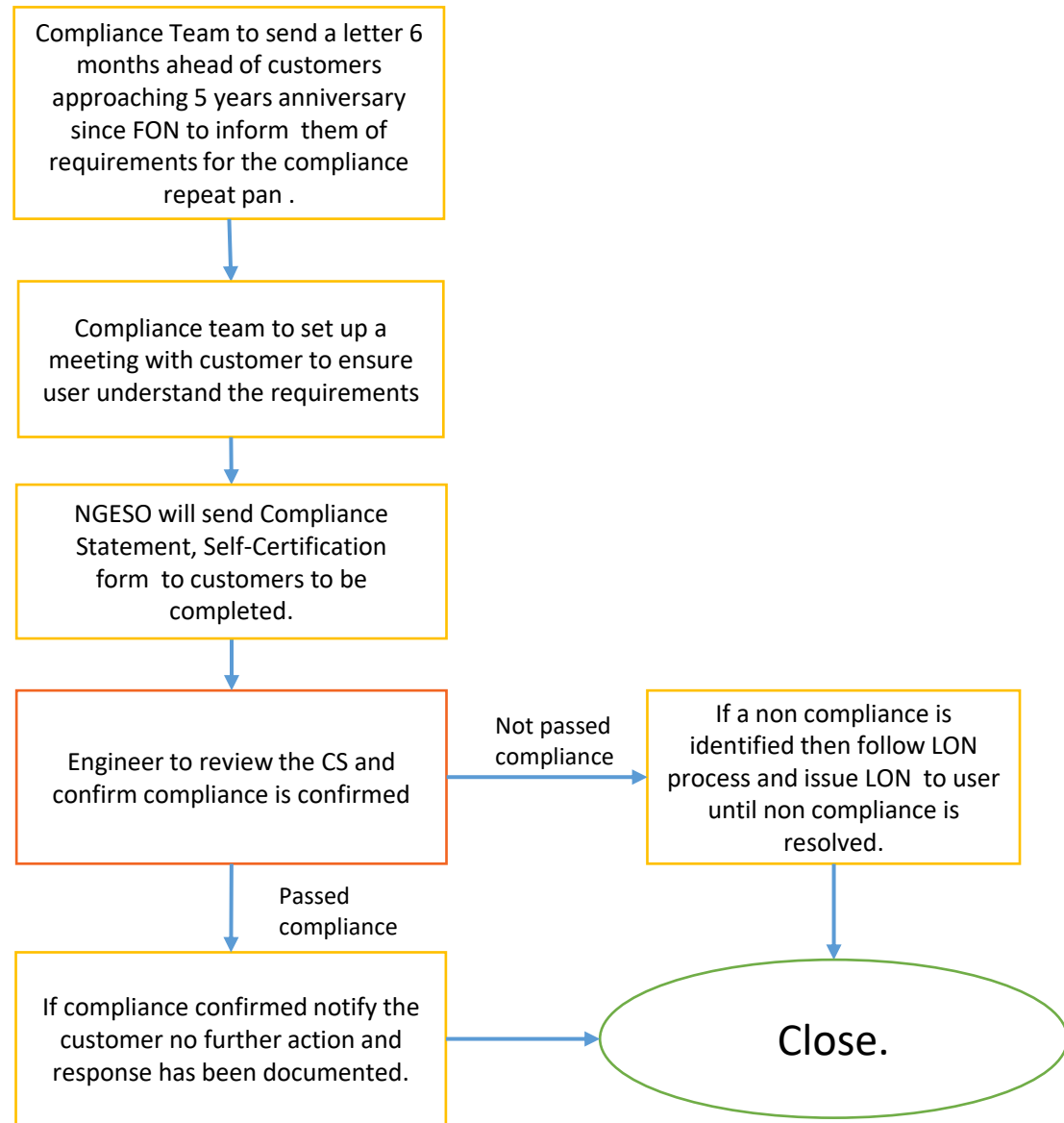
Proposed topics and approved decision

Topics	Approved Decision
<i>Independent Engineer</i>	Not required
<i>Compliance Repeat Plan</i>	The user is required every 5 years to submit compliance statement, self-certification of compliance and standard and detailed planning data in the form of DRC schedules
<i>RMS & EMT Models</i>	ESO amending the Grid Code Planning Code to specify the type of modelling required (Root Mean Square (RMS) or Electromagnetic Transient (EMT))
<i>Sharing for SSTI/SSCI</i>	ESO to allow it to share relevant modelling information submitted by a User to another User, and that the User receiving the information can only use it to complete the analysis required by ECC.6.3.17.1 and EEC.6.3.17.2 (SSTI and SSCI studies)
<i>Torsional Data</i>	Generating Units with a Completion Date before 1 April 2015, are required to provide the data in accordance with good industry practice and without undue delay when requested by the ESO. Generating Units with a Completion Date after 1 st April 2015 is a mandatory requirement.
<i>FRT Definitions & Retrospective Requirements</i>	Amend the definition so that Users are required to remain connected and stable for up to 30 minutes following an applicable fault or disturbance
<i>Enhanced FRT Studies</i>	Power Park Modules (PPMs) and HVDC systems must repeat the required simulation studies for foreseeable running arrangements (to be agreed between the ESO and the User)

Compliance Repeat Plan

GC0141 creates a new section requiring a “Compliance Repeat Plan” for users to confirm compliance with their Grid Code obligations to National Grid ESO every 5 years.

- National Grid ESO will provide guidance on how the dates for older stations confirming continued compliance should be managed and spread so that portfolio users (and ESO) do not face an impractical influx of work.
- National Grid ESO will notify the provider with a six-month reminder to ensure compliance is met within the five-year requirement to ensure ample notice for preparation and delivery.



RMS,EMT Modelling Requirements

PC.A.9 specifies the models needed, including software tool types, and the minimum level of associated data that the user is expected to provide to the Company on both RMS and EMT platforms. PC.A.9 also includes details on the models' performance requirements.

This will be part of the compliance process and NGENSO will not issue an ION/EON before this model is submitted.

Provision of Torsional/Shaft Data - PC.A.5.3.2

- User connected prior the 1st of April 2015, are required to provide the data in accordance with good industry practice and without undue delay when requested by the ESO.
- User connected after 1st April 2015 is a requirement.

RMS,EMT Model and Torsional Data Submission

DRC Schedule 1 contains a section to allow exchange of mechanical parameters (shaft data) with ESO. A shaft report (normally produced by manufacturers) should be submitted / referenced. The report should contain system diagram(s) showing major components and use the standard units as specified in DRC Schedule 1 as well as the following information.

Reduced Shaft system model input parameters (example given in diagrams):

- Number of poles
- Reduced number of masses of the multi mass model (typically 5 to 8 masses)
- Moment of inertia J [kgm^2] for each mass
- Stiffness constants between each mass K [Nm/rad]
- Damping constants D [Nms/rad]
- Relative steam power in [pu] for different turbine sections

Mechanical eigenfrequencies and eigenvectors as calculated by the manufacturer including the verification between the reduced and the original multi-mass shaft system model. Any assumptions / assumed constants should also be stated in the report.

<u>MECHANICAL PARAMETERS</u> (PC.A.5.3.2(a))			
The number of turbine generator masses		<input type="checkbox"/>	DPD II
Diagram showing the Inertia and parameters for each turbine generator mass for the complete drive train	Kgm^2	<input type="checkbox"/>	DPD II DPD II
Diagram showing Stiffness constants and parameters between each turbine generator mass for the complete drive train	Nm/rad	<input type="checkbox"/>	DPD II DPD II
Number of poles		<input type="checkbox"/>	DPD II
Relative power applied to different parts of the turbine	%	<input type="checkbox"/>	DPD II
Torsional mode frequencies	Hz	<input type="checkbox"/>	DPD II
Modal damping decrement factors for the different mechanical modes		<input type="checkbox"/>	DPD II

Sharing of Models for SSCI/ SSTI Studies

The requirement of Model sharing for SSCI and SSTI studies is detailed in ECC.6.3.17.

NGESO has also updated the guidance documents in our website.

Clarify Fault Ride Through (FRT)

The modification on FRT requires Generators to stay connected for up to 30 minutes following a transmission system fault. This is to ensure operational reserve has been restored before the system is ready to cope with a further loss of power infeed (secondary frequency response timescales).

Q&A



Please ask any questions in the meeting chat

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Questions and Answers

No	Question	Answer
1	How is the timing going to work for all plants already over 5 years old?	The duration of the process will follow similar CP.8.1 We aim to use a staggered approach for the connections already over 5 years old, starting with those that got their FON in the year 2000.
2	Can you please share link of guidance document?	https://www.nationalgrideso.com/industry-information/connections/compliance-process <ul style="list-style-type: none">• Guidance for Model Exchange – updated to include a requirement introduced by GC0141• Guidance Notes for Electro-Magnetic Transient (EMT) Models – newly to give guidance on EMT submission• Compliance Repeat Plan - Guidance Notes is under review
3	How will this work for units/stations on a LON at the moment? Will timing of 5 years run from when the FON is issued? How will stations which have individual unit LONs/FONs be treated? Will there be a compliance repeat plan for each unit? Planning data is submitted at the station level. That is, one submission for each station even if it contains unit data.	If a user is on a LON the date for the compliance repeat plan will be calculated from the latest FON. If a Generator has more than one unit and they have obtained FON's per unit then the repeat plan will be applicable per unit.

Questions and Answers

No	Question	Answer
4	Do full suite of compliance tests need to be performed every 5 years (freq, V control etc)?	CP.8 should give you the basic requirement of the repeat plan. User will be expected to reconfirm through a list of grid code requirements through the compliance statement. if user advises they are not compliant then tests/ simulation studies may need to be done to demonstrate compliance.
5	If I am old or have a Grid Code derogation, I assume I must comply with the requirements that were in place at the time, and nothing new or anything I am derogated from?	Providing the derogation is a lifetime derogation then ESO will not expect the user to be compliant against it.
6	Just to be clear that the repeat compliance process is full repeat of what is in the initial compliance statement, or would it be streamlined?	That is correct, the only time the CS will be tailored is for very old sites and this will be confirmed by the Compliance manager when initial contact is made.
7	Can you clarify if submission of model will be applicable for all generators or only particular maybe Sync generators?	PC.A.9.2.1 requires all users to submit RMS models. PC.A.9.2.2 requires all directly connected users, large power stations and all HVDC systems using convertors/inverters technology to provide EMT models.
8	Are EU Code Users able to get the shaft data without an NDA with OEMs for SSTI studies?	As shaft data should be submitted as standard Grid Code data, user will need to sign NDA with ESO to access the data.
9	In Ofgem determination letter, Ofgem states that it is NGESO responsibility to managed lack of data (models and information), when a User needs to be provided with models from other Users to do there SSTI and CI studies. How is NGESO planning to manage this?	If the model is not available, NGESO will discuss with user to see what's the best alternative generic model available. The possible option of applying GC0141 retrospectively should be discussed as future Grid Code development to address this issue.

Questions and Answers

No	Question	Answer
10	My question was more on the timing rather than the data that needs to be submitted. That is, do we have one single 5 year repeat period per unit or per station?	A single repeat plan request will send by NGENSO to the user and the user is expected to follow Gird code requirements. If the specific requirement is against a unit, we would expect the user to confirm compliance per unit if the requirement is per station expected to reconfirm compliance per station.
11	What would cause NGENSO to reject a self-certification and request more information?	The engineering compliance team will review the planning data submitted by the user. If in that process it is evident that the data is different to the original submission potentially leading to a different plant performance to the one accepted as compliant last time the user received a FON, then NGENSO will approach the user for discussions.
12	Do you mean that the models for Compliance purposes must be submitted by the User and cannot come directly from the manufacturer at the User's request?	Yes
13	Can a schedule be provided for generators of when they will be invited to complete the Compliance Repeat Plan?	Yes
14	Confirmation that the FRT definitions will be applied retrospectively?	Yes
15	Can a generator complete the Compliance Repeat Plan earlier than the 5-year compliance period?	Our View is the earliest the Generator can complete the repeat plan is 6 months before the FON anniversary date. The process will be initiated by ESO so Generators should await contact from ESO compliance Team before they enter the repeat plan compliance.

Questions and Answers

No	Question	Answer
16	What happens if after a fault within the 30 minutes mentioned in the legal text there is another fault, do the clock restart?	There is not currently a specific requirement in the Grid Code in relation to the ability of plant to ride through repeated faults within the 30 minutes span following the fault.
17	It is assumed that the 30 minutes are in steady state after a fault. That is not mentioned in the legal text.	The code only says that generators are required to remain connected and stable for up to 30 minutes following a fault event provided system operating conditions have returned to those specified within ECC.6.1. However, that assumption can be made as it would mean generation needs to remain connected for 30 minutes following the generator achieving the new steady state.
18	Although GC0141 modelling requirements are more onerous, it is not clear how compliance with this requirement have to be demonstrated.	There are not additional simulation requirements as a results of the expanded FRT definition introduced via GC0141. However, NGENSO monitors system performance and Engineering compliance investigate generator failing to comply with FRT requirements.
19	No transient over voltages during fault clearance are mentioned.	No, it is not part of GC0141.

Please take the time to give us some feedback on today's Agora



Thank you

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