nationalgrid

Stage 04: Code Administrator Consultation

Grid Code

GC0102:

Modification Title: EU Connection Codes GB Implementation – Mod 3

What stage is this document at?

01	Initial Written Assessment
02	Workgroup Consultation
03	Workgroup Report
04	Code Administrator Consultation
05	Draft Grid Code Modification Report
06	Final Grid Code Modification Report

Purpose of Modification:

This modification (3/4) will set out within the Grid Code the following compliance obligations in the EU Connection Codes:

1. Set the System Management parameters, as set out in RfG and HVDC
2. Set the Compliance requirements, as set out in RfG, DCC and HVDC

This Code Administration Consultation contains the discussion and conclusions of the joint Workgroup with the D Code which formed in July 2017 to develop and assess the proposal.

Published on: **12 January 2018**
Length of Consultation: **15 Working Days**
Responses by: **2 February 2018**

The Workgroup voted on the 6 December 2017 and voted by majority that the Original solution better facilitated the Grid Code objectives.

High Impact:
High Impact: Developers of: New generation schemes (800 Watts capacity and up), new HVDC schemes (including DC-connected Power Park Modules), and new Demand schemes; GB NETSO; Distribution Network Operators

Medium Impact:
Medium Impact: Transmission Owners (including OFTOs); Operators of existing generation, HVDC or Demand schemes considering modernisation;

Contents

Timetable

Timetable following Workgroup Consultation

Any questions?

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Workgroup Consultation issued to the Industry	19 October 2017
Modification concluded by Workgroup	22 December 2017
Workgroup Report submitted/presented to the Grid Code Review Panel	22 December 2017/ 10 January 2018
Workgroup Report presented to the Distribution Code Review Panel	4 January 2018
Code Administration Consultation Report issued to the Industry	11 January 2018
Draft Final Modification Report presented to the Grid Code Review Panel	8 February 2018
Draft Final Modification Report presented to the Distribution Code Review Panel	8 February 2018
Grid Code Review Panel Recommendation Vote	8 February 2018
Final Modification Report issued the Authority	16 February 2018
Decision implemented in the Grid and Distribution Codes	Ahead of 18 May 2018

About this document

This document is the Code Administrator Consultation for GC0102 which includes the deliberations of the Workgroup, responses to the Workgroup Consultation and the conclusions of the Workgroup. The Code Administrator is seeking views from Industry parties on the Conclusions of the Workgroup.

An electronic version of this document and all other GC0102 related documentation can be found on the National Grid website via the following link:

https://www.nationalgrid.com/uk/electricity/codes/grid-code/modifications/eu-connection-codes-gb-implementation-mod-3

Document Control

Version	Date	Author	Change Reference
0.1	19 October 2017	Code Administrator	Workgroup Consultation
0.2	12 December 2017	Workgroup	Draft Workgroup Report
0.3	22 December 2017	Workgroup	Final Workgroup Report to Panel

1.0	11 January 2018	Code Administrator	Code Administration Consultation Report

1 Summary and Introduction

1.1 This report outlines the initial Proposal, the Proposer's Solution, Alternative Solutions and corresponding Workgroup Discussions. There is also additional material for justification and to aid understanding.

1.2 In order to implement the requirements of EU Regulations 2016/631 Requirements for Grid Connection of Generators and 2016/1447 Requirements for Grid Connection of HVDC Systems three grid code modifications have been raised namely GC0100, GC0101 and GC0102. This report specifically details with GC0102 on System Management and Compliance.

1.3 GC0102 was raised by National Grid Electricity Transmission (NGET) and presented to the Grid Code Review Panel (GCRP) for its consideration on 21 June 2017 and to the Distribution Code Review Panel on 27 July 2017. Both Panels then agreed to establish a joint industry workgroup to assess and develop the proposed modification.

1.4 This particular modification is specifically limited to only dealing with two particular topics in the RFG and HVDC namely Compliance and System Management.

1.5 This consultation deals specifically with the Grid Code changes arising from the modification. **The Distribution Code changes are being consulted upon separately in parallel with this consultation by the Distribution Code Review Panel,** and to a similar timescale. The Distribution Code consultation can be found at:

http://www.dcode.org.uk/consultations.html

Compliance

1.6 The Compliance processes described in the RFG and HVDC are very similar to the existing Grid Code Compliance requirement, but are generally completely new to the existing Distribution Code.

1.7 The current Compliance process in the Grid Code involves 3 stages firstly a user is issued with permission to energise their site from external supplies by receiving an EON, secondly a user is given permission to connect a generator by receiving an ION and finally once the generator has passed all Compliance tests a FON will be issued.

1.8 The key difference between the existing Grid Code and the RFG requirements are that the current process applies to the complete process to all users, whereas the RFG only applies all parts of the

procedure to Type D generators only with types B & C only requiring the issuing of FONs.

1.9 The Proposer's initial proposal did not apply EONs and IONs to Types B & C generations, however the Proposer believed that to maintain control of the system written authorisation was still required and introduced new document for type B & C generators a PON.

1.10 Following the workgroup consultation and discussions it was clear that basically a PON was just and ION with a different name and to simplify the process for Users the Proposer agreed to remove the PON and apply the current processes including IONs to all Types of User.

1.11 One workgroup member believed that this proposal is more stringent than the RFG requirements and has submitted an alternative modification to the Proposal with the ION removed namely WACM1.

1.12 The Workgroup voted by majority that the potential alternative proposal **does not** better facilitate the Grid Code objectives. The Chairman of the Workgroup stated that this potential alternative **did** better facilitate the Grid Code Objectives and as such this is now an official Workgroup Alternative Code Modification (WACM1) that will be submitted to the Authority with the Original solution for their decision

System Management

1.13 In terms System Management this modification dealt with :-

i) Automatic reconnection
ii) Control Schemes
iii) Protection
iv) Operational Metering
v) Monitoring (RES)
vi) Automatic disconnection
vii) Simulation Models
viii) Additional devices for system security
ix) Rates of change of Active Power
x) Neutral Earthing Arrangements
xi) Synchronisation (RES)

Workgroup Conclusion

1.13 The Workgroup met on the 6 December 2017 and voted. Fifteen of the sixteen members eligible to vote stated that the Original proposal better facilitated the Grid Code objectives.

1.14 The Workgroup are satisfied that they have fulfilled their Terms of Reference. A compliance matrix is also attached (Annex 1) to aid navigation of the legal text for the Authority, Grid Code Panel and Industry members.

Introduction

1.15 The GCRP supported the establishment of a Workgroup to assess and develop the proposed modification against the Grid Code Applicable Objectives.

1.16 The DCRP supported the establishment of the Workgroup to undertake the development of the modification to include the necessary Distribution Code changes.

1.17 Section 2 (Original Proposal) together with Section 3 (apart from the Workgroup discussions) (setting out the Proposer's solution) are sourced directly from the Proposer. Statements or assertions made in these sections have not been altered, substantiated, supported or refuted by the Workgroup. Section 3 – Workgroup discussions of the report provides a summary of Workgroup discussions on the Proposal and the potential solution.

1.18 The Grid Code Review Panel detailed the scope of work for the GC0102 Workgroup in the Terms of Reference. The Terms of Reference are can be found in Annex 5.

1.19 Please note that this modification was progressed as a joint Workgroup with the D Code. This consultation relates only to the Grid Code. **The Distribution Code changes are being consulted upon separately in parallel with this consultation by the Distribution Code Review Panel**, and to the same timescale. The Distribution Code consultation can be found at: http://www.dcode.org.uk/consultations.html

National Grid view

1.20 National Grid as the GB SO supports the original proposal rather than the alternative which removes the option of a type B/C generator connecting through an interim operational notification (ION). The original proposal was developed by the workgroup to be a practical solution to the current unavailability of power generating module documents (PGMDs). The alternative, by removing the ION option, leaves B/C generators with a far less clear route to achieving a final operational notification and hence connection and is a barrier to entry. It will cause further difficulties in establishing offshore connections and hence in the process of setting up and transferring assets to an OFTO.

2 Original Proposal

This Section (2) (The Original Proposal) is sourced directly from the Proposal. Any statements or assertions have not been altered or substantiated or supported or refuted by the Workgroup. The Workgroup discussion and Workgroup Alternative Code Modification sections of the Workgroup Report outline the subsequent discussions held by the Workgroup on the Proposal, the Solution and alternatives.

What

Full sections of the Grid Code, for example the Connection Conditions (CCs), Compliance Processes (CPs) and Operating Code, will need to be extended to set out the new EU standards to which affected users will need to comply with. Similarly, Section DPC7 of the Distribution Code and EREC G59 and EREC G83 will need modifying to implement the EU Network Code requirements.

This will be a combination of completely new requirements inserted into the Grid and Distribution Codes, or adjustments/continuation of corresponding existing GB requirements to line up with equivalents in the new EU codes.

Why

Guidance from BEIS and Ofgem was to apply the new EU requirements within the existing GB regulatory frameworks. This would provide accessibility and familiarity to GB parties, as well as putting in place a robust governance route to apply the new requirements in a transparent and proportionate way.

This modification needs to be undertaken in timely manner to ensure affected users are aware of their compliance obligations - particularly in relation to procurement of equipment, compliance testing and operational requirements. This modification is also therefore, critical to facilitate/demonstrate Member State compliance to these three EU Network Codes.

How

With the support of the industry, we will use this modification to finalise proposals to apply the EU Connection Codes requirements, before consulting with the wider industry and submitting to Ofgem for a decision.

Previously, Grid Code and Distribution Code issue groups were formed (GC0048, GC0090, GC0091) to:

1. Comprehensively review the code to form a local interpretation of the requirements;
2. Undertake a mapping between the EU and GB codes to understand the gaps and the extent for possible code changes;
3. Form proposals, which will now be taken forward as formal modifications.

3 Grid Code Solution

Proposer Solution – Background

The following text details the Proposer's solution for implementing the System Management requirements into the Grid Code and Distribution Code from two of the European Connection Codes: Requirements for Generators (RfG) and High Voltage Direct Current (HVDC).

This Section is sourced directly from the Proposer. Any statements or assertions have not been altered or substantiated or supported or refuted by the Workgroup. The Workgroup discussion and Workgroup Alternative Code Modification sections of the Workgroup Report outline the subsequent discussions held by the Workgroup on the Proposal, the Solution and alternatives.

Background

As mentioned, GC0102 covers implementation of the System Management and Compliance activities of the RfG and HVDC Codes. The System Management and Compliance activities for the Demand Connection Code (DCC) will be treated under a separate consultation due to the additional implementation time frames, however it should be noted due to the similarity of the codes, many of the System Management and Compliance aspects will follow the same approach as that for the RfG and HVDC Codes.

On 3rd October 2017, National Grid hosted a webinar training session outlining the requirements in RfG relating to GC0102 and the current GB requirements in relation to these. The webinar was recorded and the reader may find it useful to watch this video[1] prior to reading the report for additional context and understanding. The slides are also available separately (Annex 9).

This consultation should be seen as one of the fundamental building blocks of the EU Connection Code implementation process. The reader is therefore encouraged to be aware of Consultations GC0100 and G0101

[1]

GC0102 Webinar/Teach In Session-20171003 1000-1
Tuesday, October 3, 2017
12:00 pm | GMT Summer Time (London, GMT+01:00)

Play recording (56 min)
Recording password: (This recording does not require a password.)

which are covered in references [1] and [2]. When these consultations are combined with this Grid consultation (GC0102) this will complete the proposers approach to implement the RfG and HVDC requirements in the GB Codes, with GC0104 finalising the Demand Connection Code.

With all these consultations (GC0100, GC0101 and GC0102) the following principles below have been adopted. It is also proposed to adopt the same approach for GC0104 when that is published.

i) Retain the same structure and format as the current GB Grid and Distribution Codes
ii) Retain the current requirements of the GB Grid and Distribution Codes unless there is good reason not to do so – for example there is either a conflict between the EU Codes and the GB codes or the EU Code requires additions to the GB Codes.
iii) Ensure that the revised GB Codes are easy to understand and use by those parties affected by them.
iv) Ensure consistency between the Grid and Distribution Codes and associated industry documents.

To achieve these objectives, there will be a new section of the Grid Code Connection Conditions called the "European Connection Conditions" (ECC's). This will apply to new Users caught by the requirements of the European Codes and ensure consistency between the GB Code and European Code without Users having to refer to two separate documents (i.e. the GB Grid Code and EU Connection Codes). Whilst notwithstanding the requirements of GC0104, when GC0100, GC0101 and GC0102 are combined it will be possible to form a fully formed version of the ECCs and ECPs.

GC0102 is split into two parts – System Management and Compliance. The System Management aspects will be introduced into the ECCs to form a complete set of Connection Conditions.

So far as the Compliance process is concerned, it is proposed to duplicate the "Compliance Processes" section of the Grid Code to form the ECPs. This will cover the Compliance Process, Testing and Simulation requirements for New Generators and HVDC installations caught by the RfG and HVDC Codes. OC5 as currently drafted in the GB Grid Code will remain unchanged and would continue to apply only for existing Generators and existing DC Converter Station owners.

For the purposes of this proposed solution, it should be assumed that, unless specifically stated, the original Grid Code text will be used and the solutions described below highlight only the exceptions from the CCs that need to be addressed (i.e. they either don't currently exist in Grid Code or where there are conflicts). For example, if "no change required" is stated, the requirements in CC are aligned to the ECCs.

Large, Medium and Small Power Stations

Article 5 of RfG sets that power-generating modules must comply with the code's various technical requirements on the basis of their connection voltage and maximum capacity. RfG classifies four Bands (Types "A-D") which define the technical requirements new Generators must adhere to. The details of these banding levels and the proposed thresholds between them are covered in Consultation GC0100 (Reference [1]).

In GB, the technical requirements have been defined in terms of Large, Medium and Small Power stations. It is however important to note that the concept of Large, Medium and Small Power Stations not only defines the technical requirements but also the Connection Process (i.e. the process of a Generator seeking to use the Transmission System) and the Licensing requirements. It also has implications for those Generators who are required to trade in the wholesale electricity market.

The process and industry codes that encompass the process for Generators are shown in Figure 1. Some will reference Large, Medium and Small.

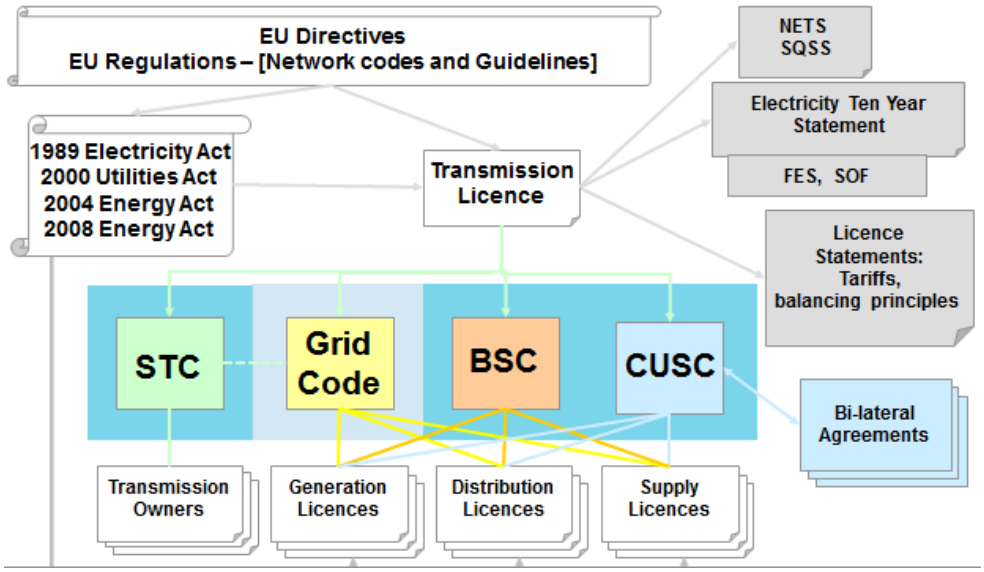

Figure 1

Figure 2 below illustrates the difference between Large, Medium and Small Power Stations and Type A – D Power Generating Modules.

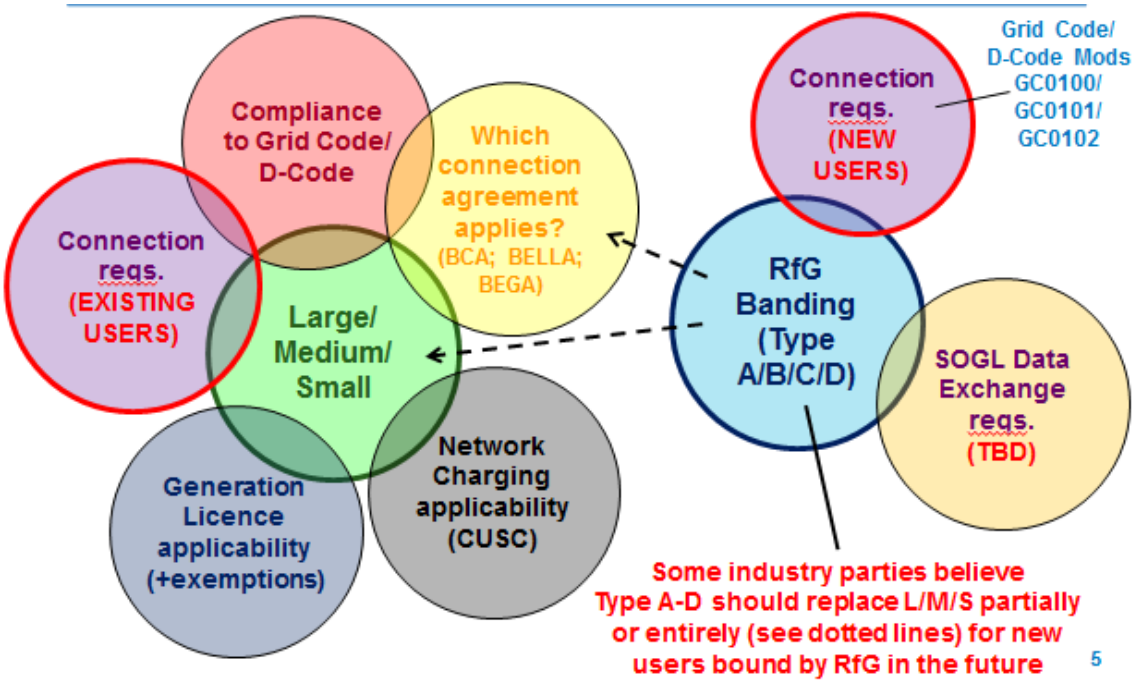

Figure 2

Implementation of the EU connection codes relates only to the technical requirements, it does not relate to issues such as market participation, the connection application process, charging or the licensing arrangements. That said, as an output of this EU Connection Code work, it will ensure that the technical requirements (e.g. frequency range, reactive capability, voltage range, fault ride through etc.) incumbent on Type A, B, C or D Power Generating Modules will be the same across GB. The only impact the regional difference on Small, Medium and Large then has is in relation to the connection process and whether or not National Grid has a contract with that Generator.

As these issues are outside the scope of the EU Connection Code implementation work it is proposed that the concepts of Large, Medium and Small Power Stations are retained as they are, and the technical requirements are then based solely around Generator Type as per RfG. So for example, a Large Power Station in England and Wales would be 100MW or more but could comprise of Power Generating Modules of Type A, Type B, Type C or Type D. The technical requirements under the EU codes would then apply to the Type of Power Generating Modules within that Power Station with the remaining elements such as to whom the party has a Connection Agreement, which industry codes apply, charging arrangements and whether or not that Generator needs to be party to the wholesale electricity market being subject to the existing GB Connection arrangements.

A consequence of the current Large Medium and Small regime is that the Licence Exempt Embedded Medium Power Stations (LEEMPS) (Embedded Medium Power Stations between 50 – 100MW in England and Wales) regime was introduced into the Grid Code and Distribution Codes in 2006. Its aim was to reduce the administrative burden of Generators in that they would only have an agreement with the DNO yet they would have to meet

certain conditions of the Grid Code relating to data and technical requirements. Although these issues become largely redundant because of the RfG Type D requirements, the contractual mechanisms between National Grid, the DNO and the Generator, for example how the Generator provides operational metering data to National Grid or what operational metering signals need to be provided, still remain an issue. For this reason, given that LMS will persist, it is simpler by far to retain the status quo as far as LEEMPS are concerned. To this end the Distribution Code (and G99) retain the term Medium Power Station, but the terms Large and Small cease to be used as defined terms in Distribution documents.

Proposer Solution - System Management

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The System Management issues in RfG and HVDC Codes are all those aspects (excluding compliance) which have not been addressed through Grid Code consultations GC0100 and GC0101. In summary, the following topics relate to System Management requirements and these are common to both RfG and HVDC:

i) Automatic reconnection
ii) Control Schemes
iii) Protection
iv) Operational Metering
v) Monitoring (RES)
vi) Automatic disconnection
vii) Simulation Models
viii) Additional devices for system security
ix) Rates of change of Active Power
x) Neutral Earthing Arrangements
xi) Synchronisation (RES)

Additional System Management Requirements applicable specifically for the HVDC Code are summarised below but the reader should note that the HVDC Code also includes DC Connected Power Park Modules and Remote End DC Converters:

i) Maximum loss of Active Power
ii) Power Quality
iii) Fast Recovery from DC Faults
iv) Interaction between HVDC Systems or other plants and equipment
v) Subsynchronous torsional interaction damping capability
vi) HVDC System Robustness

The analysis in this section relates principally to the Grid Code; however where this is an important interaction with the Distribution Code, the approach taken in the Distribution Code drafting is indicated for information.

RfG System Management Issues

As far as RfG is concerned, Annex 7 summarises the System Management issues separating these out into issues for the SO, TO and DNO and general comments.

There are however a number of high level issues which are summarised below.

Power Generating Module Type A and Type B System Management Requirements Automatic Reconnection - (Articles 13 & 14)

Article 13(7) and Article 14(4) define the requirements for automatic reconnection to the network. Article 13(7)(a) and (b) relate to the conditions (i.e. frequency and ramp rate conditions) under which automatic connection is allowed and Article 14(4) defines the requirements that TSOs shall specify for automatic reconnection following a network disturbance. Where automatic reconnection is permitted, this shall be subject to authorisation by the System Operator with the reconnection conditions specified by the relevant TSO.

Grid Code

With regard to the conditions for reconnection (i.e. frequency range and ramp rates) these would be covered under CC.6.1.3 and BC1.A.1.1. In summary, the frequency range would need to be within the limits of 47 – 52Hz, the voltage consistent with the requirements of CC.6.1.4, and the ramps rates consistent with BC1.A.1.1. With regard to CC.6.1.3 and CC.6.1.4, these would be translated to the equivalent references in ECC.

In relation to automatic reconnection to the Transmission system, as RSO for the Transmission System the requirements are broadly the same as currently. For any Generator caught by the requirements of the Grid Code (i.e. a CUSC party) they would be required to meet the requirements of BC1 and the Connection Conditions. Under BC2.5.2 automatic reconnection is not permitted unless an instruction is given by NGET and we see this requirement being equally applicable in the future.

The growth of embedded generation does however present some concern and this issue would need to be re-evaluated under a separate GB workgroup to understand the implications on the System.

Distribution Code

The TSO has specified the network conditions in 4.1.2.1 above for which connection and reconnection is allowed, the historic DNO practices in G83

and G59 are within these ranges and will be carried forward into G98 and G99.

The existing automatic reconnection will be retained for all PGMs Type A, B and C. These requirements are that provided the voltage and frequency at the connexion point have returned within the interface protection setting limits and have remained there for 20s, the PGM is allowed to auto reconnect/synchronize as appropriate. These requirements are made explicit in both G98 and G99, as they are already in G59 and G83.

Type B System Management - Control Schemes (Article 14)

Grid Code

Article 14(5) defines the requirements for control schemes and settings. The current Grid Code drafting in the proposed ECCs has been updated to include these requirements at a high level. However, such schemes tend to be site specific so any requirement would be included in the Bilateral Connection Agreement which would be consistent with the Grid Code. Examples include requirements such as operational intertripping schemes or auto close schemes where the operating times and interfacing arrangements will vary on a site by site basis.

Distribution Code

In general there is no requirement in the Distribution Code for specific control schemes. As is the current practice where a PGM is sufficiently large to trigger the Statement of Works (SoW) process, any necessity for such control schemes will be identified as part of the SoW process and will lead to a tripartite agreement between TSO, DNO and Generator.

Power Generating Module Type B System Management Requirements Protection (Article 14(5)(b))

Article 14(5)(b) defines the requirements for protection.

The Grid Code is already well catered for in respect of protection requirements for direct connections to the Transmission System, be it generation, demand or HVDC systems.

The ECCs have been updated to ensure consistency with RfG in particular with regards to issues such as protection changes. There will however still need to be site specific arrangements which cover issues such as relay protection operating times, grading and discrimination which are agreed as part of the commissioning process (i.e. the TO and Generator in coordination with the System Operator define the connection and co-ordination processes when a User first connects to the Transmission System) as these issues vary from site to site.

The Grid Code is however silent on embedded connections as these aspects are covered under the Distribution Code.

Power Generating Module Type B System Management Requirements Operational Metering (Article 14(3)(d)

This requirement is the same as current GB practice for existing Large and Medium directly connected Generators. Under CC.6.5.6 of the Grid Code the general requirements are covered at a high level in the code with the details including the operational metering signals, resolution and communication arrangements being addressed in the Bilateral Agreement. For any Generator that is required to meet the requirements of the Grid Code these arrangements are perfectly adequate. There are wider issues relating to how Non CUSC Generators (excluding LEEMPS plant) would provide the operational metering data to NGET. However as noted below the DNO's and National Grid are working together to resolve these issues.

Power Generating Module Type C System Management Requirements FSM Monitoring / Automatic Disconnection at specified voltages (Article 15 (2)/(3))

The current Ancillary Services Monitoring (frequency response monitoring) requirements are specified in OC.5.4.1(c). At the present time the more detailed requirements are defined in the Bilateral Agreement which then refers the user to meet the requirements of TS.3.24.95_RES which is the Ancillary Services Monitoring RES.

These requirements are however very loose and the opportunity has therefore been taken to update the ECCs to explicitly define these requirements and ensure they are consistent with RfG. In addition there will also be a requirement to ensure the RES standard is updated to ensure consistency with RfG.

Power Generating Module Type C System Management Requirements (Article 15(6)(a))

Article 15(6)(a) relates to loss of angular stability or loss of control.

In summary this relates to pole slipping protection which is already covered in the Grid Code under CC.6.2.2.3.4. This requirement is therefore carried forward in the ECC's with any requirement for such protection or control measures (where this is required for system reasons) being covered in the Bilateral Agreement.

Power Generating Module Type C System Management Requirements Monitoring (Article 15(6)(b)

Article 15(6) (b) relates to Dynamic System Monitoring, Fault Recording and Power Quality Monitoring.

All these aspects with the exclusion of fault recording are already specified either in the Grid Code or the Bilateral Agreement.

There are however some differences and the opportunity has therefore been taken to update the ECCs to ensure consistency with RfG. CC.6.6 relates to Dynamic System Monitoring which is currently applicable to any site which is five times a Large Power Station. Under RfG, this requirement now applies to any Type C or above Power Generating Module. There will however be a need to update the corresponding Dynamic System Monitoring Specification (TS.3.24.70_RES).

Power Quality Monitoring is specifically covered in the Bilateral Agreement but again the opportunity has been taken to make minor changes to the ECCs to ensure consistency with RfG.

Power Generating Module Type C System Management Requirements Simulation / Models (Article 15(6(c))

Much of the modelling data required by RfG is already covered under the Planning Code PC.A.5.3, PC.A.5.4.2, and the Compliance Processes CP.A.3.

It is proposed to update the Planning Code so that it includes requirements for both Existing Generators and new Power Generating Modules. So far as the Data Registration Code is concerned (which is a summary of all the Grid Code data) it is proposed to duplicate the DRC to form the European Data Registration Code (EDRC).

There are two issues worthy of note. RfG (Article 15(c)(i)) states that the model supplied should properly reflect the power generating module in both steady state and dynamic simulations (50Hz component) or in electromagnetic transient simulations. It is not National Grid's intention to require electromagnetic simulations on a routine basis but the Planning Code will be updated to reflect this requirement.

It is important that the models provided do reflect the behaviour of the plant as built. For plants using new technology, the model often has to be subject to an iterative set of updates and final tests against the actual plant before an accurate model is obtained. To submit an accurate model before testing for this type of plant could therefore present a challenge as required under Article 15(6)(c)(iv).

Power Generating Module Type C System Management Requirements - Other Issues (Article 15(6)(d)-(f))

Article 15(6)(d) relates to additional devices which are required to preserve or restore System Security.

Grid Code

It is believed these general requirements are already catered for with any specific additional requirements being covered in the Bilateral Agreement.

Article 15(6)(e) relates to ramp rates which is already covered under BC1.A.1.1. This would apply to any plant caught by the requirements of the Grid Code which needs to satisfy the requirements of BC1. It would however remain an issue for LEEMPS plant but could be addressed by an amendment to CC.3.3.

Article 15(6)(f) relates to neutral earthing which is already covered under CC.6.3.11. This requirement is already consistent with RfG and will be carried forward into the ECC's.

Distribution Code

Simulation requirements for distribution connected PGMs which are Small Power Stations are new and there are no existing D Code or other requirements. There are existing requirements on LEEMPS but these are implemented by reference to the Grid Code.

New appendices have been written for G99 which pick up both simulation and compliance testing. These are based on the historic and current NG practices, but simplified as appropriate and proportionate for DNO connexion and RfG compliance. The LEEMPS commissioning etc process will continue for new LEEMPS as before.

Power Generating Module Type D System Management Requirements Synchronising (Article 16(4))

The requirements for Synchronising are covered in Article 16(4).

Under the current GB arrangements these requirements are covered in the Bilateral Agreement and TS.3.24.60_RES. The Grid Code text under the ECC's has been updated to reflect this requirement. There will also be a need to update the RES standard.

Type D Synchronous Power Generating Modules and Type C PPM's Angular Stability under fault conditions / Power Oscillation Damping (POD - Articles 19 and 21)

Power Generating Module Type D System Management Requirements – Type D Synchronous Power Generating Modules – Angular Stability under fault conditions

This requirement would be dependent upon System Studies during the connection application phase. It is not a requirement that can be specified generically and therefore would need to be included as part of the Bilateral Agreement.

Under the GB arrangements as there is no direct contract between the TSO and Generator this would need to be coordinated via the System Operator. There are current arrangements for this under the STC where the TSO defines the technical requirements based on their system studies and the System Operator then reflect these requirements in the Connection Agreement with the Generator. It is assumed the same principles would apply going forward.

Power Generating Module Type D System Management Requirements – Type D – Power Park Modules – Power Oscillations Damping Control

Grid Code

This requirement is already covered under CC.A.7.2.4 and would be carried forward into the ECC's.

Distribution Code

The existing Distribution Code already allows, along with the CUSC statement of works process, for shared analysis with NG of stability issues.

HVDC System Management Issues

The HVDC System Management issues are very similar to those of RfG. However it is noted that the following HVDC System Management issues deserve special mention.

i) Maximum loss of Active Power
ii) Power Quality
iii) Fast Recovery from DC Faults
iv) Interaction between HVDC Systems or other plants and equipment
v) Subsynchronous torsional interaction damping capability
vi) HVDC System Robustness

As far as HVDC is concerned, Annex 8 summarises the System Management issues separating these out into issues for the SO, TO and DNO and general comments. Again the issues relating to protection, control, operational metering etc are all believed to be the same as RfG, however those additional areas highlighted above are covered in Annex 7.

Article 17 Maximum loss of Active Power

For HVDC Systems including Remote End HVDC Converter Stations, the HVDC Code requires the HVDC System shall be configured in such a way as to limit the loss of active power injection into the Synchronous area with co-ordination between relevant TSOs where the TSO connects two or more control areas.

The legal drafting in the ECCs has been updated to include this requirement but it is effectively linked to the GBSQSS which defines limits for the maximum infrequent infeed loss which effectively places a criterion

on the amount of generation that can be lost for a credible system fault. It is therefore proposed that this value is set to 1800MW to ensure consistency with the SQSS.

Article 24 Power Quality

RfG makes no reference to power quality requirements. So far as the HVDC code is concerned, the requirements for power quality as applicable to HVDC Systems, DC Connected Power Park Modules and Remote End HVDC Converters extends to ensuring that the level of distortion of fluctuation of supply voltage does not exceed the level specified by the TSO with the need to ensure that appropriate study data is supplied by all Grid Users involved so the defined limits are maintained within standards.
Under the current GB Grid Code, these requirements are already well defined under CC.6.1.5, CC.6.1.6, CC.6.1.7 and CC.6.1.8 in addition to the site specific requirements which are included in the Bilateral Agreement. Other than minor changes it is considered that the HVDC code requirements for HVDC equipment is already more than adequately catered for in the GB Grid Code and therefore it is proposed to simply carry these requirements forward into the ECCs.

Fast Recovery from DC Faults

The HVDC Code requires DC overhead lines to be capable of fast recovery from transient faults with details of the capability and scheme settings to be agreed with the protection settings under Article 34 of the HVDC Code.

This is a new requirement and the drafting under the HVDC Code has been updated to reflect these conditions in the GB Grid Code under the ECCs. The specific requirements for schemes and settings would be pursuant to the connection requirements under ECC.6.2 with any site specific requirements being pursuant to the Bilateral Agreement.

Interaction between HVDC Systems or other plants and equipment

The current GB Grid Code is limited in this area, although it should be noted that under the generic technical requirements for a HVDC Interconnector there is a requirement for DC Converter Stations to meet the requirements of TS.3.24.90.

It is acknowledged that the GB Code is however generally deficient in this area and therefore the opportunity has been taken to update the ECCs so that they are consistent with the HVDC Code.

Subsynchronous torsional interaction damping capability

The GB Grid Code (CC.6.1.9, CC.6.1.10 and CC.6.3.16) define requirements for Subsynchronous torsional interaction and subsynchronous resonance. There are some slight differences between these requirements and those in the HVDC Code so the opportunity has been taken to clarify

these issues in the ECCs. It should be noted that these issues are complex and further internal reviews are likely to be required to the draft legal text.

HVDC System Robustness

These requirements are new to the GB Grid Code and the ECC's have been updated to ensure consistency with the HVDC Code.

Proposer Solution – Compliance

This Section is sourced directly from the Proposer. Any statements or assertions have not been altered or substantiated or supported or refuted by the Workgroup. The Workgroup discussion and Workgroup Alternative Code Modification sections of the Workgroup Report outline the subsequent discussions held by the Workgroup on the Proposal, the Solution and alternatives.

The purpose of Compliance is to ensure that the plant built is fully capable of meeting the requirements of the Grid and Distribution Codes and Bilateral Agreements. In addition it is also a key method of ensuring the data and models provided reflect the true steady state and dynamic performance of the equipment, this being a fundamental prerequisite for the design and operation of the System going forward. The compliance process has been part of the GB Grid Code since August 2012 and has been modified where appropriate to provide the European Compliance Processes.

Compliance covers three main areas. These are summarised as follows:-

i) The Compliance Process (i.e. the process by which parties demonstrate their plant can meet the requirements of the codes)
ii) Simulation (the submission of plant performance based on simulations)
iii) Testing (Plant testing - validation of actual test results against simulated results)

In respect of the Compliance Process, this approach varies depending upon the Banding that the PGM falls into.

RfG

i) Type A – Based on an Installation Document and manufacturers' information

ii) Type B and C – The process is the same for both Type B and C Power Generating Modules other than Type C plant has to meet more requirements than Type B. Both Type B and Type C plant will need to submit a Power Generating Module Document (PGMD) which is essentially a subset of the requirements for Type D

iii) Type D – Compliance confirmed by a compliance statement supported by a User Data File Structure which is very similar to the current GB Compliance Process.

HVDC

i) Very similar to that required for Type D Power Generating Modules under RfG

Compliance Process

To implement the RfG and HVDC compliance processes into the Grid Code, the compliance processes sections of the Grid Code have been duplicated to form the ECPs. These will cover all aspects of the compliance process, simulation and testing in one place for new users which it is believed will provide appropriate clarity.

The current GB Grid Code includes testing within OC5 however it is considered appropriate to contain all the compliance requirements within one section of the Grid Code. For existing Users the compliance and testing arrangements will remain in the CPs and OC5.

The Compliance process for Generators who have to meet the requirements of the Grid Code is well established and very similar to that for Type D Power Generating Modules and DC Converters. However it is the smaller Generators (Types A – C) who are most greatly affected by the European requirements.

Many of these issues were discussed at a Workshop held by the ENA on 24 July 2017 and a copy of the slides presented is listed in Appendix 3.

Type A

Currently, there is no Compliance process in the Grid Code “Type A”-equivalent generators and although possible it is unlikely that a Type A Power Generating Module would connect to the GB transmission system.

RfG prominently expects Equipment Certificates to be used for mass market Power *Generating* Modules. There is however concern that the absence of an Equipment Certificate regime in Europe does present some difficulties. It has therefore been proposed that as an alternative to Equipment Certificates manufacturers’ self-generated test certificates can be used.

The requirements under RfG are with respect to the Power Generating Module, not the Unit. However as the requirements for Type A are generally frequency related (frequency range, rate of change of frequency, LFSM-O, power output with falling frequency etc) all these aspects lend themselves well to unit testing which is beneficial for compliance purposes but also is useful due to the mass market volumes expected in this range.

Under Article 30 a Type A Generator will have to supply an installation document which contains the following information.

a) The location at which the connection is made;
(b) The date of the connection;
(c) The maximum capacity of the installation in kW;
(d) The type of primary energy source;
(e) The classification of the power-generating module as an emerging technology
(f) Reference to equipment certificates issued by an authorised certifier used for equipment that is in the site installation;
(g) Where an equipment certificate has not been received, information shall be provided as directed by National Grid or the DNO.
(h) the contact details of the Generator and the installer and their signatures.

All of these issues should be reasonably straight forward to achieve via a certified approval scheme and manageable for any transmission or distribution connected installations.

Type B and C

Under RfG (Article 32), the Type B and Type C Compliance Process require submission of a PGMD (Power Generating Module Document).

In summary, the compliance process for a Type B and Type C Power Generating Module is essentially the same other than in respect of the number of tests and simulations that need to be carried out by virtue of the different requirements applicable to Type B and C plant.

Article 32 of RfG defines the following requirements to be included in the PMGD which includes the following information.

a) Evidence of an agreement on the protection and control settings relevant to the connection point between National Grid or the DNO and the Generator;
b) Itemised statement of compliance;
c) detailed technical data of the power-generating module with relevance to the grid connection as specified by National Grid or the DNO;
d) Equipment Certificates issued by an authorised certifier in respect of Power-Generating Modules, where these are relied upon as part of the evidence of compliance;
e) for Type C power-generating modules, simulation models pursuant to point (c) of RfG Article 15(6);
f) Compliance test reports demonstrating steady-state and dynamic performance as required by RfG Chapters 2, 3 and 4 of Title IV, including use of actual measured values during testing, to the level of detail required by National Grid or the DNO; and

g) Studies demonstrating steady-state and dynamic performance as required by RfG Chapters 5, 6 or 7 of Title IV, to the level of detail required by National Grid or the DNO.

The Relevant System Operator on acceptance of a complete and adequate PGMD shall issue a Final Operational Notice (FON) to the Power Generating Facility Owner.

As part of the GB implementation process, the ECPs have been updated to introduce a compliance process for Type B and Type C Power Generating Modules. As part of this implementation process two points were noted;

(i) Article 15 which applies only to Type C and D Power Generating Modules requires the submission of simulation models upon request of the System Operator whereas for Type B Power Generating Modules, study results have to be provided from a simulation model but that actual model does not need to be provided as there is no clause in the RfG to request this model and;

(ii) the Compliance process for Type B and C Power Generating Modules only provides for the issue of a Final Operational Notification on complete acceptance of all compliance information including test reports. Where compliance tests must be completed while connected to the network this leaves Power Generating Modules connected with no Operational Notification in place. To provide clarity during this period while the Power Generating Module is connecting, we have introduced the concept of a Preliminary Operational Notification (PON) so there is at least some knowledge that the Power Generating Module is about to synchronise to the System for the first time and capture the outstanding compliance activity of testing.

Type D and HVDC Systems including DC Connected Power Park Modules

For Type D Power Generating Modules, HVDC Systems, DC Connected Power Park Modules and Remote End HVDC Converter Stations the compliance process is the same with the issue of EON permitting energisation, ION permitting synchronisation, active or dynamic reactive power export and FON issued when compliance is confirmed. . The LON process is also carried across and remains unaffected from current Grid Code. One addition to the ION process is the capturing of a 24 month limit mandated by RfG which has now been included. Beyond these items there are also other minor definitions changes but it is believed there are no other significant material differences to the current Grid Code compliance arrangements.

Summary of Grid Code Changes

In terms of the Grid Code changes required to reflect the compliance processes, testing and simulation activities the following updates are believed to be necessary and these are reflected in the draft ECP legal text.

Compliance Processes

The compliance processes legal text has been duplicated and updated to include the following requirements:-

- Type A Compliance Process – This needs to be included in the Grid Code as it is theoretically possible a Type A Power Generating Module could connect directly to the Transmission System.
- Type B and C Compliance Process including the submission of a PGMD and Preliminary Operational Notification – These requirements again need to be included in the Grid Code as it is possible that whilst Type C Power Generating Modules connect to the Transmission System the same is true of Type B Power Generating Modules. Please note that following the Workgroup Consultation and discussions this has been amended. Please refer to the Workgroup discussions and also the amended solution from the Proposer.
- Type D and HVDC Compliance Process as per current GB compliance process but with definition changes etc.

Updates to the Grid Code Legal Drafting in respect of Simulation test for compliance purposes

The list below provides a summary of the changes incorporated into the Grid Code legal drafting to ensure consistency with the EU Codes. A has been mentioned the Compliance process, testing and simulations have now all been incorporated into the ECPs leaving OC5 being only applicable to Existing Generators and DC Converters.

1. Specific consequential changes which impact both the simulation and testing specifications:

2. Add option for Equipment Certificates for demonstration of simulation and/or compliance tests.

3. As a consequence of additional “Types” introduce the concept of PGMD and Installation Document.

4. Specific consequential changes to simulation specifications.

5. Redraft CP.A3 to comply with the simulation requirements set out in RfG with material changes to:

Appendix 3

- Addition of Open Circuit simulation of 10% step response to PSS tuning study specification in line with current practice.

- Reactive Capability requirement now at the connection point for Synchronous Power Generating Modules instead of machine terminals.

- Modify Fault Ride Through simulation requirements for different generation “Types” and reintroduce FRT simulations for synchronous modules. Retain the simulation for longer duration voltage dips and update simulation requirements to align with Grid Code change in 2016 (GC0062).

- Frequency response compliance now determined from step response in frequency instead of ramp and LFSM-U concept introduced. New simulation of LFSM-U introduced.

- Introduction of modification to the Load Rejection simulation for non-synchronous power generating modules in line with recent practice.

Updates to the Grid Code Legal Drafting in respect of Testing for compliance purposes

Redraft of OC5.A.1-4 and instead incorporate as appendices ECP.A.4-7 leaving existing OC5 untouched for existing plant.

Specific consequential changes to test specifications:

ECP Appendix 4 – Onsite Signal Provision for Compliance Tests

- Add MW, MVAr and voltage signals at the connection point for a Synchronous Power Generating Module to facilitate demonstration of reactive capability as the compliance point has been moved from the machine terminals.

ECP Appendix 5 - Synchronous Power Generating Modules

- Reactive Capability demonstration now at the connection point for Synchronous Power Generating Modules and also include part load and minimum load test points all for 1 hour.

- Frequency response compliance now determined from step response so modification to test spec of test A & K and additional step tests O, P, Q added at full load and minimum generation load points.

- Addition of Target Frequency setpoint demonstration in line with current practice.

- Introduction of LFSM-U tests BC5 and BC6.

ECP Appendix 6 - Power Park Modules

- Reactive Capability demonstration timescales and loading levels modified in line with RfG requirements. Longer duration tests at lower output.

- Frequency response modified as for Synchronous Power Generating Modules in Appendix 5.

ECP Appendix 7 – HVDC Systems

- Removal of current source converter (CSC) specific testing requirements.

- Changes to reactive capability MW test points and durations.

- Frequency response compliance now determined from step response so modification to test spec of test A & K and additional step tests O, Q added. MLP 2,3 and 5 removed because of testing of both import and export mode requirements.

References

[1] Grid Code Consultation GC0100
[2] Grid Code Consultation GC0101

Workgroup Consultation Responses – overview

GC0102 CONSULTATION RESPONSES

The Workgroup Consultation was issued on the 19 October and closed on the 9 November 2017. Fourteen responses were received to the Consultation and an overview of these can be found below. The full responses can be found at Annex 6.

GENERAL STATEMENT

Response From	Please express your views regarding the Workgroup Consultation, including rationale.
Nigel Turvey (Western Power Distribution)	
Steve Cox (Electricity North West)	We are aware of the considerable work that has gone into GC0102 and the associated GC0100 and GC0101, and we are pleased that we can now see the strands coming together. On this point we do not see any merit in continuing to develop the GB changes to the Grid Code in three separate modifications. They all interlink and cannot be considered in isolation. The legal text also needs to be considered as a whole, complete with all the changes to definitions, for example, worked in throughout the whole of the Grid Code and not just the Connexion Conditions. On this basis we recommend that you suspend work in GC0100 and GC0101 and find a way to move the consideration of these issues into GC0102. We note that the D Code, G99 and G98 are presented in full as part of the joint GC0102 consultation, which is helpful in all the new requirements, can be seen across all the affected text.

Response From	Please express your views regarding the Workgroup Consultation, including rationale.
Rachel Woodbridge-Stocks (NGET)	This workgroup consultation represents the end of a very long development process. There is very little time left to achieve compliance with the national implementation deadlines for the European Connection Codes (of which the first, RfG, is due on 17 May 2018). This work must now be brought to a timely close and hopefully this consultation will help in gathering any further evidence available and then allowing submission of the proposal(s) to the Panel and Authority without further delay. It is crucial that members of the industry cooperate to achieve this. Noting that legal text for the alternatives is not included in this consultation, we would point out that this is not necessary to allow their progressing to Code Administrator consultation and submission to the Authority. Given that there is very limited time remaining for compliance, the principles behind the alternative proposals are complete and that mapping tables are in the process of being prepared to ensure the GB Code is consistent with the EU Connection Codes, this consultation should be sufficient to gather any further stakeholder views and evidence and allow the work to proceed. In terms of the legal text, the relevant clauses in the code are GR21.5 which states for the Code Administrator consultation that legal text may not be required if the Panel and the Authority agree; and GR 22.1&2 regarding the final report which in GR22.2(g) requires an assessment of the changes only. It should also be noted that if mistakes are found at a later stage with any of the legal text within the Proposal, a modification can be raised to make amendments. *GR.21.5 Where the Grid Code Review Panel is of the view that the proposed text to amend the Grid Code for a Grid Code Modification Proposal or Workgroup Alternative Grid Code Modification(s) is not needed in the Grid Code Modification Report, the Grid Code Review Panel shall consult (giving its reasons as to why it is of this view) with the Authority as to whether the Authority would like the Grid Code Modification Report to include the proposed text to amend the Grid Code. If it does not, no text needs to be included. If it does, and no detailed text has yet been prepared, the Code Administrator shall prepare such text to modify the Grid Code in order to give effect to*

Response From	Please express your views regarding the Workgroup Consultation, including rationale.
	such Grid Code Modification Proposal or Workgroup Alternative Grid Code Modification(s) and shall seek the conclusions of the relevant Workgroup before consulting those identified in GR.21.2. *GR.22.2(g) The matters to be included in a Grid Code Modification Report shall be the following (in respect of the Grid Code Modification Proposal):* *g) an assessment of:* *(i) the impact of the Grid Code Modification Proposal and any Workgroup Alternative Grid Code Modification(s) on the Core Industry Documents and the STC;* *(ii) the changes which would be required to the Core Industry Documents and the STC in order to give effect to the Grid Code Modification Proposal and any Workgroup Alternative Grid Code Modification(s);* *(iii) the mechanism and likely timescale for the making of the changes referred to in (ii);*

CONSULTATION QUESTIONS

Response From	Q1. Do you believe that GC0102 Original Proposal, or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?
Nigel Turvey (Western Power Distribution)	Given the legal necessity of implementing the RfG we agree that the GC0102 proposals better facilitate both the Grid and Distribution Code objectives.
Steve Cox (Electricity North West)	Given the legal necessity of implementing the RfG we agree that the GC0102 proposals better facilitate both the Grid and Distribution Code objectives. However as per our opening remarks we are not completely convinced that running GC0102 separately from GC0100 and GC0101 is neutral on the efficiency and administration of Grid Code arrangements; we could argue that not combining the three modifications into one is now inefficient.

Response From	Q1. Do you believe that GC0102 Original Proposal, or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?
David Spillett (Energy Networks)	Given the legal necessity of implementing the RfG we agree that the GC0102 proposals better facilitate both the Grid and Distribution Code objectives. However as per our opening remarks we are not completely convinced that running GC0102 separately from GC0100 and GC0101 is neutral on the efficiency and administration of Grid Code arrangements; we could argue that not combining the three modifications into one is now inefficient.
Sridhar Sahukari (Orsted (formerly DONG Energy))	Yes. We agree that GC0102 Original proposal facilitates the Grid Code Objectives.
Matt White (UKPN)	Given the legal necessity of implementing the RfG we agree that the GC0102 proposals better facilitate both the Grid and Distribution Code objectives. We would suggest however that going forward running GC0102 separately from GC0100 and GC0101 is not the most efficient approach and would suggest combining the three
Alastair Frew (Scottish Power)	In principle yes as it implements European Law.
Graeme Vincent (SP Energy Networks)	Yes, GC0102 better facilitates the Grid Code (and Distribution Code) objectives as the proposals discharge obligations imposed by the Electricity Regulation and the European Commission.
Peter	This is enabling the development of the transmission system and I can see that the security of the system will

Response From	Q1. Do you believe that GC0102 Original Proposal, or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?
*Woodcock (*RWE Generation UK)	improve. However improving efficiencies in terms of competition, Code administration and generation costs has been worsened due to the complexity of the changes to the Code which have been enforced by RfG. However I cannot think of any significant improvement of what has been suggested by the Original Proposal or the Alternative Proposal.
Damian Jackman (SSE Generation)	We do not believe that GC0102 does better facilitate the Grid Code Objectives as it fails to discharge the obligations imposed upon the licensee by its license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency. As the National Grid presentation to EnergyUK on 23rd May 2017 noted, in respect of the three connection codes (RfG, DCC and HVDC), the aim of these Network Codes is to "*Set consistent technical requirements across EU for new connections of user equipment (e.g. generation / interconnectors)*". This accords with the recitals of the RfG, DCC and HVDC Network Codes. However, as both the Proposer's explanations to the Workgroup and the legal text makes clear there is not even to be a set of consistent technical requirements across GB (let alone with the EU) for new connections as a result of GC0102 as, for example, apparently many of these multiple technical requirements are, instead, to be determined by the TSO alone, in a non-open / non-transparent way, and applied differently to each new connection. This non-harmonised approach is inconsistent with the EU Network Codes. Furthermore, the imposition of additional costs (such as the requirement for Type B and C generators in terms of a 'PON' stage and associated administrative costs to manage) will affect cross border trade between Member States as well as within the Member State (between GB and Northern Ireland) and as such will not be in compliance with Article 8(7) of Regulation 714/2009. In addition to not being better in terms of Objective (iv) the GC0102 Original does not better facilitate the Grid

Response From	Q1. Do you believe that GC0102 Original Proposal, or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?
	Code Objectives (ii), (iii) and (v) as it: GB generation); fails to promote security and efficiency in electricity generation (by not complying with EU law – see above); and fails to promote efficiency in the implementation and administration of the Grid Code arrangements (by not complying with EU law – see above). **POTENTIAL ATLERNATIVE** We do believe that the potential alternative (as described on pages 39-47 of the Workgroup consultation) does better facilitate the Grid Code Objectives as it ensures the discharging of the obligations imposed upon the licensee by its license as well as complying with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency. As the National Grid presentation to EnergyUK on 23rd May 2017 noted, in respect of the three connection codes (RfG, DCC and HVDC), the aim of these Network Codes is to "*Set consistent technical requirements across EU for new connections of user equipment (e.g. generation / interconnectors)*". This accords with the recitals of the RfG, DCC and HVDC Network Codes. It is clear that this potential alternative seeks to ensure that *only* those obligations applicable to newly connecting parties that fall within the scope of the EU Network Codes will be implemented into the GB national network codes (such as, but not limited to, the Grid Code and Distribution Code) as required by those EU Network Codes. As detailed on pages 39-47of the Workgroup consultation document there are clear reasons as to why this is required.

Response From	Q1. Do you believe that GC0102 Original Proposal, or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?
	In addition to being better in terms of Objective (iv) the potential alternative (b) also better facilitates the Grid Code Objectives (ii), (iii) and (v): as by complying with EU law – see above – and fails to facilitate competition in the generation and supply of electricity (by not complying with EU law – see above – and imposing additional costs on not imposing additional costs (over and above those required by law) on GB generation it facilitates competition in the generation and supply of electricity; as by complying with EU law – see above – and not imposing additional costs (over and above those required by law) on GB generation it promotes security and efficiency in electricity generation; and as by complying with EU law – see above – and not imposing additional costs (over and above those required by law) on GB generation it promotes efficiency in the implementation and administration of the Grid Code arrangements.
Rachel Woodbridge-Stocks (NGET)	The original proposal for GC0102 better facilitates the Grid Code Objectives. An assessment of the original proposal against the Grid Code objectives is as follows: *i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity* Positive. By implementing RfG and HVDC into the Grid Code with Ofgem's "only make changes where needed" approach (as can be found in their 2014 Decision Letter), the current requirements for operating the system safely have remained whilst incorporating the requirements necessary to harmonise with Europe.

Response From	Q1. Do you believe that GC0102 Original Proposal, or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?
	This therefore facilitates the development of a coordinated and efficient system. *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)* Positive. By implementing the necessary changes required by RfG and HVDC, New Generators and HVDC Owners connecting to the transmission network will be treated equally from a technical connections perspective (as required by RfG and HVDC). In doing so, barriers to trade will be removed. *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* Positive, maintaining a number of existing Grid Code requirements (not mentioned in RfG or HVDC) facilitates the safe and secure operation of the system. If these requirements were removed from the Grid Code (on the basis of not being mentioned in the European Conection Codes) as is suggested in the "more stringent" alternative, there would be implications for system security and efficiency. *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* Positive. This modification is required to implement elements of the European Connection Codes forming part of the suite of European Network Codes resulting from the EU 3rd Package legislation (EC 714/2009). The most efficient way of discharging these obligations is to adopt Ofgem's "only make changes where

Response From	Q1. Do you believe that GC0102 Original Proposal, or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?
	needed" approach. v. *To promote efficiency in the implementation and administration of the Grid Code arrangements* Neutral. No major impacts on the process of administering the Grid Code. So as noted above, the GC0102 original proposal better facilitates objectives (i)-(iv) and is neutral against objective (v). The 'more stringent' alternative fulfils none of the objectives as summarised below. Assessment of the 'more stringent' alternative against the Grid Code objectives: *i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity* Negative. The 'more stringent' alternative has not been well defined in terms of what items have been considered to be more stringent with only a very limited number of examples so far provided, nor do we believe it embodies the "only make changes where needed" solution as required by Ofgem for implementation of the European Network Codes and so does not permit efficient development. *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)* Negative. The 'more stringent' alternative is not achievable in the time available and proposes striking out of national code requirements without which system security will be compromised and new connections will be unable to proceed under safety rules and due to a lack of clarity over equipment specifications. Further, due

Response From	Q1. Do you believe that GC0102 Original Proposal, or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?
	to the time that solving these issues will take the ability of new entrants to meet their European Connection Code obligations will be compromised as the lead-time that they will have prior to compliance being required will be reduced. If the more stringent alternative is, instead of the principle submitted, a 3 layer approach, then any minor points subsequently identified by stakeholders as potentially being "more stringent" could be amended as they are identified. There is a concern that if, instead, the more stringent alternative continues to change and time is spent developing it further, the process is delayed and industry parties won't get visibility of the final solution until very close to the implementation date making it more difficult for them to comply with the new standards and essentially creating a short term barrier. *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* Negative. The 'more stringent' alternative reduces secure connection of new entrants, stifles development of efficient solutions and potentially undermines the safe, secure and economic operation of the Transmission System in a reasonable, efficient and proportionate manner. . *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* Negative. The 'more stringent' alternative does not efficiently discharge the obligations of RfG and HVDC as more work is required compared to only making changes where needed – there is also the question of whether it could be implemented in the timescales required. v. *To promote efficiency in the implementation and administration of the Grid Code arrangements*

Response From	Q1. Do you believe that GC0102 Original Proposal, or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?
	Neutral.' No material impact on the administration of the Grid Code. The risk to the timescales is a concern if this alternative is pursued though.
Alan Creighton (Northern Powergrid)	Given the legal necessity of implementing the RfG we agree that the GC0102 proposals better facilitate both the Grid and Distribution Code objectives. However, running with three separate modifications may not be the best way to proceed given their interaction. For example the modification considering banding could have implications for GC0102. Combining the modifications may also make it easier for users to assess the proposed changes in their totality. There would be merit in reviewing the most efficient way forwards.
Greg Middleton (AMPS)	We believe the Original Proposal better facilitates the objectives.
Isaac Gutierrez (Scottish Power Renewable Ltd UK)	Yes

Response From	**Q2:** Do you support the proposed implementation approach?
Nigel Turvey (Western Power Distribution)	Yes – although as above it would be more efficient to combine GC0100, GC0101 and GC0102
Steve Cox	Yes – although as above it would be more efficient to combine the three modifications.

Response From	Q2: Do you support the proposed implementation approach?
(Electricity North West)	
David Spillett (Energy Networks)	Yes – although as above it would be more efficient to combine the three modifications.
Sridhar Sahukari (Orsted (formerly DONG Energy))	Yes
Matt White (UKPN)	Yes – although as above we believe it would be more efficient to combine the three modifications now. We acknowledge the amount of work that has gone into GC0102 and the associated GC0100 and GC0101, and are pleased to see these are now progressing. Since these modifications are interlinked and cannot be considered in isolation, we believe there is no merit in continuing with the three separate mods. The legal text also needs to be considered as a whole, complete with all the changes to definitions, (e.g. worked in throughout the whole of the Grid Code and not just the Connection Conditions). On this basis we recommend that you suspend work in GC0100 and GC0101 and find a way to move the consideration of these issues into GC0102.
Alastair Frew (Scottish Power)	Yes
Graeme Vincent (SP Energy	Yes, although given the interdependencies between the three separate modifications which are now beginning to appear it would be better to consider the three modifications (GC0100, Gc0101 and GC0102) as one going forward. In this way stakeholders will be able to see all the proposed changes and legal text as one document

Response From	Q2: Do you support the proposed implementation approach?
Networks)	and be able to see how the definitions flow between each of the separate sections of draft legal text.
*Peter Woodcock (*RWE Generation UK)	I am in support of this approach as it builds on the existing Code whilst integrating the RfG requirements into it. There are no significant concerns and just finer details which may be improved in future modifications once the Code is used in practice.
Damian Jackman (SSE Generation)	We note the proposed implementation approach set out in Section 10 of the Workgroup document and support that approach.
Rachel Woodbridge-Stocks (NGET)	For the original proposed solution, yes. For the alternative proposed, no due to the reasons outlined above. The most important factors for Generators in particular at this stage should be lead time for compliance - this has been greatly reduced due to the time spent on requests for evidence and pursuing alternatives to the detriment of new entrants to the market.
Alan Creighton (Northern Powergrid)	Yes
Greg Middleton (AMPS)	Yes
Isaac Gutierrez (Scottish Power	No, timescales for implementation of the modifications are being rushed.

Response From	**Q2:** Do you support the proposed implementation approach?
Renewable Ltd UK)	

Response From	**Q3:** Do you have any other comments?
Nigel Turvey (Western Power Distribution)	No
Steve Cox (Electricity North West)	Not that are not picked up in the rest of these questions.
David Spillett (Energy Networks)	None that are not picked up in the rest of these questions.
Sridhar Sahukari (Orsted (formerly DONG Energy))	Section 4.1.7 mentions that Article 15(4) in RfG is covered by CC.6.3.10 and CC.6.3.15. However, Article 15(4)(c) is not covered.
Matt White (UKPN)	We note that work is ongoing in developing both G98 and G99, and there are a number of questions still to be answered. We would look to the ongoing work in this area to provide sufficient clarity on both the requirements for customers and network operators. We acknowledge, agreement in principle with regards to format and layout of the documents

Response From	**Q3:** Do you have any other comments?
Alastair Frew (Scottish Power)	As the SOGL Article 54 also deals with compliance it would be better to ensure that this proposal is also compliant with this article to avoid this have to reopened and changed in the near future.
Graeme Vincent (SP Energy Networks)	No
*Peter Woodcock (*RWE Generation UK)	No
Rachel Woodbridge-Stocks (NGET)	The original proposal satisfies the requirements of RfG and HVDC and, providing there are no delays to the process, can be implemented by the deadlines required. Where the workgroup has identified additional changes in order to improve the efficiency of and competition within, the electricity network, these should be addressed outside of GC0102 as Open Governance allows industry parties to raise modifications to the Grid Code in order to achieve this. The inclusion of additional requirements that are not necessary to ensure compliance with RfG and HVDC should therefore not delay Implementation and hence risk GB to be non-compliant with European Law given that the original proposal stated in GC0102 satisfies the defect of currently being non-compliant.
Alan Creighton (Northern	No

Response From	**Q3:** Do you have any other comments?
Powergrid)	
Greg Middleton (AMPS)	No
Isaac Gutierrez (Scottish Power Renewable Ltd UK)	No

Response From	**Q4:** Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider?
Nigel Turvey (Western Power Distribution)	None provided
Steve Cox (Electricity North West)	No
David Spillett (Energy Networks)	No
Sridhar	No

Response From	**Q4:** Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider?
Sahukari (Orsted (formerly DONG Energy))	
Matt White (UKPN)	No
Alastair Frew (Scottish Power)	No
Graeme Vincent (SP Energy Networks)	No
*Peter Woodcock (*RWE Generation UK)	No, I believe that the one currently under consideration is suitable.
Damian Jackman (SSE Generation)	No
Rachel Woodbridge-	No

Response From	**Q4:** Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider?
Stocks (NGET)	
Alan Creighton (Northern Powergrid)	No
Greg Middleton (AMPS)	No
Isaac Gutierrez (Scottish Power Renewable Ltd UK)	No

Specific GC0102 Consultation Questions

Response From	**Q5:** Do you have any comments on the structure of the proposed relationship between the D Code, G59 and G83, and G98 and G99? In particular which of the three options in Section 3.2 of this consultation do you support and why?
Nigel Turvey (Western	We believe that the option now alighted on, post recent discussions with stakeholders, is a reasonable compromise. It has the benefit of being the simplest division of documents for new installations compared to

Response From	Q5: Do you have any comments on the structure of the proposed relationship between the D Code, G59 and G83, and G98 and G99? In particular which of the three options in Section 3.2 of this consultation do you support and why?
Power Distribution)	existing in that micro generation (i.e. less than 16A per phase) will refer only to G98 (cf G83 for existing) and all other generation will refer to G99 (cf G59 for existing).
Steve Cox (Electricity North West)	We are aware of the significant discussions on how to best present the GB requirements to GB stakeholders, recognizing the differences in connexion application process for different sizes of generating equipment, the different needs of stakeholders, and the influence of existing and emergent European standards. We believe that the option now alighted on, post recent discussions with stakeholders, is the best compromise. It has the benefit of being the simplest division of documents for new installations compared to existing in that micro generation (i.e. less than 16A per phase) will refer only to G98 (cf G83 for existing) and all other generation will refer to G99 (cf G59 for existing).
David Spillett (Energy Networks)	We are aware of the significant discussions on how to best present the GB requirements to GB stakeholders, recognizing the differences in connection application process for different sizes of generating equipment, the different needs of stakeholders, and the influence of existing and emergent European standards. We believe that the option now alighted on (Option 3), post recent discussions with stakeholders, is the best compromise. It has the benefit of being the simplest division of documents for new installations compared to existing in that micro generation (i.e. less than 16A per phase) will refer only to G98 (cf G83 for existing) and all other generation will refer to G99 (cf G59 for existing).
Matt White (UKPN)	We are aware of the significant discussions on how to best present the GB requirements to GB stakeholders, recognizing the differences in connection application process for different sizes of generating equipment, the different needs of stakeholders, and the influence of existing and emergent European Standards. In terms of the D Code, we would expect it to be limited in terms of technical content, with reference being made in the main to G98/G99 (G83/G59). We believe that Option 3, post recent discussions with stakeholders, is the best compromise. It has the benefit of being the simplest division of documents for new installations compared to existing, in that micro generation

Response From	Q5: Do you have any comments on the structure of the proposed relationship between the D Code, G59 and G83, and G98 and G99? In particular which of the three options in Section 3.2 of this consultation do you support and why?
	(i.e. less than 16A per phase) will refer only to G98 (G83 for existing) and all other generation will refer to G99 (G59 for existing).
Alastair Frew (Scottish Power)	The structural arrangements seem acceptable but there needs to be a more detailed look at the remaining legal text DCRP7 as how it actually discharges compliance requirements to existing generators. Support option 1 as type A splits easily in the two types of generator, however the higher end of Type A does not fit well either in G99 nor the G-code. I would also go further and say the type A requirements should be removed from the G-code and the G-code should just refer to G98.
Graeme Vincent (SP Energy Networks)	We are aware of the significant stakeholder interactions which the developers of the proposed text have undertaken and support the preferred approach (Option 3) as being the most suitable compromise in meeting all stakeholders' requirements.
*Peter Woodcock (*RWE Generation UK)	I believe that option 3 is the most sensible structure to follow as this provides a concise document for microgenerators and a detailed document for larger projects who should have the technical capability of understanding which requirements are applicable for their situation.
Damian Jackman (SSE Generation)	We note that the proposed relationship between the D Code, G59 and G83, and G98 and G99 as set out in (a) the 19th October version of the Workgroup consultation document; and (b) the 3rd November version of the Workgroup consultation document. Given the presentation provided to the G98 and G99 workshop on Tuesday 7th November – which sets out a different proposed relationship between the D Code, G59 and G83, and G98 and G99 to that shown in either the 19th October or 3rd November versions of the Workgroup consultation document – we are unable to comment on, or indicate our support for, either the 19th October or 3rd November versions of the proposed relationship between the D Code, G59 and G83, and G98 and G99.

Response From	**Q5:** Do you have any comments on the structure of the proposed relationship between the D Code, G59 and G83, and G98 and G99? In particular which of the three options in Section 3.2 of this consultation do you support and why?
Rachel Woodbridge-Stocks (NGET)	No comment
Alan Creighton (Northern Powergrid)	We believe that on balance, Option Three, which emerged from recent stakeholder discussion, is the best solution if only because it relates more closely to the present document structure and should therefore be easier for stakeholders to follow.
Greg Middleton (AMPS)	We support option 3
Isaac Gutierrez (Scottish Power Renewable Ltd UK)	SPR preferred option is number 2 as both type A and micro generator requirements will be covered in one document

Response From	**Q6:** Do you agree with the organization of G99 and how it applies to the different Types of generation? Do you have any alternative suggestions for structure?
Nigel Turvey (Western	The current draft represents a good basis

Response From	**Q6:** Do you agree with the organization of G99 and how it applies to the different Types of generation? Do you have any alternative suggestions for structure?
Power Distribution)	
Steve Cox (Electricity North West)	We note the development of the structure of G99 and note that more interaction with stakeholders is planned to refine the approach. However we believe that the current draft represents a good basis.
David Spillett (Energy Networks)	We note the development of the structure of G99 and note that more interaction with stakeholders is planned to refine the approach. However we believe that the current draft represents a good basis.
Matt White (UKPN)	We note the continued development of the structure of G99 and note that more interaction with stakeholders is planned to refine the approach. We believe that the current draft represents a good basis.
Alastair Frew (Scottish Power)	Yes, but the only section which does not fit well into the structure is appendix C as it contains technical requirements whereas all the other technical requirements are in the text, but I suppose this is a result of the strange G-code structure which also does this from which it has been copied .
Graeme Vincent (SP Energy Networks)	We believe that the current format of G99 is a good basis on which to further engage with stakeholders to further refine the document structure.
*Peter Woodcock (*RWE Generation UK)	Yes this seems sensible.
Damian	See our answer to Q5.

Response From	**Q6:** Do you agree with the organization of G99 and how it applies to the different Types of generation? Do you have any alternative suggestions for structure?
Jackman (SSE Generation)	
Rachel Woodbridge-Stocks (NGET)	Yes
Alan Creighton (Northern Powergrid)	The current structure of G99 does seem to be reasonably logical and clear although it may be possible to provide additional clarity by incorporating some of the structural diagrams from the GC0102 consultation and a diagram showing the relationship between Power Generating Facility, Power Generation Modules etc. Further descriptions of the scenarios where the GCode requirements apply to Medium may help, recognising that a Medium may comprise multiple Type A synchronous generators.
Greg Middleton (AMPS)	The drafts included with this consultation are unfinished and as it stands G99 is completely unsuitable for application to synchronous generators as the type testing procedure is copied from that for inverter based micro-generators. Extensive work is underway on these and a proper consultation must be carried out when they are complete. Because of this it is impossible to give an answer to this question. At the least the workgroup report to Code Panel should clearly acknowledge this. Ideally G98 and G99 will be removed from this consultation process until such time as they are fit for purpose.
Isaac Gutierrez (Scottish Power Renewable	Yes

Response From	Q6: Do you agree with the organization of G99 and how it applies to the different Types of generation? Do you have any alternative suggestions for structure?
Ltd UK)	

Response From	Q7: Do you agree with the current view of how the Grid and Distribution Codes (and G98 and G99) will be applied to installations where new PGMs are installed alongside existing pre-RfG equipment? *(see page 11)*
Nigel Turvey (Western Power Distribution)	This is a very important practical point and we are pleased to see that some clear examples have been laid out in 6.1.5 of G99. It will be important to ensure that these examples are fully accepted as illustrative of the legal situation that will apply in such cases by all stakeholders, including Ofgem and BEIS
Steve Cox (Electricity North West)	This is a very important practical point and we are pleased to see that some clear examples have been laid out in 6.1.5 of G99. It will be important to ensure that these examples are fully accepted as illustrative of the legal situation that will apply in such cases by all stakeholders, including Ofgem and BEIS.
David Spillett (Energy Networks)	This is a very important practical point and we are pleased to see that some clear examples have been laid out in 6.1.5 of G99. It will be important to ensure that these examples are fully accepted as illustrative of the legal situation that will apply in such cases by all stakeholders, including Ofgem and BEIS. Note that we expect the D Code to be limited in terms of technical content, with reference being made in the main to G98/G99
Sridhar Sahukari (Orsted (formerly DONG	Yes, we agree with the way RfG clauses will co-exist in the Grid Code.

Response From	**Q7:** Do you agree with the current view of how the Grid and Distribution Codes (and G98 and G99) will be applied to installations where new PGMs are installed alongside existing pre-RfG equipment? *(see page 11)*
Energy))	
Matt White (UKPN)	This is a very important practical point and we are pleased to see that some clear examples have been laid out in 6.1.5 of G99. It will be important to ensure that these examples are fully accepted as illustrative of the legal situation that will apply in such cases by all stakeholders, including Ofgem and BEIS.
Alastair Frew (Scottish Power)	Yes
Graeme Vincent (SP Energy Networks)	Yes – it is beneficial for examples to be provided which will allow all stakeholders to understand how these situations will be considered.
*Peter Woodcock (*RWE Generation UK)	6.1.3.2 and 6.1.4.2 of G99 is clear and easy to understand. Table 6.1 is very useful to align specific projects to get a guide / appreciation of the approach to take, however not all scenarios are possible to cover here. What is the process if a dispute occurs between DNO and generator about the requirements for a project?
Damian Jackman (SSE Generation)	See our answer to Q5.
Rachel Woodbridge-Stocks (NGET)	No comment

Response From	**Q7:** Do you agree with the current view of how the Grid and Distribution Codes (and G98 and G99) will be applied to installations where new PGMs are installed alongside existing pre-RfG equipment? *(see page 11)*
Alan Creighton (Northern Powergrid)	We agree with the interpretation as set out in the draft EREC G99 and that the examples are helpful. We have provided some editorial comments on the table. It will be important to ensure that these examples are fully accepted as illustrative of the legal situation that will apply in such cases by all stakeholders, including Ofgem and BEIS, particularly as there are some situations where increased technical requirements may be applied to plant already connected.
Greg Middleton (AMPS)	Yes
Isaac Gutierrez (Scottish Power Renewable Ltd UK)	Yes

Response From	**Q8:** Do you agree on the introduction of a Preliminary Operation Notification relating to the Compliance process for Transmission connected Type B and Type C PGMs? *(See Workgroup discussions section)*
Nigel Turvey (Western Power Distribution)	In principle yes. We not however that this is being portrayed by some stakeholders as a new (and arguably therefore more stringent) requirement. We do not believe this to the case and believe that it should be presented as either (or both) a relaxation on the full EON/ION/FON process for smaller generating plant, or as a formalization of something that happens anyway, but not codified.

Response From	**Q8:** Do you agree on the introduction of a Preliminary Operation Notification relating to the Compliance process for Transmission connected Type B and Type C PGMs? *(See Workgroup discussions section)*
Steve Cox (Electricity North West)	In principle yes. We note however that this is being portrayed by some stakeholders as a new (and arguably therefore more stringent) requirement. We do not believe this to the case and believe that it should be presented as either (or both) a relaxation on the full EON/ION/FON process for smaller generating plant, or as a formalization of something that happens anyway, but not codified.
David Spillett (Energy Networks)	In principle yes. We note however that this is being portrayed by some stakeholders as a new (and arguably therefore more stringent) requirement. We do not believe this to be the case and believe that it should be presented as either (or both) a relaxation on the full EON/ION/FON process for smaller generating plant, or as a formalization of something that happens anyway, but not codified.
Matt White (UKPN)	In principle yes, for smaller generators we believe that it should be presented as either (or both) a relaxation on the full EON/ION/FON process or as a formalization of something that happens anyway, but not codified.
Alastair Frew (Scottish Power)	Agree with principle of issuing written approval but question why a consistent approach cannot be applied to all types, see answer to question 15.
Graeme Vincent (SP Energy Networks)	Whilst we recognise that the Preliminary Notification Process is not an explicit requirement within the RfG for Type B and C PGMs and therefore could considered as a more stringent requirement, we do understand and appreciate that it is a pragmatic solution for a practical requirement in the connection process for Transmission Connected type B & C PGMs.
*Peter Woodcock (*RWE Generation UK)	I think this is to the benefit of type B and C generators when considering connection to the transmission system as it gives a structured approach (process) to obtaining a FON. Therefore I do agree that a PON is required. However I would like clarification following the issue of a FON to a type B or C generator and then subsequent discovery of an compliance issue. Would a LON or PON be issued to manage the issue?

Response From	**Q8:** Do you agree on the introduction of a Preliminary Operation Notification relating to the Compliance process for Transmission connected Type B and Type C PGMs? *(See Workgroup discussions section)*
Damian Jackman (SSE Generation)	Firstly, we do <u>not</u> agree with the introduction of a Preliminary Operation Notification relating to the Compliance process for Transmission connected Type B and Type C PGMs. Secondly, we believe that the proposed requirement to oblige Type B and Type C generators (i) not to submit a *power-generating module document* and (ii) to, instead, submit a *Preliminary Operation Notification* is illegal. Had the Member States and the Commission intended that Type B and Type C generators were to submit an 'ION' (which is effectively what the 'Preliminary Operation Notification' is, in all but name) they would simply have amended Article 33 accordingly. They did not do so – rather, they determined that a *power-generating module document* and <u>not</u> an 'ION' (or 'PON' as it has not to subtly been renamed!) was all that Type B and Type C generators need to submit.
Rachel Woodbridge-Stocks (NGET)	Yes, it is a tool to aid New Generators using the transmission network. We believe this clarification gives protection to both Generators and Network Operators especially given that equipment certificates might not be fully developed by May 2018.
Alan Creighton (Northern Powergrid)	We can see the benefits of recording formally the fact that a PGM is connected to the transmission system, and although we have yet to see a draft PON, we would not envisage this to be an onerous requirement.
Greg Middleton (AMPS)	No, the process should remain as far as possible the same as it is now unless it has to change to be compliant with RfG. Introduction of a PON seem unnecessary for Type B PGMs

Response From	**Q8:** Do you agree on the introduction of a Preliminary Operation Notification relating to the Compliance process for Transmission connected Type B and Type C PGMs? *(See Workgroup discussions section)*
Isaac Gutierrez (Scottish Power Renewable Ltd UK)	Yes

Response From	**Q9:** Do you agree with the retaining of the current GB arrangements for automatic connection and reconnection and the logic for it? If not, what alternative should be proposed? *(see section 4.1.2.2)*
Nigel Turvey (Western Power Distribution)	Yes. Pending any decisions to change the fundamental approach in GB, the status quo should be maintained.
Steve Cox (Electricity North West)	Yes. Pending any decisions to change the fundamental approach in GB, the status quo should be maintained.
David Spillett (Energy Networks)	Yes. Pending any decisions to change the fundamental approach in GB, the status quo should be maintained.
Matt White (UKPN)	Yes. Pending any decisions to change the fundamental approach in GB, the status quo should be maintained.
Alastair Frew (Scottish	Yes

Response From	**Q9:** Do you agree with the retaining of the current GB arrangements for automatic connection and reconnection and the logic for it? If not, what alternative should be proposed? *(see section 4.1.2.2)*
Power)	
Graeme Vincent (SP Energy Networks)	Yes we agree to retaining the existing approach.
*Peter Woodcock (*RWE Generation UK)	This does seem logical and so I agree with the approach.
Damian Jackman (SSE Generation)	It is not clear to us that the current GB arrangements for the automatic connection and reconnection after an incidental disconnection caused by a network disturbance are sufficient to discharge the RfG requirements in Articles 13(7) and 14(4). Therefore we cannot agree to the retaining of those current arrangements un-amended.
Rachel Woodbridge-Stocks (NGET)	Yes
Alan Creighton (Northern Powergrid)	Yes, although we appreciate that there may be a requirement to review this position in the future. We have provided some editorial comment on the legal text e.g. that further clarity of the requirements may be helpful, for example, where there is a Embedded Medium Power Station that comprises multiple Type B PGMs.
Greg Middleton (AMPS)	Yes, it is appropriate

Response From	**Q9:** Do you agree with the retaining of the current GB arrangements for automatic connection and reconnection and the logic for it? If not, what alternative should be proposed? *(see section 4.1.2.2)*
Isaac Gutierrez (Scottish Power Renewable Ltd UK)	Yes

Response From	**Q10:** Do you consider any parts of the proposed compliance, simulation or testing requirements for distribution-connected generators to be disproportionately onerous? *(See section 5.2.5)*
Nigel Turvey (Western Power Distribution)	As we work through the new requirements placed on smaller embedded generators, it has obviously been sensible to consider using well developed process that apply to larger transmission connected plant. We expect to continue to work with stakeholders to examine the requirements in more detail over the next couple of months.
Steve Cox (Electricity North West)	As we work through the new requirements placed on smaller embedded generators, it has obviously been sensible to consider using well developed process that apply to larger transmission connected plant. We expect to continue to work with stakeholders to examine the requirements in more detail over the next couple of months.
David Spillett (Energy Networks)	As we work through the new requirements placed on smaller embedded generators, it has obviously been sensible to consider using well developed process that apply to larger transmission connected plant. We expect to continue to work with stakeholders to examine the requirements in more detail over the next couple of months.
Sridhar	We believe there is no requirement for Preliminary Frequency Testing (ECP.A.6.6.4) as per RfG. We believe

Response From	**Q10:** Do you consider any parts of the proposed compliance, simulation or testing requirements for distribution-connected generators to be disproportionately onerous? *(See section 5.2.5)*
Sahukari (Orsted (formerly DONG Energy))	this is onerous on the developers, as there is high dependency on weather conditions to perform this test.
Matt White (UKPN)	We acknowledge the approach in using an already well developed process for transmission connected plant, however further work is required with stakeholders to examine the requirements in more detail.
Alastair Frew (Scottish Power)	This a major change for embedded generators who had minimal requirements before but this now matches them with G-code connected generators.
Graeme Vincent (SP Energy Networks)	No, where there well developed and robust processes exist for Transmission Connected generation then it seems sensible to adopt and adapt these to suit distribution connected generation.
*Peter Woodcock (*RWE Generation UK)	No
Damian Jackman (SSE Generation)	Yes, we do consider parts of the proposed compliance, simulation and testing requirements for distribution-connected generators to be more stringent than the requirements as defined in the RfG.
Rachel	No comment

Response From	**Q10:** Do you consider any parts of the proposed compliance, simulation or testing requirements for distribution-connected generators to be disproportionately onerous? *(See section 5.2.5)*
Woodbridge-Stocks (NGET)	
Alan Creighton (Northern Powergrid)	DNOs, via the ENA ,are working with small generators to develop the compliance processes which will be incorporated in the new EREC G98 and G99
Greg Middleton (AMPS)	As stated under question 6 the draft of G99 with this consultation is completely unsuitable for application to synchronous generators as the type testing procedure is copied from that for microgenerators. A proper consultation is needed once the proposed requirements are known, this cannot be that consultation. Because of this it is impossible to give an answer to this question. At the least the workgroup report to Code Panel should clearly acknowledge this. Ideally G98 and G99 will be removed from this consultation process until such time as they are fit for purpose
Isaac Gutierrez (Scottish Power Renewable Ltd UK)	Yes, in particular the Fault ride through testing. Although it appears in the current UK Grid Code there is no evidence that in the UK any developer has carried out such test. SPR suggest removal of this section as the current practice for compliance is for the wind turbine manufacturer to type test generating units at the factory, provide a type test report to NGET and provide FRT simulations that prove compliance with the UK Grid Code. Also LFSM-U shall not be requested for windfarms

Response From	**Q11:** Do you agree it is appropriate to drop the designation Large and Small from the Distribution Code as proposed in section 3.3.1 of this consultation? Do you believe it is appropriate to drop the designation Large, Medium and Small from the Grid Code?
Nigel Turvey (Western Power Distribution)	DNOs believed that National Grid shared the widespread view that it was inappropriate to retain Large, Medium and Small, and the associated regional differences, as the RfG and the other EU Codes are implemented. Discussions along these lines started probably as far back as 2013. It was therefore a surprise when National Grid announced that regional differences would remain in place and that generation stakeholders would need to be classified into Large, Medium or Small and also into Types A to D. Given the imminence of the compliance deadlines, we agree that it now inappropriate to try to unpick the regional differences. Nevertheless we support the removal of the terms Large and Small from the Distribution Code, noting that it is necessary to retain Medium because the retention of regional differences means that Embedded Medium Power Stations will retain their complex LEEMPS status.
Steve Cox (Electricity North West)	DNOs believed that National Grid shared the widespread view that it was inappropriate to retain Large, Medium and Small, and the associated regional differences, as the RfG and the other EU Codes are implemented. Discussions along these lines started probably as far back as 2013. It was therefore a surprise when National Grid announced that regional differences would remain in place and that generation stakeholders would need to be classified into Large, Medium or Small and also into Types A to D. Given the imminence of the compliance deadlines, we agree that it now inappropriate to try to unpick the regional differences. Nevertheless we support the removal of the terms Large and Small from the Distribution Code, noting that it is necessary to retain Medium because the retention of regional differences means that Embedded Medium Power Stations will retain their complex LEEMPS status.
David Spillett (Energy Networks)	DNOs believed that National Grid shared the widespread view that it was inappropriate to retain Large, Medium and Small, and the associated regional differences, as the RfG and the other EU Codes are implemented. Discussions along these lines started probably as far back as 2013. It was therefore a surprise when National Grid announced that regional differences would remain in place and that generation stakeholders would need to be classified into Large, Medium or Small and also into Types A to D. Given the imminence

Response From	**Q11:** Do you agree it is appropriate to drop the designation Large and Small from the Distribution Code as proposed in section 3.3.1 of this consultation? Do you believe it is appropriate to drop the designation Large, Medium and Small from the Grid Code?
Sridhar Sahukari (Orsted (formerly DONG Energy))	Yes, we agree to drop the designation Large, Medium and Small from the Grid Code with regard to technical requirements.
Matt White (UKPN)	We believed that National Grid would look to remove this categorisation in lieu of the changes proposed by the EU codes, subsequently removing any regional differences. There is concern that this may add unnecessary complexity going forward. Given the imminence of the compliance deadlines, we agree that it's now inappropriate to try and move away from the status quo. Nevertheless we support the removal of the terms Large and Small from the Distribution Code, noting that it is necessary to retain Medium classification to cater for LEEMPS applications.
Alastair Frew (Scottish Power)	Yes Note that there are still some references G99 6.1.3.1 large is include G99 13.9.4 Embedded Medium
Graeme Vincent (SP Energy Networks)	We had assumed, that following the introduction of the RfG then the Large, Medium and Small (LMS) designation would be inappropriate and cease to be used as Type A, B C and D would apply across the GB and any regional differences would also disappear. It was therefore a surprise to see the proposed continued use of these terms and believe that it is potentially confusing for connecting parties going forward. However, it is recognised that the imminent deadlines to ensure compliance with RfG will effectively limit the opportunity for these regional differences to be removed across all codes impacted by the use of terms Large, Medium and

Response From	**Q11:** Do you agree it is appropriate to drop the designation Large and Small from the Distribution Code as proposed in section 3.3.1 of this consultation? Do you believe it is appropriate to drop the designation Large, Medium and Small from the Grid Code?
	Small. We support the removal of Large and Small from the Distribution Code, but note that due to NGET decision to retain LMS terminology that Medium will need to be maintained to cater for embedded medium plant (LEEMPS) connecting to the Distribution Network.
*Peter Woodcock (*RWE Generation UK)	As we are forced to adopt the Type definitions, it is appropriate to remove the LMS references as much as possible to avoid confusion for new generators. However it is too much work to do this completely and I would suggest that the term medium is kept in the interim for the D Code. For future clarity I would suggest that a working group should be set up to look at this and other Coding areas which utilise LMS and attempt to convert this to the Type definitions. Note that this may be part of the future European Network Code requirements (Electricity Balancing?). For example 6.1.3.1 in G99 still refers to large power stations in the Grid Code.
Damian Jackman (SSE Generation)	We see no evidence, in 3.3 of the Workgroup consultation document, to dropping the designations in terms of Large / Medium / Small that this question states. Rather it's the complete opposite, with the reference to: "*As these issues are outside the scope of the EU Connection Code implementation work it is proposed that the concepts of Large, Medium and Small Power Stations are* ***retained***…" [3.3] Furthermore, we are concerned that the lack of a harmonised approach to the connection arrangements for new generators in GB would be detrimental. This is because the failure to provide a harmonised approach to the connection of generators in GB will not facilitate Union-wide trade in electricity, will not ensure system

Response From	**Q11:** Do you agree it is appropriate to drop the designation Large and Small from the Distribution Code as proposed in section 3.3.1 of this consultation? Do you believe it is appropriate to drop the designation Large, Medium and Small from the Grid Code?
	security, will not facilitate the integration of renewable electricity sources, will not increase competition and will not allow more efficient use of the network and resources and, therefore, the benefit of consumers will not be achieved.
Rachel Woodbridge-Stocks (NGET)	Removing Large and Small from the Distribution Code is a relatively simple step with few implications and may therefore be appropriate. However, removing Large, Medium and Small from the Grid Code has wider impacts on other GB codes and there is not sufficient time to review the wider impacts of doing so and make the necessary amendments. More importantly, it is not necessary for compliance with RfG an HVDC – which is what GC0102 seeks to address. So far as the technical requirements are concerned, the Grid Code has been updated to ensure the technical requirements are consistent with the RfG and HVDC Code without making reference to Large, Medium and Small Power Stations. If it sensible to remove Large, Medium and Small from the Grid Code it should be part of a separate modification, not GC0102. Under Open Governance any industry party can raise a modification to address this which can then be progressed along a separate timeline.
Alan Creighton (Northern Powergrid)	We had understood that the intention was to remove the concept of Large, Medium and Small Power Stations from the Grid Code and Distribution Code, however we appreciate to complexities associated with doing this particularly as Large, Medium and Small are based on power station capacities, whilst Types A-D may based on the capacity of individual generating units. Retaining the concept of Large, Medium and Small for commercial and regulatory purposes whilst basing the technical requirements on Type A-D could be confusing for stakeholders, but given the extent of the potential changes and timescales involved we accept the current proposal
Greg Middleton (AMPS)	Yes, these are inappropriate terms in any code now that all network codes refer to bands A-D.

Response From	Q11: Do you agree it is appropriate to drop the designation Large and Small from the Distribution Code as proposed in section 3.3.1 of this consultation? Do you believe it is appropriate to drop the designation Large, Medium and Small from the Grid Code?
Isaac Gutierrez (Scottish Power Renewable Ltd UK)	Yes, although compliance process will need further revision if this categorization is dropped

Response From	Q12: Do you have any comments on the draft requirements for fault recording equipment for distribution-connected Type C PGMs as drafted in Section 13.11 and Appendix C3 of G99?
Nigel Turvey (Western Power Distribution)	No
Steve Cox (Electricity North West)	We have contributed to the drafting of this new specification and await stakeholder feedback.
David Spillett (Energy Networks)	We have contributed to the drafting of this new specification and await stakeholder feedback.
Matt White (UKPN)	We have contributed to the drafting of this new specification and await stakeholder feedback.

Response From	**Q12:** Do you have any comments on the draft requirements for fault recording equipment for distribution-connected Type C PGMs as drafted in Section 13.11 and Appendix C3 of G99?
Alastair Frew (Scottish Power)	Ignoring the fact this is a very expensive piece of kit to be purchased by a Type C generator. The next obvious question is why are the DNOs changing any settings of equipment which is not theirs.
Graeme Vincent (SP Energy Networks)	We have contributed to the drafting of these sections and therefore await comments from other stakeholders on the proposed requirements.
*Peter Woodcock (*RWE Generation UK)	It may be more appropriate to only consider including harmonic recording if there is found to be a specific concern, say following a harmonics study. This would save unnecessary cost of including permanent harmonic monitoring, which may be a significant cost.
Damian Jackman (SSE Generation)	Not withstanding the confusion about which version of the consultation we are replying to, the proposed requirements for fault recording are far too onerous and go well beyond the minimum requirements of RfG which simply specifies four values (voltage, active power, reactive power, frequency) to be recorded, with the criteria for triggering, sample rates and other 'settings' to be agreed with between the generator, system operator and TSO. There is absolutely no justification for the requirements as set out and these would impose significant cost burdens on to generators. For example: the requirement for time 'tagging' (implying sample rate?) of inputs to a **1**µs (*micro*second!) resolution is technically demanding due to its demands on data storage and the high cost of equipment capable of recording for long durations at this time resolution. Similarly it is left open for the DNO to specify if digital triggering is required but there are no limits on the amount of triggers a DNO could request and hence the impact on the cost of the recorder to accommodate all the triggers.

Response From	Q12: Do you have any comments on the draft requirements for fault recording equipment for distribution-connected Type C PGMs as drafted in Section 13.11 and Appendix C3 of G99?
	Relatively low cost (< £10k) fault recorders are available which can record samples on a fault trigger at sufficiently high rates (e.g. 1024 samples / cycle) for almost all fault investigation work but the requirement as currently proposed precludes the use of such devices despite these being in widespread use in the Republic of Ireland and the fault recorded data from them being accepted by Eirgrid despite it the system being approximately 10x smaller than that of GB. In writing this section, it would be far better if the TSO defined a minimum requirement *with an awareness of the cost to implementation* by advising in a schedule appended to G99 or the Grid Code, which 'off the shelf' fault recording products on the market are likely to be capable of meeting this standard .
Rachel Woodbridge-Stocks (NGET)	No comment
Alan Creighton (Northern Powergrid)	We are still reviewing this internally and will provide feedback to the drafting team as soon as possible.
Greg Middleton (AMPS)	No comment
Isaac Gutierrez (Scottish Power	Section C3.2.1 does not specify the minimum inputs required for the recording device Section C3.4 under what circumstances the DNO has the right to request demonstration of accuracy and functionality. Need to be clearer on this requirement

Response From	Q12: Do you have any comments on the draft requirements for fault recording equipment for distribution-connected Type C PGMs as drafted in Section 13.11 and Appendix C3 of G99?
Renewable Ltd UK)	

Response From	Q13: Do you agree that it is appropriate to include storage in G98 and G99, noting that as storage is explicitly excluded from the RfG, the technical requirements that arise solely from the RfG are not applied to storage in G09 and G99?
Nigel Turvey (Western Power Distribution)	We understand how difficult it would be for Ofgem to approve an approach that applied the new GB documentation to storage, given it is explicitly excluded from the RfG.
Steve Cox (Electricity North West)	We understand how difficult it would be for Ofgem to approve an approach that applied the new GB documentation to storage, given it is explicitly excluded from the RfG. We believe this is a fundamentally incorrect approach, but recognize that we have essentially no choice in law. However G99 has been drafted to include storage in terms of connexion process etc, but to exclude the RfG specific requirements.
David Spillett (Energy Networks)	We understand how difficult it would be for Ofgem to approve an approach that applied the new GB documentation to storage, given it is explicitly excluded from the RfG. We believe this is a fundamentally incorrect approach, but recognize that we have essentially no choice in law. However G99 has been drafted to include storage in terms of connection process etc, but to exclude the RfG specific requirements.
Matt White (UKPN)	We understand how difficult it would be for Ofgem to approve an approach that applied the new GB documentation to storage, given it is explicitly excluded from the RfG. We believe the exclusion of storage is fundamentally wrong, but recognize that we have essentially no choice in law. We agree with the approach to include storage within G98 and G99 in terms of the connection process etc., excluding the RfG specific

Response From	Q13: Do you agree that it is appropriate to include storage in G98 and G99, noting that as storage is explicitly excluded from the RfG, the technical requirements that arise solely from the RfG are not applied to storage in G09 and G99?
	requirements.
Alastair Frew (Scottish Power)	Yes as these requirements appear to be extremely minimal and are more safety related.
Graeme Vincent (SP Energy Networks)	We agree with the proposed inclusion noting that storage is specifically excluded from the RfG. However, in order to provide clarity for Users we believe that it is important for connection related processes to be retained together but also noting that the drafting of the document excludes the RfG requirements being applied to this technology.
*Peter Woodcock (*RWE Generation UK)	Yes, it is appropriate. It is entirely likely that distributed battery storage (e.g. bidirectional vehicle chargers) will be controlled by national 'aggregators'. In theory individual installations would/should come under Type A Generators. These Generators are likely to play an increasingly significant role in balancing, frequency response, arbitrage, etc.. and so should be considered alongside other non-storage technologies.
Damian Jackman (SSE Generation)	We have reservations that the proposed application of G98 and G99 to storage will, perhaps inadvertently, apply some RfG obligations on storage which, in our view would be inappropriate.
Rachel Woodbridge-Stocks (NGET)	If it is necessary for compliance with RfG and HVDC or if it is a tool to allow implementation of RfG and HVDC.
Alan Creighton (Northern	We currently apply the principles of EREC G83 and G59 when designing battery storage connections and believe it is appropriate to clarify that the scope of the new documents includes storage. Recognising that there are currently industry debates on the treatment of storage we think that it is reasonable to exclude the specific RfG requirements

Response From	Q13: Do you agree that it is appropriate to include storage in G98 and G99, noting that as storage is explicitly excluded from the RfG, the technical requirements that arise solely from the RfG are not applied to storage in G09 and G99?
Powergrid)	from applying to storage as set out in Appendix 5 pending further debate.
Greg Middleton (AMPS)	No comment
Isaac Gutierrez (Scottish Power Renewable Ltd UK)	Yes

Response From	Q14: Do you agree that it is appropriate to include Type A PGMs <800W in capacity in G99, noting that those technical requirements that emanate from the RfG are not applied to PGMs <800W?
Nigel Turvey (Western Power Distribution)	Yes, GB process apply to all generation, irrespective of its size or ability to also act as demand. Therefore it is appropriate to include these technologies in G99. We note that the drafting specifically excludes the RfG provisions from applying to these technologies.
Steve Cox (Electricity North West)	Yes, GB process apply to all generation, irrespective of its size or ability to also act as demand. Therefore it is appropriate to include these technologies in G99. We note that the drafting specifically excludes the RfG provisions from applying to these technologies.
David Spillett (Energy	Yes, GB processes apply to all generation, irrespective of its size or ability to also act as demand. Therefore it is appropriate to include these technologies in G99. We note that the drafting specifically excludes the RfG

Response From	Q14: Do you agree that it is appropriate to include Type A PGMs <800W in capacity in G99, noting that those technical requirements that emanate from the RfG are not applied to PGMs <800W?
Networks)	provisions from applying to these technologies .
Matt White (UKPN)	We would suggest before committing <800W schemes to G99 further work is done to assess the inclusion of <800W schemes in G98 as opposed to G99. Since G98 deals solely with micro-generators this may be a more pragmatic approach. We acknowledge that the drafting specifically excludes the RfG provisions from applying to these technologies.
Alastair Frew (Scottish Power)	Should this be G98? On the bases of potential safety issues it is appropriate to have very basic requirements onto anything which is being connected.
Graeme Vincent (SP Energy Networks)	Yes – inclusion within one document we believe offers a certain degree of clarity for all Users as the connection processes apply equally within GB. We further note that the drafting of G99 specifically excludes the RfG provisions from applying to these particular Users.
*Peter Woodcock (*RWE Generation UK)	Is this in reference to section 2.3 and 6.1.2 of G99? If so this is not an issue as they refer the reader to G98. However it was my understanding that any PGM rated less than 800W does not need a type definition, so this question is a bit confusing.
Damian Jackman (SSE Generation)	As with our answer to Q13, we have reservations that the proposed application of G98 and G99 to sub 800W generators will, perhaps inadvertently, apply some RfG obligations on sub 800W which, in our view would be inappropriate.
Rachel Woodbridge-	If it is necessary for compliance with RfG and HVDC or if it is a tool to allow implemention of RfG and HVDC.

Response From	Q14: Do you agree that it is appropriate to include Type A PGMs <800W in capacity in G99, noting that those technical requirements that emanate from the RfG are not applied to PGMs <800W?
Stocks (NGET)	
Alan Creighton (Northern Powergrid)	Yes, the use of a common set of documents simplifies the connection process for stakeholders and the proposals explicitly exclude the RfG requirements from applying to units <800W.
Greg Middleton (AMPS)	They should be included in G98 as they are micro-generation. The inapplicable requirements can easily be noted.
Isaac Gutierrez (Scottish Power Renewable Ltd UK)	No, SPR disagree

Response From	Q15: If you do not consider the proposed solution to sufficiently harmonise the connection requirements for new parties connecting to the transmission and distribution networks, how would you propose this to be addressed? *(See Workgroup discussions section)*
Nigel Turvey (Western Power Distribution)	-
Steve Cox (Electricity	Whilst we recognize that more can always be done to increase harmonization, the development of both the Grid and Distribution Code requirements has been done jointly, with stakeholders, and as far as is practicable the

Response From	Q15: If you do not consider the proposed solution to sufficiently harmonise the connection requirements for new parties connecting to the transmission and distribution networks, how would you propose this to be addressed? *(See Workgroup discussions section)*
North West)	requirements are the same.
David Spillett (Energy Networks)	Whilst we recognize that more can always be done to increase harmonization, the development of both the Grid and Distribution Code requirements has been done jointly, with stakeholders, and as far as is practicable the requirements are the same.
Sridhar Sahukari (Orsted (formerly DONG Energy))	We agree that the requirements are harmonised as best as possible with the Proposer's solution. We are not in favour of publishing all the Bilateral Connection Agreements in the public domain due to the commercial sensitivity and confidentiality reasons. However, at the same time we propose that the existing templates for BCA, ConsAg and other appendices to be improved to increase the transparency. Similarly, if any generator is required to meet additional requirement than what is mentioned in the template, NGET shall provide all the required evidence for the addition.
Matt White (UKPN)	Whilst we recognize that more can always be done to increase harmonization, the development of both the Grid and Distribution Code requirements has been done jointly, with stakeholders, and as far as is practicable the requirements are the same.
Alastair Frew (Scottish Power)	3 page technical table inserted
Graeme Vincent (SP Energy Networks)	It is noted that the development of the proposals have been undertaken through a joint working group and have harmonised requirements where practicable.
Peter Woodcock	I believe that the proposed solution is adequate enough for generators connected in England, which is my main focus. I do not have enough appreciation / experience for the complexities of network ownership in Scotland.

Response From	**Q15:** If you do not consider the proposed solution to sufficiently harmonise the connection requirements for new parties connecting to the transmission and distribution networks, how would you propose this to be addressed? *(See Workgroup discussions section)*
*(*RWE Generation UK)	
Damian Jackman (SSE Generation)	We do not consider the proposed solution set out in the GC0102 Original proposal to sufficiently harmonise the connection requirements for new parties connecting to the transmission and distribution networks. We propose that this be addressed, as a matter of the utmost urgency, by the Relevant TSO(s) and relevant System Operator(s) in accordance with their legal obligations under the RfG.
Rachel Woodbridge-Stocks (NGET)	I consider the proposed solution to sufficiently harmonise the connection requirements for new parties connecting to the transmission and distribution networks, however, a possible alternative would be for distribution networks to follow the same System Management and compliance procedures as transmission networks – this was not proposed though as it could potentially put additional costs on Embedded Generators.
Alan Creighton (Northern Powergrid)	Whilst we recognise that more can always be done to increase harmonisation, the development of both the Grid and Distribution Code requirements has been done jointly, with stakeholders, and as far as is practicable the requirements are the same.
Greg Middleton (AMPS)	No comment
Isaac Gutierrez (Scottish Power Renewable Ltd UK)	No comment

Response From	**Q16:** G98 and G99 include specific requirements for power quality, harmonic compliance etc. Do you believe it should be possible to use other international standards or requirements to achieve these ends such that these specific requirements can be dropped from these documents? An explanation of your views would be useful.
Nigel Turvey (Western Power Distribution)	We believe it is an absolute requirement that generating equipment should meet relevant PQ standards. However we are still exploring with stakeholders what is the best way to seek assurance that manufacturers have paid appropriate heed to the standards and that equipment is compliant.
Steve Cox (Electricity North West)	We believe this is a good question. We believe it is an absolute requirement that generating equipment should meet relevant PQ standards. However we are still exploring with stakeholders what is the best way to seek assurance that manufacturers have paid appropriate heed to the standards and that equipment is compliant.
David Spillett (Energy Networks)	We believe it is an absolute requirement that generating equipment should meet relevant PQ standards. However DNOs are still exploring with stakeholders what is the best way to seek assurance that manufacturers have paid appropriate heed to the standards and that equipment is compliant.
Matt White (UKPN)	We believe it is an absolute requirement that generating equipment should meet relevant PQ standards. Further work is required to ensure that manufacturers are aware of their obligations and that their equipment is compliant.
Graeme Vincent (SP Energy Networks)	As a networks operator we believe that it is appropriate for generators to comply with power quality requirements. However, we are aware of the ongoing engagement with stakeholders in this area
*Peter Woodcock (*RWE Generation	In the case of harmonics, G5/4 provides a means for calculating, or at least predicting, harmonic voltages from a manufacturer's supplied figures of harmonics currents. Reference to the G5/4, or equivalent, process should be sufficient without having to reiterate in G98/99. Accepting results of data from other international standards would have to be approached intelligently on a case-by-case basis.

Response From	**Q16:** G98 and G99 include specific requirements for power quality, harmonic compliance etc. Do you believe it should be possible to use other international standards or requirements to achieve these ends such that these specific requirements can be dropped from these documents? An explanation of your views would be useful.
UK)	
Damian Jackman (SSE Generation)	Where EU law permits international standards to be used then consideration should be given to this. However, we do not accept that this means that specific requirements can be dropped from the documents – rather, the documents should clearly (where applicable) refer to the exact specific requirement(s) and exactly where (within the detailed part of the international standard) this has been replaced by. European standard EN 50160 relates to Voltage characteristics of electricity supplied by public electricity networks. We would have expected that this is the only standard that would need to apply with respect to Power Quality.
Rachel Woodbridge-Stocks (NGET)	No comment
Alan Creighton (Northern Powergrid)	It is important that PGMs should comply with international power quality standards, but we are open as to the best way for compliance to be demonstrated.
Greg Middleton (AMPS)	As stated under questions 6 and 10 the drafts of G98 and G99 with this consultation are completely unsuitable for application to synchronous generators as the type testing procedure is copied from that for micro-generators. A proper consultation is needed once the proposed requirements are known, this cannot be that consultation. Because of this it is impossible to give an answer to this question. At the least the workgroup report to Code Panel should clearly acknowledge this. Ideally G98 and G99 will be removed from this consultation process until such time as they are fit for purpose
Isaac Gutierrez	Yes, other standards should be use as well. For example, currently in the UK developers have to meet the planning levels at the PoC in line with the requirements of Engineering recommendations G5/4. The power quality

Response From	Q16: G98 and G99 include specific requirements for power quality, harmonic compliance etc. Do you believe it should be possible to use other international standards or requirements to achieve these ends such that these specific requirements can be dropped from these documents? An explanation of your views would be useful.
(Scottish Power Renewable Ltd UK)	measurement equipment in continental Europe facilitates harmonics measurements in line with IEC standard which is not included in G99. Allowing the use of other standards like IEC will definitively facilitate procurement of equipment for power stations.

Response From	Q17: Do you agree that the explanation of type testing, both full and partial, and the inclusion of equipment certificates, is sufficiently clear and unambiguous in G99 drafting? Please make any suggestions that could add clarity
Nigel Turvey (Western Power Distribution)	We think the efficiencies from manufacturers' type testing, and equipment certificates in the future, are essential and we believe that the requirements in G98 and G99 form a good basis for continuing discussions with manufacturing stakeholders to refine and improve processes.
Steve Cox (Electricity North West)	We think the efficiencies from manufacturers' type testing, and equipment certificates in the future, are essential and we believe that the requirements in G98 and G99 form a good basis for continuing discussions with manufacturing stakeholders to refine and improve processes.
David Spillett (Energy Networks)	We think the efficiencies from manufacturers' type testing, and equipment certificates in the future, are essential and we believe that the requirements in G98 and G99 form a good basis for continuing discussions with manufacturing stakeholders to refine and improve processes.
Matt White (UKPN)	We think there are significant efficiencies to be gained from manufacturers' type testing, and the use of equipment certificates in the future. We believe that the requirements in G98 and G99 form a good basis for continuing discussions with manufacturers to refine and improve processes. We would also want see further clarity around the requirements for witness testing installations.

Response From	**Q17:** Do you agree that the explanation of type testing, both full and partial, and the inclusion of equipment certificates, is sufficiently clear and unambiguous in G99 drafting? Please make any suggestions that could add clarity
Alastair Frew (Scottish Power)	G99 4 Terms and Definitions possible clarification as follows "Where Equipment Certificate(s) as defined in EU 2016/631 cover all or part of the relevant compliance points, then the Equipment Certificate(s) shall be accepted as demonstrating compliance without need for further evidence for those aspects within the scope of the Equipment Certificate."
Graeme Vincent (SP Energy Networks)	Yes we are in agreement though recognise that there is always room for improvement and look forward to receiving feedback from and engaging further with stakeholders to improve clarity.
*Peter Woodcock (*RWE Generation UK)	It would be very useful to include the table in section 5.2.5 of the workgroup report in G99 as I found this a very good summary.
Damian Jackman (SSE Generation)	We note that the draft legal text for G99 has been amended compared to the draft legal text set out in (a) the 19th October version of the Workgroup consultation document; and (b) the 3rd November version of the Workgroup consultation document. Therefore we are unable to answer this question in detail. Nevertheless we would point out that the use of Equipment Certificates should be actively encouraged and supported by the Relevant TSO(s) and relevant System Operator(s). However, we are not certain that this is the case to date.
Rachel	No comment

Response From	Q17: Do you agree that the explanation of type testing, both full and partial, and the inclusion of equipment certificates, is sufficiently clear and unambiguous in G99 drafting? Please make any suggestions that could add clarity
Woodbridge-Stocks (NGET)	
Alan Creighton (Northern Powergrid)	We agree that the concept of full and particle type testing but note that whilst reliance on compliance evidence information from manufactures is a pragmatic solution, this is not as robust as compliance been certified by independent test houses in the form of equipment certificates. We have provided some comment on the legal text that should improve clarity.
Greg Middleton (AMPS)	As stated under questions 6, 10 and 16 the drafts of G98 and G99 with this consultation are completely unsuitable for application to synchronous generators as the type testing procedure is copied from that for microgenerators. A proper consultation is needed once the proposed requirements are known, this cannot be that consultation. Because of this it is impossible to give an answer to this question. At the least the workgroup report to Code Panel should clearly acknowledge this. Ideally G98 and G99 will be removed from this consultation process until such time as they are fit for purpose
Isaac Gutierrez (Scottish Power Renewable Ltd UK)	Disagree. It is not clear the scope of what fully type tested or partially type tested should be. There should be a section indicating what makes a power generating unit fully type tested (list of criteria to meet) i.e FRT type testing, VC type testing?. From SPR experience and according to G99 it would be impossible for a wind turbine to be fully type tested as protection interface always is done on site.

Response From	Q18: The application of new technical requirements to non-type tested generation connecting to distribution networks will give rise to new processes etc. Please comment on how comprehensive the coverage of this is in the current drafting of G99 and please suggest any improvements

Response From	**Q18:** The application of new technical requirements to non-type tested generation connecting to distribution networks will give rise to new processes etc. Please comment on how comprehensive the coverage of this is in the current drafting of G99 and please suggest any improvements
Nigel Turvey (Western Power Distribution)	We are continuing to work with other DNOs, the ENA and stakeholders to refine and improve the processes and drafting of G99.
Steve Cox (Electricity North West)	We are continuing to work with other DNOs, the ENA and stakeholders to refine and improve the processes and drafting of G99.
David Spillett (Energy Networks)	We are continuing to work with our members and stakeholders to refine and improve the processes and drafting of G99.
Matt White (UKPN)	We are continuing to work with other DNOs, the ENA and stakeholders to refine and improve the processes and drafting of G99.
Alastair Frew (Scottish Power)	See answer to question15.
Graeme Vincent (SP Energy Networks)	No particular comment but as DNO involved in the drafting process we would be keen to hear stakeholders views in this area which would allow us to work with the other DNOs and the ENA to improve these processes and the wording within G99.
*Peter Woodcock (*RWE Generation UK)	Ran out of time to review this in detail!

Response From	Q18: The application of new technical requirements to non-type tested generation connecting to distribution networks will give rise to new processes etc. Please comment on how comprehensive the coverage of this is in the current drafting of G99 and please suggest any improvements
Damian Jackman (SSE Generation)	We expect the use of Equipment Certificates will not give rise to new detailed processes etc., as the use of them will obviate the need for further compliance testing.
Rachel Woodbridge-Stocks (NGET)	No comment
Alan Creighton (Northern Powergrid)	We will continue to work with other DNOs, the ENA and stakeholders to refine and improve the connection processes and drafting of G99 in order to simplify and clarify the process as far as possible.
Greg Middleton (AMPS)	As stated under questions 6,10, 17 and 17 the drafts of G98 and G99 with this consultation are completely unsuitable for application to synchronous generators as the type testing procedure is copied from that for microgenerators. A proper consultation is needed once the proposed requirements are known, this cannot be that consultation. Because of this it is impossible to give an answer to this question. At the least the workgroup report to Code Panel should clearly acknowledge this. Ideally G98 and G99 will be removed from this consultation process until such time as they are fit for purpose
Isaac Gutierrez (Scottish Power Renewable Ltd UK)	No comment offered

Response From	**Q19:** Do you have any views on how the data and information required and articulated within G99 can or should relate to the Distribution Data Registration Code in the Distribution Code?
Nigel Turvey (Western Power Distribution)	This is an area where all DNOs would welcome feedback from stakeholders.
Steve Cox (Electricity North West)	Again this is an area where all DNOs would welcome feedback from stakeholders.
David Spillett (Energy Networks)	Again this is an area where all DNOs would welcome feedback from stakeholders.
Matt White (UKPN)	This is an area for further examination and where we would welcome feedback from other stakeholders.
Alastair Frew (Scottish Power)	No
Graeme Vincent (SP Energy Networks)	As above we would be keen to hear stakeholder's views in this area.
*Peter Woodcock (*RWE Generation UK)	No

Response From	Q19: Do you have any views on how the data and information required and articulated within G99 can or should relate to the Distribution Data Registration Code in the Distribution Code?
Damian Jackman (SSE Generation)	We note that the data requirements are being addressed via GC0106, GLDPM and KORRR. These changes may, in turn, lead to the Distribution Data Registration Code in the Distribution Code needing to be changed accordingly.
Rachel Woodbridge-Stocks (NGET)	No comment
Alan Creighton (Northern Powergrid)	We believe that the DDRC should detail the data that should be available the DNO, and are open to suggestion from stakeholders on the best vehicle for facilitating the data exchange as part of the connection and compliance process.
Greg Middleton (AMPS)	The relevant parts of DDRC should be incorporated into G99 but care should be exercised that no unnecessary information is captured accidentally or that the documentation requirement are no more onerous than sum of the requirements from G59 and RfG
Isaac Gutierrez (Scottish Power Renewable Ltd UK)	No

Response From	Q20: Do you believe that this modification helps to promote transparency across the Industry and if not which areas should be improved? *(see Workgroup discussions section)*

Response From	**Q20:** Do you believe that this modification helps to promote transparency across the Industry and if not which areas should be improved? *(see Workgroup discussions section)*
Nigel Turvey (Western Power Distribution)	There is a significant education and briefing need that the network licensees need to undertake with stakeholders from this point forward.
Steve Cox (Electricity North West)	We are only too aware what a significant body of documentation this process is producing, as it tries to make plain the existing and new requirements in a coherent form. We certainly see there is a significant education and briefing need that the network licensees need to undertake with stakeholders from this point forward, probably until well after all the EU codes have been implemented and bedded down, i.e. over years, not months.
David Spillett (Energy Networks)	We are only too aware what a significant body of documentation this process is producing, as it tries to make plain the existing and new requirements in a coherent form. We certainly see there is a significant education and briefing need that the network licensees need to undertake with stakeholders from this point forward, probably until well after all the EU codes have been implemented and bedded down, i.e. over years, not months.
Matt White (UKPN)	We are only too aware what a significant body of documentation this process is producing, as it tries to make plain the existing and new requirements in a coherent form. We see the need for significant engagement and education for stakeholders over the coming months/years. We believe there is a place for a set of documents summarising key requirements. These need to be developed over time with key stakeholders.
Alastair Frew (Scottish Power)	Yes
Graeme Vincent (SP	Yes we believe that this modification and the associated documents are a good start in promoting transparency but realise that there is a significant amount of documentation being created by this implementation process.

Response From	Q20: Do you believe that this modification helps to promote transparency across the Industry and if not which areas should be improved? *(see Workgroup discussions section)*
Energy Networks)	This is likely to require network operators to undertake further briefing and education sessions with stakeholders.
*Peter Woodcock (*RWE Generation UK)	I believe that the debate on transparency and whether putting requirements in the bilateral agreement is acceptable needs to continue. This is a lot of work to identify all the references to bilateral agreements in the Code, however due to time restrictions in the working group meetings, more work does need to be done on this to identify specific examples and come up with a more transparent solution. At this stage, my personal opinion would be to make the additional BCA requirements public, e.g. intertrip, but not the technical details. This would then be published in a matrix with checks for all the applicable requirements. Competitors would then be able to cross reference similar sites and identify which requirements they are operating under the bilateral connection agreement.
Damian Jackman (SSE Generation)	We do not believe that the GC0102 Original modification helps to promote transparency across the Industry. There is, for example, a total lack of visibility to stakeholders of the actual technical parameters that, as a newly connecting party, they have to meet.
Rachel Woodbridge-Stocks (NGET)	Yes. This modification incorporates RfG and HVDC into the Grid Code so that New Users only need to refer to one Code. It removes some of the ambiguity from the ENCs to aid Users' understanding and anything that can be included into the Grid Code (as opposed to Bilateral Connection Agreements) has been in a conscious effort to promote transparency.
Alan Creighton (Northern Powergrid)	The changes proposed in this and the associated consultation will help to add transparency to the implementation of the RfG. Given the extent of the documentation, it's inevitable that areas will emerge where further clarification or explanation is required once the new documentation is implemented. We therefore envisage the need for regional and national dissemination and that further changes to the Grid Code and Distribution Code.
Greg	Yes

Response From	Q20: Do you believe that this modification helps to promote transparency across the Industry and if not which areas should be improved? *(see Workgroup discussions section)*
Middleton (AMPS)	
Isaac Gutierrez (Scottish Power Renewable Ltd UK)	Yes

Legal drafting questions

Response From	Q21: The Proposed draft Grid Code legal text contains a number of comments incorporating both internal and workgroup comments. Please feel free to provide further comment on the documents (Annex 1-5)
Sridhar Sahukari (Orsted (formerly DONG Energy))	In the App 3 -> ECP.6.6.1 (pg 15), it is not clear if 24months period starts from issue of ION-A or ION-B especially in the case of Offshore PPMs. As discussed in the workgroup meetings, load rejection drafting needs to be improved to make it clearer on what is expected of the studies. We believe there is no requirement for Preliminary Frequency Testing (ECP.A.6.6.4) as per RfG. We believe this is onerous on the developers to be able to do this due to high dependency on weather conditions.

Response From	**Q21:** The Proposed draft Grid Code legal text contains a number of comments incorporating both internal and workgroup comments. Please feel free to provide further comment on the documents (Annex 1-5)
Alastair Frew (Scottish Power)	ECP.1.1 (i) Type A the text "followed by NGET and any User" possible change to "followed by NGET and any Type A Power Generating Module" ECP.1.1 (ii) Type B or C the text "followed by NGET and any Generator" possible change to "followed by NGET and any Type B or B Power Generating Module" ECP.1.1 (iii) Type D the text in each of the first 3 paragraphs "followed by NGET and any User to" possible change to "followed by NGET and any Type D Power Generating Module to" ECP.4.2. proposed text clarification" The provisions contained in CPECP.5 to CPECP.7 detail the process to be followed in order for the User's Plant and Apparatus (including OTSUA) to become operational. This process includes for energisation an EON, for connection either a PON (types B &C Power Generating Modules) or an ION (Type C Power Generating Modules) and for final certification a FON. ECP.4.3 & 4.3.1 "Medium Power Stations" are still referred to is this correct? ECP.A.5.1.9 states "NGET will permit relaxation from the requirement ECP.A.5.2 to ECP.A.5.9 where an Equipment Certificate for the Synchronous Power Generating Module", whereas G99 B.5.1.9 states " The **DNO** may permit relaxation from the requirement B.5.2 to B.5.9 where **Manufacturers Information** for the **Synchronous Power Generating Module",** why are these different and can they be made consistent. Other minor point G99 only does not go up to B.5.9. ECP.A.5.3.1 has the text "CP.6.4" not "ECP.6.4". ECP.A.5.4.2 and G99 B.5.4.2. Looking in G99 B.5.4.2 it refers directly to ECP.A.5.4.2 as opposed including the text, however ECP.A.5.4.3 also refers to PSS testing but is not referenced in G99 B.5.4.2, but then when you look in ECP.A.5.4.3 the first 4 tests appear to be applicable to ECP.A.5.4.1 and G99 B.5.4.1. ECP.A.5.5.4 The Under-excitation Limiter will normally be tested at low active power output (minimum stable operating level) and at maximum Active Power output (Maximum Capacity). Why has the "minimum stable

Response From	Q21: The Proposed draft Grid Code legal text contains a number of comments incorporating both internal and workgroup comments. Please feel free to provide further comment on the documents (Annex 1-5)
	operating level” reference been added to the original OC5.A.2.5.4 text? Also G99 B.5.4.3.4 has minimum generation and is still using the term Registered Capacity. G99 B.5.4.3.5 Still has references to Registered Capacity. ECP.A.5.7.1 and G99 B.5.5.1 Reactive Power capability this has changed from the OC5.A.2.7.1 simple test operation of “the Generating Unit at 0.85 power factor lagging for 1 hour and 0.95 power factor leading for 1 hour.” Why is there now a requirement for MAXIMUM leading and lagging capacity to be demonstrated as opposed to a compliance test requesting the required capacity to be demonstrated and using the values from ECC.6.3.2.2 of 0.95 lead & 0.95 lag for type B and from ECC.6.3.2.3 of 0.92 lead & 0.92 lag for types C & D? Also why has the maximum and minimum generation requirements been added? ECP.A.5.7.2 and G99 B.5.5.2 “In the case of an Embedded Synchronous Power Generating Module where distribution network considerations restrict the Synchronous Power Generating Module Reactive Power Output then the maximum leading and lagging capability will be demonstrated without breaching the host network operators limits.” whilst I accept this is the current text in OC5.A.2.7.2 how are generators actually expected to do this? Or this this supposed allow limited testing only up to the network limits and if this is the case should the wording not be more like that in OC5.A.3.4.3” In the case of an Embedded Synchronous Power Generating Module where distribution network considerations restrict the Synchronous Power Generating Module Reactive Power Output NGET will only require demonstration within the acceptable limits of the Network Operator then the maximum leading and lagging capability will be demonstrated without breaching the host network operators limits.” ECP.A.5.7.4 and G99 B.5.5.4 “Where the Generator is recording the voltage and Reactive Power at the Synchronous Power Generating Module terminals and the voltage, Active Power and Reactive Power at the HV connection point shall be included. The results shall be supplied in an electronic spreadsheet format.” The original OC5.A.2.7.4 was a general request for generator information if they had it, now the wording of ECP.A.5.7.4 and G99 B.5.5.4

Response From	**Q21:** The Proposed draft Grid Code legal text contains a number of comments incorporating both internal and workgroup comments. Please feel free to provide further comment on the documents (Annex 1-5)
	seems to be written that if a generator happens to be recording generator data they have to also record connection point data, which might not be the case. I think this need to rewritten such as to be requesting only the available data as follows “Where the Generator is recording either the voltage and Reactive Power at the Synchronous Power Generating Module terminals and or the voltage, Active Power and Reactive Power at the HV connection point shall be included. All the available results from either or both shall be supplied in an electronic spreadsheet format.” ECP.A.5.8.4 why have tests H and I been added to the original OC5.A.2.8.4 preliminary tests? ECP.A.6.1.9 states “NGET will permit relaxation from the requirement ECP.A.6.2 to ECP.A.6.8 where an Equipment Certificate for the Synchronous Power Generating Module”, whereas G99 B.6.1.9 states “ The **DNO** may permit relaxation from the requirement B.6.2 to B.6.8 where **Manufacturers Information** for the **Synchronous Power Generating Module”,** why are these different and can they be made consistent. ECP.A.6.4.3 this section for network restrictions on an Embedded Generator has not been included in G99 B.6.3 it was include for synchronous generators. ECP.A.6.4.5 and B.6.3.3 have had the minimum operated MW level increased to 60% where it used to be 50% in OC5.A.3.4.5 why? Also most of the test duration times have changed more specifically tests (i) & (ii) durations have been reduced from 60 to 30 minutes, test (iii) has increased from 5 to 30 minutes and tests (iv) & (v) have increased from 5 to 60 minutes again why? ECP.A.6.6.4 why have tests H and I been added to the original OC5.A.2.8.4 preliminary tests? G99 B.6.5.4 Preliminary Frequency Response Testing G99 has no text. ECP.A.6.7 and B.6.6 Fault Ride Through Testing whilst accepting this does currently appear in OC5.A.3.7, I would query the safety of carrying these tests on site using temporally installed equipment. Have any of these tests actually taken place or do these requirements not actually start applying until 1 December 2017. This test seem very similar to the sudden short circuit test applied to synchronous generators which in most case carried

Response From	Q21: The Proposed draft Grid Code legal text contains a number of comments incorporating both internal and workgroup comments. Please feel free to provide further comment on the documents (Annex 1-5)
	out in factories under controlled conditions, however for large site built hydro generators this has to be done on site. When this test is carried out on site temporary equipment is installed and then subjected to very high currents which can be problematic. ECP.A.7.2.3 Embedded HVDC System Owners where are these dealt with in distribution code? ECP.A.7.2.5 HVDC reactive power test durations have change so they are all 60minutes from the original OC5.A.4.2.5 values where only tests (i) & (ii) were 60 minutes and all the rest were 5 minutes long, why? ECP.A.7.5.4 why have tests H and I been added to the original OC5.A.4.5.4 preliminary tests? ECP.A.7.5. Figure 1 – Frequency response volume tests why have all the MLP2, MLP3 and MLP5 test been dropped from the original OC5.A.4.5. ECC.6.3.17.1.3 has the phase 6 line down “dynamic stability assessment studies undertaken by NGET in coordination with the Relevant Transmission Licensee to identify the stability limits“ is this correct are these studies not done by the Relevant Transmission Licensee. Also in the last sentence possible clarification “The selection of the control parameter settings shall be agreed with between NGET in coordination with the Relevant Transmission Licensee between the relevant TSO and the HVDC System Owner” ECC.6.3.17.2.1 last sentence possible change ”If adverse interaction is identified, the studies shall identify possible mitigating actions to be implemented to ensure compliance with the requirements of the ECC6.1.9 Grid Code” ECC.6.3.17.2 change text to “Interaction between HVDC Systems or other Users' Plant and Apparatus Plant and equipment” ECC.6.3.17.2.2 proposed text change and question what level of participation is expected from others? “The studies shall be carried out by the connecting HVDC System Owner with the participation of all other Users’ parties identified by NGET” ECC.6.3.17.2.3 possible change “All Users’ parties identified by NGET as relevant to each the Connection Point, including the Relevant Transmission Licensee’s” ECC.6.3.17.2.6 mitigating actions the wording from connection application prior to agreement in GSR018

Response From	Q21: The Proposed draft Grid Code legal text contains a number of comments incorporating both internal and workgroup comments. Please feel free to provide further comment on the documents (Annex 1-5)
	Annex 4 I think is better and propose modifying to "User and The Company shall agree any necessary mitigating actions identified by the studies carried out as follows the site specific requirements and the works, including any Transmission Reinforcement Works and/or User Works, required to ensure that all Sub-Synchronous Oscillations are sufficiently damped" ECC.6.3.17.2.7 do not agree with this being included this appears to allow NGET to put other Users' plant at risk, who is taking responsibility if system needs to operate to ECC6.1.9.
Damian Jackman (SSE Generation)	We will provide further comments on the Annex 1-5 documents at the forthcoming (16th -17th November) two day workshop.
Alan Creighton (Northern Powergrid)	ECC General It's unclear whether a Network Operator in respect to an existing Distribution Network connected to an Existing GSP should comply with the ECC requirements or CC requirements or both. The proposed definition of New User implies that it only relates to a 'new network operator'. ECC3.1 (d) suggest that the ECC apply to Network Operators who don't comply with the conditions set out in ECC3.6, yet ECC3.6 doesn't set out any criteria – rather it states the it applies to Network Operators Systems. Furthermore many of the obligations set out in ECC seem to relate to Network Operators rather than Network Operators Systems and do seem to duplicate those in the CC. We had assumed that a Network Operator would only need to comply with the ECC as part of the connection of a new Distribution System. New User is a newly defined term; we have seen a copy of the proposed definition (which isn't included in the consultation pack) but we're not convinced that this definition aligns with ECC3.1 ECC6.2.3.6. This new text suggests that NGET and the DNO should agree the protection scheme and settings at the GSP. In accordance with the principles in RES, the details of the protection scheme forming part the busbar protection schemes should be agreed between the DNO and NGET; however the protection scheme for equipment outside the scope of the busbar protection scheme (e.g. on the outgoing feeders) should be established by the

Response From	**Q21:** The Proposed draft Grid Code legal text contains a number of comments incorporating both internal and workgroup comments. Please feel free to provide further comment on the documents (Annex 1-5)
	DNO alone provided that settings can be applied which properly co-ordinate and discriminate with NGETs protection. ECC6.2.3.7 As above the need to agree changes should not include changes to the protection scheme outside the busbar protection zone. ECC6.2.3.10 Further details are required in relation to the synchronisation obligation. The DNO has no means of 'synchronising' and can only prevent closure of circuit breakers where the parameters either side of an open point are outside pre-defined parameters. ECC6.5.6.1 As drafted NGET require 'visibility of the real time output and status of indications of **User's Plant and Apparatus** so they can control the operation of the **System**' which would include DNOs plant and equipment as a 'User'. Is this the intention? ECC6.5.6.3 At the moment DNOs don't provide operating metering signals - metering is provided by NGETs FMS. Is the intention for NGET not to specify any additional requirements in the DNOs BCA? ECC.A5.4.1 The details of the LFDD scheme is an example where clarification is required on whether a DNO should comply with ECC.A5.4.1 or CC.A.5.4.1. Is reconnection only permitted in accordance with the requirements of ECC6.2.3.10 or CC6.2.3.10? EDRC General As per the proposed draft ECC, it's unclear whether a Network Operator in respect to an existing Distribution Network connected to an Existing GSP should comply with the DRC requirements or EDRC requirements or both.

Response From	**Q21:** The Proposed draft Grid Code legal text contains a number of comments incorporating both internal and workgroup comments. Please feel free to provide further comment on the documents (Annex 1-5)
Greg Middleton (AMPS)	No comment
Isaac Gutierrez (Scottish Power Renewable Ltd UK)	Significant comment offered.

Response From	**Q22:** Do you have any views on the structure of the Grid Code drafting for System Management and Compliance? (Annex 1-5)
Alastair Frew (Scottish Power)	No
Damian Jackman (SSE Generation)	We will provide further comments on the Annex 1-5 documents at the forthcoming (16th -17th November) two day workshop.
Greg Middleton (AMPS)	G98/G99 defines the compliance route and when those are finished we must have a consultation on them, this cannot be that consultation.

Response From	Q23: Are there are any areas in the Grid Code or Distribution Code drafting which you do not believe reflect the requirements of the RfG or HVDC Codes and, if so, why do you believe they are deficient? (Annex 1-9)
Alastair Frew (Scottish Power)	No
Damian Jackman (SSE Generation)	We do not agree that the draft legal text contained in Annex 1-5 and 6-9 delivers the intent of the solution outlined in Sections 3-5. This is because the intent of the GC0102 solution is to ensure that all the requisite applicable articles of the EU Network Codes (RfG, DCC and HVDC) are implemented into the national network codes (namely the Grid Code and Distribution Code). However, there is no evidence provided that clearly maps over each of the EU Network Code obligations (that GC0102 is intended to implemented into the national network codes) to the draft legal text in Annex 1-5. It is clear from the draft legal text for GC0102 that multiple gaps and inconsistency existed between the draft legal text and the delivery of the intent of the solution outlined in Sections 3-5 of the Workgroup consultation. Absent a clear mapping of the EU Network Code articles to the draft legal text we cannot see how either (a) the Workgroup; or (b) stakeholders; or (c) the requite Code Panel(s); or (d) Ofgem can say that the draft legal text in Annex 1-5 does deliver the solution outlined in Section 3-5. Notwithstanding the above, we also note that the draft legal text appears to be in direct contravention of the EU Network Codes. By way of example, the suggested use of the existing national definitions, amended in part by the EU Network Code requirements, has the unintended (or possibly intended?) consequence that it will not be clear to existing

Response From	Q23: Are there are any areas in the Grid Code or Distribution Code drafting which you do not believe reflect the requirements of the RfG or HVDC Codes and, if so, why do you believe they are deficient? (Annex 1-9)
	connected parties that, in fact, they are not actually bound by the EU Network Code amended definitions within the Grid Code (or Distribution Code) as this would be applying those EU Network Codes definitions (and associated obligations) to existing connected parties without either (1) a CBA being undertaken or (2) those parties having substantially modified their respective connection agreement(s) which would be in direct contravention of the RfG, DCC and HVDC Network Codes.
Alan Creighton (Northern Powergrid)	This assessment will be easier once the compliance mapping table is available.
Greg Middleton (AMPS)	No
Isaac Gutierrez (Scottish Power Renewable Ltd UK)	Yes, particularly those sections in relation to grid code testing of windfarms for LFSM-U. The testing for widnfarm under LFSM-U should be removed as teh requirement is not mandatory if you do not have the headroom to provide it whihc in LFSM is not possible for a windfarm unless the windfarm de-loads. FRT testing should also be considered for removal

Response From	Q24: Please make any other comments on the legal text drafting for the Distribution Code, G98 and G99 using the appropriate templates issued with this consultation
Alastair Frew (Scottish	None provided

Response From	Q24: Please make any other comments on the legal text drafting for the Distribution Code, G98 and G99 using the appropriate templates issued with this consultation
Power)	
Damian Jackman (SSE Generation)	We will provide further comments on the G98 and G99 documents at the forthcoming (23rd - 24th November) two day workshop.
Alan Creighton (Northern Powergrid)	We have provided comments embedded in copies of the consultation documents.
Greg Middleton (AMPS)	We are feeding our detailed comments on G98/G99 back to the ENA as part of the workgroup developing them. It would be impractical and inefficient to duplicate the hundreds of comments on these forms. Again, we must make the point that this cannot be the considered a consultation on G98 and G99 as the drafts attached are unfinished and the latest drafts have changed substantially. The consultation makes the false statement “This GC0102 consultation includes the full legal text of the Distribution Code and G99.”. It clearly does not include the full text of G99. It also states “The nearly complete text of G98 was included in GC0100 and GC0101 consultations. The version of G98 that is included in this consultation has been modified in the light of feedback from those two previous consultations” implying that this has already been consulted on. Neither document was consulted on, they were just included in the document pack for those consultations with no reference to their existence or questions asked about them. Thus to us it follows that this consultation is flawed and should be withdrawn or re-worded to ensure that participants are not misled or are voting for things that are not clear and defined.
Isaac Gutierrez (Scottish	No comment offered

Response From	Q24: Please make any other comments on the legal text drafting for the Distribution Code, G98 and G99 using the appropriate templates issued with this consultation
Power Renewable Ltd UK)	

Workgroup Discussions

The Workgroup convened six times to discuss the modification, detail the scope of the proposed defect, devise potential solutions and assess the proposal in terms of the Grid Code Applicable Objectives.

At the second Workgroup meeting held on the 6 September, the Proposer of GC0102 talked through their position on Large, Medium and Small generation and how it can coexist with Banding (which is outlined in Section 3.3 of this Consultation document) using the slides which can be found on the National Grid website[2].

The Workgroup talked through the difference in Connection Conditions should a party connect at transmission in Scotland versus connecting at transmission in England and Wales. A Workgroup member submitted the following detail following the meeting to provide additional context; in terms of achieving the RfG objectives; such as Recitals (3)[3] (5)[4] and (15)[5]; and in particular the need to "*avoid unnecessary investments in some geographical areas in order to take into account their respective regional specificities*". Some Workgroup members agreed that the small, medium and large issue was out of scope, whilst other Workgroup members believed that it was within the scope of GC0102. If it was indeed out of scope then it was noted that this could be a potential future modification to the Grid Code.

The Workgroup convened for the third time on Monday 9th October[6] during which members initially reviewed (but not in detail) the draft Workgroup Consultation in addition to some initial examples from the corresponding draft legal text. The voluminous draft legal text had not been reviewed in depth by all Workgroup members prior to the meeting. It was noted that a full review of the legal text needed to be carried out by the Workgroup. The

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[2] http://www2.nationalgrid.com/UK/Industry-information/Electricity-codes/Grid-code/Grid-Code-Development-Forum/Workgroup-Day/?LangType=2057

[3] " Harmonised rules for grid connection for power-generating modules should be set out in order to provide a clear legal framework for grid connections, facilitate Union-wide trade in electricity, ensure system security, facilitate the integration of renewable electricity sources, increase competition and allow more efficient use of the network and resources, for the benefit of consumers."

[4] "….Therefore, as a prerequisite for grid connection, relevant technical requirements should be set for power- generating modules."

[5] "The requirements should be based on the principles of non-discrimination and transparency as well as on the principle of optimisation between the highest overall efficiency and lowest total cost for all involved parties. Therefore those requirements should reflect the differences in the treatment of generation technologies with different inherent characteristics, and avoid unnecessary investments in some geographical areas in order to take into account their respective regional specificities. …."

[6] The agenda for this 9th October Workgroup meeting can be found online via the following link: http://www2.nationalgrid.com/UK/Industry-information/Electricity-codes/Grid-code/Modifications/GC0102/

Workgroup concluded that the best time to complete this piece of work would be following the Workgroup Consultation to ensure all feedback had been fed in from Industry members.

In response to the scope, the Proposer invited comment in relation to removing the Demand Connection Code areas of scope from this GC0102 modification. It was outlined that this was due to the fact that all of the other EU Network Code Articles being addressed within this modification have an implementation date of May 2018 except for HVDC and Demand Connection Code which have an implementation date of September 2018. A Workgroup member expressed concern regarding a potential re-assignment of defects from one modification (GC0102) to GC0104 and so agreed that Ofgem should first be consulted on this intent but otherwise offered a general consensus. The Code Administrator stated that they would update the Terms of Reference (which are joint with the Distribution Code) and seek approval from the Panel and from Ofgem.

Following the Grid Code Panel meeting on 18 October 2017 and after consulting with Ofgem it was agreed to remove the Demand Connection Code Articles from the modification. The Terms of Reference will be updated for GC0102 and GC0104 following this decision and circulated to the Panel for sign off.

Harmonisation

Some Workgroup members expressed a concern that (i) distribution and transmission or (ii) distribution only or (iii) transmission only new connections in GB are not being harmonised to the extent possible (which is advisable to promote market integration) in the proposed draft legal text and the solution that was outlined by the Proposer, as per the requirement under RfG.

A Workgroup member made the point that, for example, where the RfG requirement(s) for a Type D generator in GB are not harmonised to the extent possible for (i), (ii) or (iii) above then this will not facilitate Union-wide trade in electricity, will not ensure system security, will not facilitate the integration of renewable electricity sources, will not increase competition and will not allow more efficient use of the network and resources, for the benefit of consumers..

Workgroup members acknowledged the need to evidence the implementation of a harmonised and non-discriminatory approach as part of the GC0102 work. The Workgroup noted that they should ultimately be looking to find a solution to this and agreed to add a Workgroup Consultation question to seek any guidance or proposed solutions from Industry on this matter (question 15). The degree to which connection differences are evident depending on who owns the network (as distinct from voltage) was also highlighted; although a Workgroup member noted that given, for example, the Grid Code requirements on network operators

in terms of exercising Good Industry Practice[7] it was not clear why there should be connection differences in GB in the context of the RfG (and HVDC).

The problem comes if a user wishes to connect a power station at say 33,000V the precise connection requirements depend on who owns the connection point and not the voltage or size of the power station. If the connection point is owned by The Transmission Owner the connectee is required to enter into a contract with the System Operator and comply with the requirements of the grid code, however if the connection point is owned by a Distribution Company the connectee is only required to enter a contract with the DNO and comply with the D-code where the power station is small. This issue is more apparent at 110,000V where there are currently significant regional ownership differences meaning the technical requirements and compliance can be marginally different for providing the same power station.

Guidance Document following EU Network Code Implementation

The merits of a non-interpretative guidance document to assist Grid Code users following the implementation of the EU Network Codes was discussed. The Code Administrator acknowledged that this would be beneficial for all Stakeholders involved in the process.

Openness and Transparency

Some Workgroup members were concerned about the lack of openness and transparency; within the GC0102 Original proposal; about the actual relevant technical requirements that newly connecting parties will need to comply with once the RfG and HVDC Network Codes are implemented in GB in May 2018. These concerns resulted in a Workgroup member submitting some possible solutions outlined below.

It was noted that as part of the implementation of the RfG and HVDC there is a requirement on either (i) the relevant TSO(s) and / or (ii) the relevant network operator(s) so specify certain technical requirements that, in the case of generators, Types A-D plant need to comply with from May 2018. This is, for example, set out in Recitals (3)[8] (5)[9] and (15)[10] of the RfG[11] and

[7] "The exercise of that degree of skill, diligence, prudence and foresight which would reasonably and ordinarily be expected from a skilled and experienced operator engaged in the same type of undertaking under the same or similar circumstances."
[8] " Harmonised rules for grid connection for power-generating modules should be set out in order to provide a clear legal framework for grid connections, facilitate Union-wide trade in electricity, ensure system security, facilitate the integration of renewable electricity sources, increase competition and allow more efficient use of the network and resources, for the benefit of consumers."
[9] "….Therefore, as a prerequisite for grid connection, relevant technical requirements should be set for power- generating modules."
[10] "The requirements should be based on the principles of non-discrimination and transparency as well as on the principle of optimisation between the highest overall efficiency and lowest total cost for all involved parties. Therefore those requirements should reflect the differences in the treatment of generation technologies with different inherent characteristics, and avoid unnecessary investments in some geographical areas in order to take into account their respective regional specificities. …."
[11] https://electricity.network-codes.eu/network_codes/rfg/

it highlights, in particular, that "*as a prerequisite for grid connection, relevant technical requirements should be set for power- generating modules*".

Most of these requirements are 'generic'; that is they apply, for example, to all Type B generators in the control area of the party who specify them. Therefore in order for the RfG to be implemented into the GB national codes (such as the Grid Code and Distribution Code) then the relevant TSO(s) and / or (ii) the relevant network operator(s) will need to set these 'generic' relevant technical requirements so that newly connecting parties have the maximum visibility of what they are.

Some Workgroup members put forward that given that the relevant TSO(s) and / or the relevant network operator(s) who are obligated (separately or collectively) to specify the relevant technical requirement(s) have already had approximately 18 months (from 14th April 2016) to date (and over two years in total up to May 2018) to discharge these obligations (within the RfG and / or HVDC) it would be appropriate to require them; in the interest both of openness and transparency and to ensure stakeholders can comply with their obligations to publish these 'generic' relevant technical requirement(s) within ten Business Days of Ofgem approving GC0102 and to further require them to (a) publish any future changes to the 'generic' relevant technical requirement(s) and (b) to give stakeholders no less than ten Business Days' notice of any such change prior that change (to the 'generic' relevant technical requirement(s)) being applied.

Please note that a new modification, GC0107 has recently been raised to address this discussion item. More information can be found at the following link:

https://www.nationalgrid.com/uk/electricity/codes/grid-code/modifications/open-transparent-non-discriminatory-and-timely

In a very limited number of cases a few of the RfG (and HVDC) relevant technical requirements are not to be set 'generically' but are, instead, to be set 'specifically' to each new connection. In other words the relevant TSO(s) and / or the relevant network operator(s), often only in agreement with the newly connecting party, shall specify a specific value for that new connection.

On review of the proposed draft legal text for the system management aspects of GC0102, there was a Workgroup discussion about how and the degree to which the relevant TSO(s) and / or the relevant network operator(s) could enhance openness and transparency of these 'specific' relevant technical requirements.

It was suggested by a Workgroup member that it could be expected, in GB, that these site specific relevant technical requirements could be incorporated into the relevant part(s) of the bilateral connection agreement (which, for example, is publically available on the CUSC part of the National Grid website) for the specific new connection.

Some Workgroup members were of the view that taking account of the need for openness, transparency and non-discrimination it would be appropriate to therefore require the relevant TSO(s) and / or the relevant network operator(s) (i.e. whomsoever is the counter party to the bilateral connection agreement) to publish (quarterly?) the 'specific' relevant technical requirements that they have placed upon, in the case of generators, each Type (A-D) of plant. It may also be appropriate that this information is be further broken down by plant fuel type. There was a view from some Workgroup members about the legal complexity that would likely ensue from this and/or the publication of this detail. However, a Workgroup member noted that as the relevant TSO(s) and / or the relevant network operator(s) would themselves need to have such a list (of all the individual specific relevant technical requirements they were contractually enforcing) that the publication of this list could not be seen as unduly onerous. Legal feedback regarding the implications of publishing this material to facilitate openness, transparency and the non-discriminatory treatment of newly connecting parties will be provided to Workgroup in due course.

Some workgroup members raised concerns of data in Bilateral Connection Agreements being shared publicly due to sensitive commercial information within them. They also voiced their opinion that, currently, anything that can be made public (i.e. generic requirements) are already transparent and available.

Future Housekeeping modification following GC0100/GC101 and GC0102

During an initial review of the proposed draft legal text during the meeting it was noted that there would be some housekeeping amendments that would have to be made as a result of the work on GC0100 and GC0101. It was also noted that there would be subsequent referencing that would have to be amended throughout the Grid Code as a result of the work completed on these modifications. The Code Administrator noted that it would be beneficial for a housekeeping modification to be raised to be implemented in line with the implementation date of these modifications (GC0100/101/102).

Preliminary Operating Notice (PON)

On review of the draft legal text associated with the proposed Original Compliance solution, questions were raised around the legality of the Proposer's solution with its introduction of a '*Preliminary Operating Notice* (PON)'[12] as a new, additional, mechanism to facilitate the compliance process but which, firstly, does not form part of the existing GB national network codes or associated documents[13] and, secondly, does not form

[12] See ECP.1.1 (ii) and ECP.6B in the draft legal text for further details.

[13] During the GC0100 and GC0101 Workgroup meeting to review the responses to the Workgroup consultation it was highlighted (within the Scottish Power response) that the current GB accepted minimum technical standards appears to be the version of the Electricity Safety, Quality and Continuity Regulations 2002, Electricity Transmission Licence, Electricity Distribution Licence, Electricity Interconnector Licence, the Grid and Distribution Codes that have been submitted by the Member State (i.e. BEIS for GB) to the Commission.

part of the RfG requirements. The future proposed '*requirement*' for a newly connecting generator to have a PON would apply to Type B and Type C connections (at transmission only)

Within the RfG a procedure is set out[14] which is based around the Energisation Operation Notification (EON), Interim Operation Notification (ION), and Final Operation Notice (FON) which are specified for Type D generators only. Questions were asked by a Workgroup member around placing more stringent requirements for Types B and C generators that go beyond the RfG provisions[15].

A Workgroup member was also concerned that in addition to the possible legality of the PON, this implied that the PON took precedence over the Equipment Certificate. The Workgroup member noted that where an Equipment Certificate had been issued by an authorised certifier that those elements of the RfG (or HVDC) that had been so tested (by the certifier) would not have to be repeat tested by the newly connecting party as part of the GB compliance procedure(s) to newly connect to the system.

The Proposer clarified that where Equipment Certificates cover the test requirements a PON would not need to be issued and the station could go direct to FON.

In relation to the Compliance-related draft legal text, one Workgroup member questioned why the draft legal text does not sufficiently evidence the differences in the requirements between Type B and Type C generators that are otherwise apparent in RfG. For example, the general requirements on Type B generators[16]runs to just under four pages, whilst the equivalent for Type C generators[17] runs to an additional seven pages. The Workgroup member noted that it is very difficult for stakeholders to see where, exactly, each RfG (and HVDC) obligation is set out in the corresponding GB national network code legal text drafting that has been produced for GC0102[18]. This was taken away as an action for the Proposer and has subsequently been factored into the revised draft legal text as circulated.

Anecdotally it seemed, to the Workgroup member, that the Proposer has been 'gilding the lily' by seeking to place additional obligations on some or all newly connecting parties and / or omitting corresponding obligations etc., on the relevant TSO and / or relevant network operator(s) from those within the RfG or HVDC Network Code respectively. However, the Workgroup member who raised these concerns, noted that the revised draft legal text which was circulated ahead of the meeting did not appear to have addressed all the concerned they had raised.

Further initial thoughts on the draft legal text

[14] See Articles 33, 34, 35 36 and 37 for further details.
[15] See Articles 31 and 32 for further details.
[16] See Article 14 for further details.
[17] See Article 15 for further details.
[18] And also for GC0100 and GC0101.

Clarity on ECC6.3.7(c)(i) which refers to load rejection parameters. Some articulation of acceptable ramp rate and/or droop setting would be useful. One Workgroup member agreed to look at how this could be achieved.

Clarity on Offshore Transmission System User Arrangements (OTSDUA) and ION A/B was raised by another Workgroup member. The Proposer acknowledged that this has not been part of the current Grid Code drafting so therefore not part of the drafting of the ECP. It was noted that a separate modification on this would have to be raised to address this additional defect due to the fact that the RfG does not cover this.

Most Workgroup members agreed with the Proposer's suggestion to extract the proposed ECPA1 flow diagrams from the draft legal text and re-position it into the suggested Grid Code guidance document which was discussed, but which Workgroup members have not seen.

One Workgroup member noted the simulation methodology only indicated a single minimum fault level. The Proposer confirmed that Article 14 (3) (iv) requires provision for two fault levels (pre fault level and post fault level).

Sub-Synchronous Resonance and Sub-Synchronous Torsional Interaction (SSTI)

It was highlighted that the proposed new legal text relating to HVDC connections was detailing with issues discussed in SQSS modification GSR0018 & GC0077 and it was queried, how the modification interacted with those changes.

GSR018 and GC0077 apply on interactions between Transmission Plant and User's plant. For reference, the main concepts were agreed (when it comes to SSO arising from interactions with Transmission Connected Plants) for example

1) NGET (and TOs through NGET) are responsible for the mitigation
2) NGET can pass some of the obligations for mitigation measures to Users
3) The SQSS criteria is vague kept at a very high level to allow Users to specify what level of damping is unacceptable to their plant.

It was also noted although both GC0077 & GSR0018 had been approved by the Authority but only GC0077 had been implemented, with GSR0018 still awaiting a Licence amendment (to reference the correct version number) ahead of formal implementation of the modification into the SQSS. The Code Administrator stated that they would speak to the Authority around this impact and whether the licence change process could be actioned now to ensure it is implemented ahead of the EU Network Code implementation for this modification.

During the final meeting to discuss the workgroup consultation, one member of the workgroup raised a concern that another individual member

had substantially reworked the “Workgroup Discussion” section of the report and had added detailed context that had not been discussed during previous sessions. They stated that it would be more appropriate to add this as a Consultation response.

Discussions following Workgroup Consultation – November 2017

The Workgroup for GC0102 met on the 14 November to discuss the fourteen Consultation responses received.

A Workgroup member highlighted SOGL and specifically Article 54, they stated that they would prefer to not complete all of this work and come back to SOGL after and have to re do all of the work already completed. He noted that this Article applies at the same time as RFG (May 2019). It was noted however that this modification had a specific Terms of Reference to cover and as such the SOGL Article would, if needed, be covered under a separate modification.

A DNO representative noted the comments within the Consultation responses with regards to the diagrams and structure of G98 and G99. He stated that the DNOs would be taking on board the comments outlined and would be holding two workshops to further progress the drafting.

The Workgroup discussed question seven of the Consultation and it was noted that storage would not be required for RfG compliance and that this needs to be clear to all parties. The Workgroup noted that there this is something that could be outlined within the Guidance document that had been discussed.

The Workgroup discussed the Governance procedures that can be used when finding errors within the EU Codes themselves and that it was not immediately clear how to resolve these. It was noted that there was an urgent and non-urgent route for amendments and that it would take around five years via the non-urgent Governance.

PON/ION Discussions

The Proposer outlined that this had been included within the drafting to provide clarification on the current GB process, protecting both the System Operator and Generator when connecting to the Transmission System. It was noted that there was scope on what form the notification could take, for example the ION could be used. The Proposer also highlighted the issues should this not be in place:

- Removing the ION option prevents new generators connecting if no equipment certificates are available as testing can’t be ticked off in the PGMD and they therefore can’t receive a FON. This creates barriers to entry and doesn’t facilitate cross-border trade.
- By removing ION A for offshore it destroys this established process which is widely used to trigger other industry processes, despite silence on any offshore process from RfG.

A workgroup member stated that as per their Workgroup Consultation response should this be implemented into the Grid Code it would in his view be illegal. The Workgroup member stated that he believes EU Law states something different to what has been drafted by the Proposer.

The Proposer outlined that should you not have a certificate of some description you would not be able to connect. The Workgroup member stated that he could connect by using RfG and EU Law. Another Workgroup member stated that you would require some form of written Authority to do so for example ION, DNO approval, NGET letter of acknowledgment. A Workgroup member reiterated that as a newly connecting Generator you only have to do what is outlined in the RfG and stated that should there be any errors in the drafting it is still law and as such it needs to be complied with.

One Workgroup member requested that as per their Workgroup Consultation response that the same document be used for new and existing Generators be used (ION). He questioned why there would be different documentation if connecting is the same. It was noted by the Workgroup that harmonisation of documentation is required and not just in the name of the document but also in the contents. A Workgroup member noted that nine respondents to the Consultation supported the approach outlined by the Proposer. A Workgroup member stated that even if all or no Workgroup members supported their approach it did not mean it should or shouldn't be the Proposers solution to the defect.

The Proposer outlined that the Original Solution was not preventing new Users from connecting via the process outlined in RfG but simply allowing an alternative method should there be unnecessary delays (such as waiting for an Equipment Certificate if one was not available). The Proposer felt that by preventing new Generators from connecting to the system when there is an alternative and established process in place; they would be negatively affecting cross-border trade by preventing new Generators to opt for this method if it was deemed more suitable for their circumstances. The Proposer emphasised that this would by no means replace the process outlined in RfG and that new Generators could, if they wished, submit a full and complete PGMD instead. In this sense, allowing new Users the option of either submitting a PGMD or following existing GB processes, there are no additional requirements, stringent or otherwise.

A Workgroup member explained that to not use the Grid Code and have to use documentation this would find the number of documents and the process quite difficult to understand so the same document would aid with this.

A Workgroup member stated that there would be a reason as to why the drafting was completed in such a way and as such this would form part of the potential alternative on stringency.

The Proposer of the modification took away an action to clarify what their preferred solution would be. A Workgroup member stated that either solution would not be what the law stated and as such the same issue would remain. The solution was clarified by the Proposer ahead of the Alternative and Workgroup votes and can be located in the next section of the Workgroup Report (Proposers solution following Workgroup Consultation)

It was noted by the Workgroup that there would be some consequential RES amendments that will be required as a result of GC0102. It was outlined by the Proposer that these would be sent to the Grid Code Panel for their approval in January 2018. It was noted that the changes may not be housekeeping as there would be costs involved. The Chair of the Workgroup noted that the Governance procedure for the approval of RES documentation and it could result in the documentation requiring consultation and approval from the Authority.

Large, Medium and small

The majority of the Workgroup noted that this issue need to be resolved at some point and that it was a long term objective that needs to be resolved but that the RfG modifications were not the correct place to do so.

It was noted that the Guidance document that had been discussed previously would assist in the first instance to assist with navigating the Grid Code.

A Workgroup member highlighted that the issue is harmonisation and in addition that no amendments have been proposed to the CUSC as a result of these modifications. He believed that GC0100-102 fail to harmonise. The Proposer explained that anything generic had been proposed to the Grid Code and stated that Appendices are published but are yet to be finalised. He also explained that there was an ongoing piece of work to update the Connection Agreement.

Furthermore, to provide additional clarity to stakeholders and to ensure that the Connection Codes had been discharged into the Grid Code correctly, the Proposer ran two days of legal text discussions and also produced a new “code map” highlighting which new sections of the Grid Code each clause of the Connection Codes were discharged in. There was an additional two days of discussions to go through the code map and ensure the relevant European Network Codes had been discharged correctly and appropriately. All comments resulting from these sessions were addressed and, where improvements were possible, the Proposer amended the text accordingly. The code map did not highlight any clauses that would need to be discharged into the CUSC and no stakeholders could identify any examples where this would be necessary either.

It was finally noted that LMS would not be addressed within the GC100-102 modifications and that once they are implemented into the Grid Code further pieces of work can then be completed to improve the baseline. A

Workgroup member informed the Workgroup that they had raised the LMS issue at the CUSC Panel at that it was still an outstanding action with the Panel at the time of writing.

A Workgroup member highlighted Article 71 of the RfG and that the Authority has an obligation to ensure all contracts in relation to the code are lawful.

Harmonisation

The Workgroup looked at and discussed the Scottish Power Generation Workgroup Consultation response. It includes some tables that outline compliance requirements and documentation for newly connecting and commissioning generators.

The Workgroup member that responded to the Consultation stated that he wanted to highlight the differences and question whether there could be a standard template across TSOs and DNOs. Another Workgroup member stated that there should be a harmonised solution.

The Consultation respondent highlighted Table 2 of his response and noted that he expected it to be less comparable than it was.

The Proposer of GC0102 stated that they had harmonised the proposed solution to the defect to the extent possible. It was noted that this could also be a potential future piece of work once the technical aspects of the Grid Code are implemented.

Grid Code: Proposers Solution following Workgroup Consultation

Following the workgroup consultation responses with regards to the PON, the Proposer sought guidance from the workgroup members with a majority suggesting that replacing the PON for Type B and Type C with the same process as current GB practice (i.e. EON, ION, FON and LON) would be more appropriate and less confusing to New Generators.

Therefore, for Types B - D, the possibility of following the current GB process is available with the PGMD retained for Type B and C still representing the format of compliance information. It should be noted where a Generator provides all necessary documentation and compliance evidence in the PGMD they can progress direct to the FON as set out in RfG and no additional process is required. This is acceptable under the Proposer text. (i.e. a complete PGMD with all the necessary information, including test reports is supplied prior to connection; which would likely to be obtained via Equipment Certificates).

Under the Offshore Generator build arrangements, the Offshore Generator is responsible for the design and build of the Offshore Transmission Network (i.e. before transfer to an Offshore Transmission Licensee (OFTO)) and the Offshore Generating plant (eg Wind turbines etc). So far as the ION is concerned, it is split into two parts, (ION A in respect of the

OTSUA (i.e. the Offshore Transmission Network)) and ION B in respect of the Offshore Generating Plant. The EU Codes are silent on the GB Offshore Transmission Regime so if both the ION A and ION B are switched off it would mean that the ION for the Generating plant is switched off as well as that for the Offshore Transmission System. If the ION A was therefore switched off, as well as that for the ION B (as proposed under the alternative), it would mean a large hole in the drafting, but would also present a major problem for Offshore Developers in seeking to demonstrate compliance.

As Equipment Certificates are not yet available and the RfG requires test reports as part of the compliance evidence within a PGMD for Type B/C it was felt that this could prevent Generators from achieving connections as FON could not be issued unless a PGMD was complete. With RfG providing no process to cover a circumstance where Equipment Certificates are not available this would be inefficient and could prevent new competition from entering the market as they would not be able to receive an Operational Notification to connect without first providing test results.

The Proposed Solution provides for this circumstance by allowing a New Users a means of connecting Type B/C Power Generating Modules to the transmission system without the inclusion of test reports and the ability to complete the required tests as part of their commissioning process for their site. By permitting the ION with Outstanding Items for Type B and Type C as made available for Type D Power Generating Modules we believe we are giving Generators a process within their control similar to the current GB practice rather than having to wait for Equipment Certificates to be provided from elsewhere, a process beyond the control of the Generator.

Therefore, the Proposed Solution is provided to allow New Users the ability to connect to the transmission system following the process set out in Rfg to obtain FON. In addition the option is provided to use the ION process in line with the current GB practice, where necessary, should appropriate test reports be unavailable at the time of the their connection. By allowing this we believe we are encouraging new competition to enter the market rather than preventing it.

Grid Code: Workgroup Alternative Code Modifications

During the course of the Workgroup meetings for GC0102 one potential alternative to the Original proposal was submitted.

The alternative relates to removing more stringent requirements and is set out below.

The below has been sourced from the Proposer of the alternative (WACM1)

Removing More Stringent Requirements

This alternative was raised at the second GC0100 and GC0101 and first GC0102 Workgroup meeting[19] and, subsequently, at the August 2017 joint Workgroups meeting where the Proposer outlined that it was the intention, with GC0102 (original) that all the existing obligations placed on new connecting parties within the (GB) national network codes (such as, but not limited to, the Grid Code, the Distribution Code, the Engineering Requirements, the CUSC etc.,) would continue (with the GC0102 original proposal) to be applied to future parties connecting under the RfG, DCC and HVDC Network Codes. In other words, the obligations in those EU Network Codes would be applied to future parties connecting whilst retaining all existing national network code obligations. In short, it was not intended that, in principle, any obligations for future connecting parties would be removed from the national network codes as a result of the GC0102 original proposal.

However, a Workgroup member identified that this appeared to be incompatible with the requirements of the Third Package, and in particular Articles 8(7) and 21 of Regulation 714/2009[20].

> *Article 8(7)*
> *"The network codes shall be developed for cross-border network issues and market integration issues and shall be without prejudice to the Member States' right to establish national network codes* ***which do not affect cross-border trade****."* [emphasis added]
>
> *Article 21*
> *"This Regulation shall be without prejudice to the rights of Member States to maintain or introduce measures that contain* ***more detailed*** *provisions than those set out herein or in the Guidelines referred to in Article 18."* [emphasis added]

The Workgroup member highlighted that when the RfG was first drafted by ENTSOE (noting that the proposer of GC0102, National Grid, was an active member of the RfG drafting team for ENTSOE) they had included an Article 7, which was subsequently deleted by the Commission on 14th January 2014.

That old Article 7 said the following:

> *"This Network Code shall be* ***without prejudice to the rights of Member States to maintain or introduce measures that contain*** *more detailed or* ***more stringent provisions than those set out herein****, provided that these measures are compatible with the principles set forth in this Network Code."* [emphasis added]

Of particular relevance to the currently discussions are the parts emphasised in bold.

[19] Held on 6th July 2017
[20] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:211:0015:0035:EN:PDF

It was clear, by their drafting, that ENTSOE intended to be able to maintain (or introduce later) requirements contained in the exiting national network codes[21] where those requirements were (or could be in the future) more stringent than the provisions set out in the EU Network Codes.

The Commission explicitly removed this proposed wording by ENTSOE.

Shortly after the Commission's deletion of the old Article 7 in January 2014, and at the prompting of GB stakeholders (including the Workgroup member who raised this potential alternative) Ofgem enquired of the Commission as to why that article had been deleted.

In their response dated 28th February 2014, the Commission wrote to Ofgem in the following terms:

> *"1. that Article 21 of Regulation (EC) No 714/2009 already provided for the possibility for Member States to adopt* ***more detailed*** *measures and that there was thus no need to reiterate this possibility in the ENC RfG"* [emphasis added]
>
> *"2.* ***the adoption by Member States of measures more stringent than the ones of the ENC RfG*** *(to the extent of measures with cross-border trade effect)* ***would not be in line with Article 21 of Regulation (EC) No 714/2009****, i.e. if the Member states were to adopt more stringent measures then it should be proved that there is no cross border trade effect of doing so"* [emphasis added]

This response was shared by Ofgem with GB stakeholders (including the proposer of GC0102, National Grid) shortly after.

Over a year later, on 26th June 2015, the RfG (and later the DCC and HVDC) Network Code was approved via the Comitology procedure, noting that in doing so, it:

> *"…****provide[s] a clear legal framework for grid connections****, facilitate Union-wide trade in electricity, ensure system security, facilitate the integration of renewable electricity sources, increase competition and allow more efficient use of the network and resources, for the benefit of consumers*"[22] [emphasis added]

As part of that approval process an arrangement was put in place by DECC (later BEIS) and Ofgem to canvass GB stakeholder views (including from the proposer of GC0102, National Grid) on any 'red line' items that the stakeholder(s) believed that DECC and Ofgem should seek to change in each of the respective EU Network Code prior to its approval. The Workgroup member could not recall National Grid identifying, as one of its 'red line' items, the need to allow for more stringent obligations (to those set out in the EU Network Codes) being placed on future connecting parties in GB.

[21] Such as, but not limited to, the Grid Code, the Distribution Code, the Engineering Requirements, the CUSC etc., in GB

[22] RfG, 14th April 2016, Recital 3

The Workgroup member was also unaware of any other TSO in other Member States having, likewise, raised any similar concerns in respect of more stringent obligations in the intervening seventeen month period (from mid-January 2014 to late June 2015) as the RfG Network Code was proceeding though the approvals process.

Clearly in the intervening seventeen month period TSOs could , if they believed this issue to be important, have put forward 'more stringent' obligations if they were required; such as those, for example, needed for maintaining the security of the electrical system; for inclusion in the EU Network Codes. If this had been done at the time then, as such, they would not, in law, be 'more stringent' in terms of Article 8(7) or Article 21 as any obligation(s) would not be in the national network codes (but rather in the EU Network Codes). However, this was not done by the TSOs, despite there being time for them to do so if they wished.

As part of the implementation of the EU Network Codes arrangements have been put in place for stakeholder involvement going forward (this is, for example, set out in Article 11 of the RfG, Article 10 of the DCC and Article 11 of the HVDC).

As a result a ('combined') stakeholder committee for the three connections codes[23] (RfG, DCC and HVDC) was established in 2016. Chaired by ACER, with secretariat support from ENTSOE it brings together pan European trade associations etc., of stakeholders with interest in the three EU Network Codes relating to connections.

One of the questions that arose early on in the life of the connections codes stakeholder committee was around applying more stringent requirements within the national network codes.

This question was posed to the Commission in the following terms:

> *"Can a Member State impose more stringent requirements by a separate legislation than imposed by the network code Requirements for Generators (RfGNC)?"*

The Commission's answer to the question was provided in its presentation to the stakeholder committee on 8th September 2016 (which was subsequently repeated at the 9th December 2016 and 7th June 2017 meetings). The answer is as follows:

> "•**In general, no – not outside of the values provided for in the code**. [emphasis added]
>
> •But: "*the relevant system operator, in coordination with the relevant TSO, and the power-generating facility owner **may agree** on wider frequency ranges, longer minimum times for operation or specific*

[23] Further details, including papers / minutes etc., can be found at https://www.entsoe.eu/major-projects/network-code-implementation/stakeholder-committees/Pages/default.aspx

requirements for combined frequency and voltage deviations to ensure the best use of the technical capabilities of a power-generating module, if it is required to preserve or to restore system security." Article 13. [emphasis added]

•*"The network codes shall be developed for cross-border network issues and market integration issues and shall be without prejudice to the Member States' right to establish national network codes* ***which do not affect cross-border trade****." Article 8, Regulation 714.*" [emphasis added]

This issue had also been brought to the attention of GB stakeholders (including the proposer of GC0102, National Grid) in the spring of 2014 via a presentation which was given to meetings of the three relevant GB stakeholder bodies at that time (ECCAFF, JESG and the joint DECC/Ofgem Stakeholder Group).

That spring 2014 presentation was also shared with the GC0102 Workgroup prior to the joint Workgroup meeting[24]. The Workgroup member wished to highlight a number of points in that presentation (some of which have been set out already in the above few paragraphs so are not repeated here), including:

– Firstly: burden of proof to say a particular "more stringent" national measure (over and above the ones of the ENCs) does not affect cross border trade resides with the Member State (not stakeholders)

– Secondly: the presumption for all "more stringent" national measures (over and above the ones of the ENCs) is that they are not legally binding unless and ***until the Member State*** *(not stakeholders)* ***has "proved*** *that there is no cross border trade effect"* [25][emphasis added]

"• In terms of Art 8 and Art 21 what do "...which do not affect cross-border trade..." and "... no cross border trade effect..."mean?

• Important to be mindful of very strong ENTSOe arguments about Type A generators – individually an 800W generator will not affect cross border trade but, cumulatively, they will have an affect on cross border trade" [26]

"• Single GB code requirement:*
– on one generator, maybe a case of there being no cross border affect?
– cumulatively on multiple generators, a case that there is an affect?

• Multiple GB code requirements:*
– cumulatively on one generator, some cross border affect?

[24] 6th September 2017
[25] Slide titled 'Another point of view (3)'
[26] Slide titled 'Another point of view (4)'

– cumulatively on multiple generators, a clear affect?

• All GB code requirements:*
– cumulatively on one generator, some cross border affect?
– cumulatively on multiple generators, a clear affect?

** document(s) where national requirements are set out - such as GC, DC, DCUSA, BSC, CUSC, Engineering Recommendations (G59 / G83) etc."* [27]

In respect of the effect on cross border trade of obligating future connecting parties in GB, such as generators[28], to meet more stringent requirements than those set out in the respective EU Network Code, the Workgroup member wished to highlight to the Workgroup twelve examples of additional costs etc., which, in that scenario, a generator could (would?) face.

These examples include:

1) *"pay for the extra obligations to be assessed and the solutions identified;*

2) pay for the extra equipment or pay for the extra procedures to be developed to meet the extra obligations;

3) pay for the operation and maintenance of the extra equipment;

4) pay for the extra operational costs of the procedures (including extra staff);

5) pay for the extra equipment and procedures to be internally(*) tested (prior to the network operator compliance testing);

6) pay for the network operator's compliance testing of the extra equipment and procedures;

7) have to include a risk premium for items (5) and (6) in terms of if the tests are failed or delayed and either (a) remedial actions / costs are incurred to put this right and / or (b) the delay results in the plant not commissioning on time (delaying the revenue income being received);

8) in respect of (7) if the tests under items (5) and (6) fail, then pay for the extra equipment/ procedures changes plus the (re) testing of these elements (or the full rerun of the testing);

9) pay for the replacement costs of the extra equipment either at the end of its design life or if the equipment fails during its operational lifetime;

10) have to include a risk premium for the failure of the extra equipment resulting in the plant being non compliant and the

[27] Slide titled 'Another point of view (5)'
[28] But not limited to generators - the DCC Network Code concerns demand connections and the HVDC Network Code deals with the connection of HVDC systems.

plant being placed off line till the repairs or replacement can be undertaken;

11) in terms of (10) pay for the (re) testing (internal and / or compliance) of the repaired / replaced extra equipment; and (last, but not least)

12) pay the capital cost for all these extra items above, noting that last time we look as an industry at this, the WACC of GB generators was over twice and in some cases more than quadruple that of network operators.

(*) the test is undertaken for the internal purposes of the generator, although the actual testing itself maybe undertake by an external provider, such as the equipment supplier."[29]

The Workgroup member noted that this list is not comprehensive and that other generators may identify additional items that have, inadvertently, been omitted. (e.g. costs associated with compliance with other codes such as mandatory participation in the balancing mechanism for 132 kV connected generators in Scotland > 10 MW) (?)

In the view of the Workgroup member it was clear that the cumulative effect, of all these additional costs[30], on multiple generators in GB, would affect cross border trade; although the Workgroup member acknowledged, as per the Commission's statement[31] of 28th February 2014 to Ofgem, that it was not for the stakeholder, such as a generator, to prove that there was a cross border trade affect, but rather for *those who wish to apply more stringent requirements* (than those in the EU Network Codes) to prove that there is no cross border trade effect of doing so.

The Workgroup member was mindful that the GC0102 proposals would, in due course, be presented to the National Regulatory Authority (Ofgem) for determination. In this context, the Workgroup member was alive to the duty placed upon Ofgem (as the NRA for GB) "to ensure compliance with European Union Law". This was summarised under duties of the regulatory authority; in the Commission's interpretive note on Directive 2009/72 concerning the common rules for the internal market in Electricity (and the Gas equivalent) dated 22nd January 2010[32]; in the following terms:

> "Article 37(1)(b) of the Electricity Directive and Article 41(1)(b) of the Gas Directive state that the NRA has the duty of '*ensuring compliance of transmission and distribution system operators, and where relevant, system owners, as well as of any electricity and natural gas undertakings, with their obligations under this Directive*

[29] Shared with the GC0100 and GC0101 Workgroup by email on 3rd August 2017

[30] Arising from having to comply with the more stringent national network code obligations which go beyond what is required by the EU Network Code(s)

[31] *"if the Member states were to adopt more stringent measures then it should be proved that there is no cross border trade effect of doing so"*

[32] https://ec.europa.eu/energy/sites/ener/files/documents/2010_01_21_the_regulatory_authorities.pdf

and other relevant Community legislation, including as regards cross border issues'.

It follows from this provision that, without prejudice to the rights of the European Commission as guardian of the Treaty on the functioning of the European Union, the NRA is granted a general competence — and the resulting obligation — as regards ensuring general compliance with European Union law. The Commission's services are of the opinion that Article 37(1)(b) of the Electricity Directive, and Article 41(1)(b) of the Gas Directive, are to be seen as a provision guaranteeing that the NRA has the power to ensure compliance with the entire sector specific regulatory '*acquis communautaire*' relevant to the energy market, and this vis-à-vis not only the TSOs but any electricity or gas undertaking."[33]

In light of the above, and given the information from the GC0102 Proposer noted at the start of this item; together with the presentations (and associated discussions of the 'more stringent' point in terms of compliance) at the 24th July 2017 'Compliance with the RfG' hosted at the ENA; the Workgroup member believed that the original proposal (by virtue of not removing 'more stringent' requirements contained within the GB national network codes, that it was proposed to apply to future GB connecting parties) would be incompatible with EU law for the reasons set out above[34] and would thus also not better facilitate Grid Code Applicable Objective (d)[35]:

"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"

Therefore, the Workgroup proposed to bring forward an alternative proposal to the GC0102 original proposal which would be to ensure that more stringent obligations contained within the GB national network codes would not be applicable to future connecting parties who fall within the scope of the RfG, DCC and HVDC Network Codes respectively; although, for the avoidance of doubt, those (GB) national network code obligations would continue to be applicable to 'existing' connected parties (as defined in the RfG, DCC and HVDC Network Codes respectively) unless and until they fall within the scope of the EU Network Codes for connection.

To set this in context the Workgroup member was mindful of the recent presentation given by the Proposer setting out (in a tabular form) the items covered, in the case of generation, with the RfG Network Code for the four types of generation (A-D).

[33] Found at pages 14-15 of the Commission's interpretive note.

[34] As well as, potentially, with respect to Competition Law for the reasons outlined under Section 2 'Governance – Legal Requirements' in the GC0103 proposal: http://www2.nationalgrid.com/UK/Industry-information/Electricity-codes/Grid-code/Modifications/GC0103/

[35] Or the Distribution Code equivalent Applicable Objective (iv).

This table is shown below:

Technical Requirements	Type A	Type B	Type C	Type D
Operation across range of frequencies	•	•	•	•
Rate of change of System Frequency (ROCOF)	•	•	•	•
Limited Frequency Sensitive Mode Over Frequency (LFSM-O)	•	•	•	•
Output Power with falling Frequency	•	•	•	•
Logic Interface (input port) to cease active power production	•	•	•	•
Conditions for automatic reconnection	•	•	•	•
Operation across range of frequencies	•	•	•	•
Ability to reduce Active Power on instruction		•	•	•
Fault Ride Through and Fast Fault Current Injection		•	•	•
Conditions for automatic reconnection following disconnection		•	•	•
Protection and Control		•	•	•
Operational Metering		•	•	•
Reactive Capability		•	•	•
Active Power Controlability			•	•
Frequency Response including LFSM-U			•	•
Monitoring			•	•
Robustness			•	•
System Restoration / Black Start			•	•
Simulation Models			•	•
Rates of Change of Active Power			•	•
Earthing			•	•
Enhanced Reactive Capability and control			•	•
Voltage Ranges				•
Enhanced Fault Ride Through				•
Synchronisation				•
Excitation Performance				•

Using this summary table, the Workgroup member identified that with the potential alternative that Type A generators would only be obligated, in terms of their connection to the grid, to those items shown in the table (and so on for Types B, C and D). All other items would be considered more stringent unless it could be proven that there was no cross border trade effect of obligating generators to comply with further obligations over and above those in the RfG (and likewise in terms of the DCC for Demand and the HVDC for HCDV connecting parties).

The Alternative form for this alternative solution (WACM1) including legal text can be found on the following pages.

Alternative request Proposal form

Grid Code

Modification potential alternative submitted to:

What stage is this document at?

01 Proposed Alternative

02 Formal Workgroup Alternative

GC0102 - WACM1

Mod Title: As per original (Removing More Stringent Requirements)

Purpose of alternative Proposal:
As per the Original.

Date submitted to Code Administrator: August 2017

You are: A Workgroup member

Workgroup vote outcome: Formal alternative

Any Questions?

Contact:
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Code Administrator

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Alternative Proposer:
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Company

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Contents

Alternative proposed solution for workgroup review

Removing More Stringent Requirements

This proposed alternative was raised at the second GC0100 and GC0101 and first GC0102 Workgroup meeting[36] and, subsequently, at the August 2017 joint Workgroups meeting where the Proposer outlined that it was the intention, with GC0102 (original) that all the existing obligations placed on new connecting parties within the (GB) national network codes (such as, but not limited to, the Grid Code, the Distribution Code, the Engineering Requirements, the CUSC etc.,) would continue (with the GC0102 original proposal) to be applied to future parties connecting under the RfG, DCC and HVDC Network Codes. In other words, the obligations in those EU Network Codes would be applied to future parties connecting whilst retaining all existing national network code obligations. In short, it was not intended that, in principle, any obligations for future connecting parties would be removed from the national network codes as a result of the GC0102 original proposal.

However, a Workgroup member identified that this appeared to be incompatible with the requirements of the Third Package, and in particular Articles 8(7) and 21 of Regulation 714/2009[37].

> *Article 8(7)*
> *"The network codes shall be developed for cross-border network issues and market integration issues and shall be without prejudice to the Member States' right to establish national network codes* ***which do not affect cross-border trade****."* [emphasis added]
>
> *Article 21*
> *"This Regulation shall be without prejudice to the rights of Member States to maintain or introduce measures that contain* ***more detailed*** *provisions than those set out herein or in the Guidelines referred to in Article 18."*
> [emphasis added]

The Workgroup member highlighted that when the RfG was first drafted by ENTSOE (noting that the proposer of GC0102, National Grid, was an active member of the RfG drafting team for ENTSOE) they had included an Article 7, which was subsequently deleted by the Commission on 14th January 2014.

That old Article 7 said the following:

> *"This Network Code shall be* ***without prejudice to the rights of Member States to maintain or introduce measures that contain*** *more detailed or* ***more stringent provisions than those set out herein****, provided that these measures are compatible with the principles set forth in this Network Code."* [emphasis added]

Of particular relevance to the currently discussions are the parts emphasised in bold.

It was clear, by their drafting, that ENTSOE intended to be able to maintain (or introduce later) requirements contained in the exiting national network codes[38] where those requirements were (or could be in the future) more stringent than the provisions set out in the EU Network Codes.

The Commission explicitly removed this proposed wording by ENTSOE.

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[36] Held on 6th July 2017

[37] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:211:0015:0035:EN:PDF

[38] Such as, but not limited to, the Grid Code, the Distribution Code, the Engineering Requirements, the CUSC etc., in GB

Shortly after the Commission's deletion of the old Article 7 in January 2014, and at the prompting of GB stakeholders (including the Workgroup member who raised this potential alternative) Ofgem enquired of the Commission as to why that article had been deleted.

In their response dated 28th February 2014, the Commission wrote to Ofgem in the following terms:

> *"1. that Article 21 of Regulation (EC) No 714/2009 already provided for the possibility for Member States to adopt* ***more detailed*** *measures and that there was thus no need to reiterate this possibility in the ENC RfG"* [emphasis added]
>
> *"2.* ***the adoption by Member States of measures more stringent than the ones of the ENC RfG*** *(to the extent of measures with cross-border trade effect)* ***would not be in line with Article 21 of Regulation (EC) No 714/2009****, i.e. if the Member states were to adopt more stringent measures then it should be proved that there is no cross border trade effect of doing so"* [emphasis added]

This response was shared by Ofgem with GB stakeholders (including the proposer of GC0102, National Grid) shortly after.

Over a year later, on 26th June 2015, the RfG (and later the DCC and HVDC) Network Code was approved via the Comitology procedure, noting that in doing so, it:

> *"…****provide[s] a clear legal framework for grid connections****, facilitate Union-wide trade in electricity, ensure system security, facilitate the integration of renewable electricity sources, increase competition and allow more efficient use of the network and resources, for the benefit of consumers*"[39] [emphasis added]

As part of that approval process an arrangement was put in place by DECC (later BEIS) and Ofgem to canvass GB stakeholder views (including from the proposer of GC0102, National Grid) on any 'red line' items that the stakeholder(s) believed that DECC and Ofgem should seek to change in each of the respective EU Network Code prior to its approval. The Workgroup member could not recall National Grid identifying, as one of its 'red line' items, the need to allow for more stringent obligations (to those set out in the EU Network Codes) being placed on future connecting parties in GB.

The Workgroup member was also unaware of any other TSO in other Member States having, likewise, raised any similar concerns in respect of more stringent obligations in the intervening seventeen month period (from mid-January 2014 to late June 2015) as the RfG Network Code was proceeding though the approvals process.

Clearly in the intervening seventeen month period TSOs could , if they believed this issue to be important, have put forward 'more stringent' obligations if they were required; such as those, for example, needed for maintaining the security of the electrical system; for inclusion in the EU Network Codes. If this had been done at the time then, as such, they would not, in law, be 'more stringent' in terms of Article 8(7) or Article 21 as any obligation(s) would not be in the national network codes (but rather in the EU Network Codes). However, this was not done by the TSOs, despite there being time for them to do so if they wished.

[39] RfG, 14th April 2016, Recital 3

As part of the implementation of the EU Network Codes arrangements have been put in place for stakeholder involvement going forward (this is, for example, set out in Article 11 of the RfG, Article 10 of the DCC and Article 11 of the HVDC).

As a result a ('combined') stakeholder committee for the three connections codes[40] (RfG, DCC and HVDC) was established in 2016. Chaired by ACER, with secretariat support from ENTSOE it brings together pan European trade associations etc., of stakeholders with interest in the three EU Network Codes relating to connections.

One of the questions that arose early on in the life of the connections codes stakeholder committee was around applying more stringent requirements within the national network codes.

This question was posed to the Commission in the following terms:

> *"Can a Member State impose more stringent requirements by a separate legislation than imposed by the network code Requirements for Generators (RfGNC)?"*

The Commission's answer to the question was provided in its presentation to the stakeholder committee on 8th September 2016 (which was subsequently repeated at the 9th December 2016 and 7th June 2017 meetings). The answer is as follows:

> "•**In general, no – not outside of the values provided for in the code**. [emphasis added]
>
> •But: "*the relevant system operator, in coordination with the relevant TSO, and the power-generating facility owner **may agree** on wider frequency ranges, longer minimum times for operation or specific requirements for combined frequency and voltage deviations to ensure the best use of the technical capabilities of a power-generating module, if it is required to preserve or to restore system security." Article 13.* [emphasis added]
>
> •*"The network codes shall be developed for cross-border network issues and market integration issues and shall be without prejudice to the Member States' right to establish national network codes **which do not affect cross-border trade**." Article 8, Regulation 714.*" [emphasis added]

This issue had also been brought to the attention of GB stakeholders (including the proposer of GC0102, National Grid) in the spring of 2014 via a presentation which was given to meetings of the three relevant GB stakeholder bodies at that time (ECCAFF, JESG and the joint DECC/Ofgem Stakeholder Group).

That spring 2014 presentation was also shared with the GC0102 Workgroup prior to the joint Workgroup meeting[41]. The Workgroup member wished to highlight a number of points in that presentation (some of which have been set out already in the above few paragraphs so are not repeated here), including:

[40] Further details, including papers / minutes etc., can be found at https://www.entsoe.eu/major-projects/network-code-implementation/stakeholder-committees/Pages/default.aspx

[41] 6th September 2017

– Firstly: burden of proof to say a particular "more stringent" national measure (over and above the ones of the ENCs) does not affect cross border trade resides with the Member State (not stakeholders)

– Secondly: the presumption for all "more stringent" national measures (over and above the ones of the ENCs) is that they are not legally binding unless and ***until the Member State*** *(not stakeholders)* ***has "proved*** *that there is no cross border trade effect"* [42][emphasis added]

"• In terms of Art 8 and Art 21 what do "...which do not affect cross-border trade..." and "... no cross border trade effect..."mean?

• Important to be mindful of very strong ENTSOe arguments about Type A generators – individually an 800W generator will not affect cross border trade but, cumulatively, they will have an affect on cross border trade" [43]

"• Single GB code requirement:*
– on one generator, maybe a case of there being no cross border affect?
– cumulatively on multiple generators, a case that there is an affect?

• Multiple GB code requirements:*
– cumulatively on one generator, some cross border affect?
– cumulatively on multiple generators, a clear affect?

• All GB code requirements:*
– cumulatively on one generator, some cross border affect?
– cumulatively on multiple generators, a clear affect?

** document(s) where national requirements are set out - such as GC, DC, DCUSA, BSC, CUSC, Engineering Recommendations (G59 / G83) etc."* [44]

In respect of the effect on cross border trade of obligating future connecting parties in GB, such as generators[45], to meet more stringent requirements than those set out in the respective EU Network Code, the Workgroup member wished to highlight to the Workgroup twelve examples of additional costs etc., which, in that scenario, a generator could (would?) face.

These examples include:

2) *"pay for the extra obligations to be assessed and the solutions identified;*

2) pay for the extra equipment or pay for the extra procedures to be developed to meet the extra obligations;

3) pay for the operation and maintenance of the extra equipment;

4) pay for the extra operational costs of the procedures (including extra staff);

[42] Slide titled 'Another point of view (3)'
[43] Slide titled 'Another point of view (4)'
[44] Slide titled 'Another point of view (5)'
[45] But not limited to generators - the DCC Network Code concerns demand connections and the HVDC Network Code deals with the connection of HVDC systems.

5) pay for the extra equipment and procedures to be internally(*) tested (prior to the network operator compliance testing);

6) pay for the network operator's compliance testing of the extra equipment and procedures;

7) have to include a risk premium for items (5) and (6) in terms of if the tests are failed or delayed and either (a) remedial actions / costs are incurred to put this right and / or (b) the delay results in the plant not commissioning on time (delaying the revenue income being received);

8) in respect of (7) if the tests under items (5) and (6) fail, then pay for the extra equipment/ procedures changes plus the (re) testing of these elements (or the full rerun of the testing);

9) pay for the replacement costs of the extra equipment either at the end of its design life or if the equipment fails during its operational lifetime;

10) have to include a risk premium for the failure of the extra equipment resulting in the plant being non compliant and the plant being placed off line till the repairs or replacement can be undertaken;

11) in terms of (10) pay for the (re) testing (internal and / or compliance) of the repaired / replaced extra equipment; and (last, but not least)

12) pay the capital cost for all these extra items above, noting that last time we look as an industry at this, the WACC of GB generators was over twice and in some cases more than quadruple that of network operators.

(*) the test is undertaken for the internal purposes of the generator, although the actual testing itself maybe undertake by an external provider, such as the equipment supplier."[46]

The Workgroup member noted that this list is not comprehensive and that other generators may identify additional items that have, inadvertently, been omitted. (e.g. costs associated with compliance with other codes such as mandatory participation in the balancing mechanism for 132 kV connected generators in Scotland > 10 MW) (?)

In the view of the Workgroup member it was clear that the cumulative effect, of all these additional costs[47], on multiple generators in GB, would affect cross border trade; although the Workgroup member acknowledged, as per the Commission's statement[48] of 28th February 2014 to Ofgem, that it was not for the stakeholder, such as a generator, to prove that there was a cross border trade affect, but rather for *those who wish to apply more stringent requirements* (than those in the EU Network Codes) to prove that there is no cross border trade effect of doing so.

The Workgroup member was mindful that the GC0102 proposals would, in due course, be presented to the National Regulatory Authority (Ofgem) for

[46] Shared with the GC0100 and GC0101 Workgroup by email on 3rd August 2017

[47] Arising from having to comply with the more stringent national network code obligations which go beyond what is required by the EU Network Code(s)

[48] "*if the Member states were to adopt more stringent measures then it should be proved that there is no cross border trade effect of doing so*"

determination. In this context, the Workgroup member was alive to the duty placed upon Ofgem (as the NRA for GB) "to ensure compliance with European Union Law". This was summarised under duties of the regulatory authority; in the Commission's interpretive note on Directive 2009/72 concerning the common rules for the internal market in Electricity (and the Gas equivalent) dated 22nd January 2010[49]; in the following terms:

> "Article 37(1)(b) of the Electricity Directive and Article 41(1)(b) of the Gas Directive state that the NRA has the duty of '*ensuring compliance of transmission and distribution system operators, and where relevant, system owners, as well as of any electricity and natural gas undertakings, with their obligations under this Directive and other relevant Community legislation, including as regards cross border issues*'.
>
> It follows from this provision that, without prejudice to the rights of the European Commission as guardian of the Treaty on the functioning of the European Union, the NRA is granted a general competence — and the resulting obligation — as regards ensuring general compliance with European Union law. The Commission's services are of the opinion that Article 37(1)(b) of the Electricity Directive, and Article 41(1)(b) of the Gas Directive, are to be seen as a provision guaranteeing that the NRA has the power to ensure compliance with the entire sector specific regulatory '*acquis communautaire*' relevant to the energy market, and this vis-à-vis not only the TSOs but any electricity or gas undertaking."[50]

In light of the above, and given the information from the GC0102 Proposer noted at the start of this item; together with the presentations (and associated discussions of the 'more stringent' point in terms of compliance) at the 24th July 2017 'Compliance with the RfG' hosted at the ENA; the Workgroup member believed that the original proposal (by virtue of not removing 'more stringent' requirements contained within the GB national network codes, that it was proposed to apply to future GB connecting parties) would be incompatible with EU law for the reasons set out above[51] and would thus also not better facilitate Grid Code Applicable Objective (d)[52]:

> *"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"*

Therefore, the Workgroup proposed to bring forward an alternative proposal to the GC0102 original proposal which would be to ensure that more stringent obligations contained within the GB national network codes would not be applicable to future connecting parties who fall within the scope of the RfG, DCC and HVDC Network Codes respectively; although, for the avoidance of doubt, those (GB) national network code obligations would continue to be applicable to 'existing' connected parties (as defined in the RfG, DCC and HVDC Network Codes respectively) unless and until they fall within the scope of the EU Network Codes for connection.

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49 https://ec.europa.eu/energy/sites/ener/files/documents/2010_01_21_the_regulatory_authorities.pdf

50 Found at pages 14-15 of the Commission's interpretive note.

51 As well as, potentially, with respect to Competition Law for the reasons outlined under Section 2 'Governance – Legal Requirements' in the GC0103 proposal: http://www2.nationalgrid.com/UK/Industry-information/Electricity-codes/Grid-code/Modifications/GC0103/

52 Or the Distribution Code equivalent Applicable Objective (iv).

To set this in context the Workgroup member was mindful of the recent presentation given by the Proposer setting out (in a tabular form) the items covered, in the case of generation, with the RfG Network Code for the four types of generation (A-D).

This table is shown below:

Technical Requirements	Type A	Type B	Type C	Type D
Operation across range of frequencies	•	•	•	•
Rate of change of System Frequency (ROCOF)	•	•	•	•
Limited Frequency Sensitive Mode Over Frequency (LFSM-O)	•	•	•	•
Output Power with falling Frequency	•	•	•	•
Logic Interface (input port) to cease active power production	•	•	•	•
Conditions for automatic reconnection	•	•	•	•
Operation across range of frequencies	•	•	•	•
Ability to reduce Active Power on instruction		•	•	•
Fault Ride Through and Fast Fault Current Injection		•	•	•
Conditions for automatic reconnection following disconnection		•	•	•
Protection and Control		•	•	•
Operational Metering		•	•	•
Reactive Capability		•	•	•
Active Power Controlability			•	•
Frequency Response including LFSM-U			•	•
Monitoring			•	•
Robustness			•	•
System Restoration / Black Start			•	•
Simulation Models			•	•
Rates of Change of Active Power			•	•
Earthing			•	•
Enhanced Reactive Capability and control			•	•
Voltage Ranges				•
Enhanced Fault Ride Through				•
Synchronisation				•
Excitation Performance				•

Using this summary table, the Workgroup member identified that with the potential alternative that Type A generators would only be obligated, in terms of their connection to the grid, to those items shown in the table (and so on for Types B, C and D). All other items would be considered more stringent unless it could be proven that there was no cross border trade affect of obligating generators to comply with further obligations over and above those in the RfG (and likewise in terms of the DCC for Demand and the HVDC for HCDV connecting parties).

Potential Alternative update following Workgroup Consultation

GC0102 Potential Alternative to ensure that 'More Stringent Requirements' are not applied to GB Users.

In light of the discussions at the 5th October 2017 Workgroup meeting and, in particular, the response to the Workgroup Consultation provided by Scottish Power (see extract below) the Workgroup member who had proposed the potential Alternative clarified the position.

In accordance with Article 5 of the Directive 2009/72/EC common rules for the internal market in electricity are submitted by the Member State to the Commission and these are relevant in terms of the RfG (as detailed in recital (2)[53]) and other Network Codes (as applicable).

It is understood that the (UK) Member State has submitted the necessary documentation, in accordance with Article 5 of 2009/72, to the Commission and therefore (i) any requirements set out in those submitted documents along with (ii) the requirements set out in the relevant Network Code(s) (such as the RfG for generators) would not, for the purposes of this potential Alternative, be considered as being 'more stringent'.

However, if as part of the Original Proposal GC0102 any additional requirement(s), over and above those set out in the documentation noted under (i) and (ii) above, were to be included in the solution (that is, within the legal text) then this would be considered as being 'more stringent'.
Therefore the potential Alternative would be the Original proposal solution, but excluding any of these 'more stringent' requirements.

What these 'more stringent' requirements' are (that will be removed from the Original, via this potential Alternative) can only be determined when a comprehensive mapping of the draft legal text for GC0102 to the actual Network Code article(s) and / or clause(s) etc., has been provided in order to cross check this alongside the Grid Code wording.

By way of illustration, the current version[54] of the GC0102 draft legal text includes the introduction of a '*Preliminary Operating Notice* (PON)'[55] as a new, additional, mechanism to facilitate the compliance process but which, firstly, does not form part of the existing GB national network codes or associated documents (i.e. those submitted in accordance with Article 5 of the Directive 2009/72) and, secondly, does not form part of the RfG requirements.

Therefore as this 'PON' requirement; for Type B and Type C generators; is 'more stringent' then, in the context of this potential Alternative for GC0102 this would be excluded from the Original proposal – that is, the Original would still go forward with this 'PON' wording included, whilst the Alternative would go forward with the 'PON' wording excluded from the legal text.

[53] "..... In addition Article 5 of Directive 2009/72/EC of the European Parliament and of the Council (2) requires that Member States or, where Member States have so provided, regulatory authorities ensure, inter alia, that objective technical rules are developed which establish minimum technical design and operational requirements for the connection to the system. ..."
[54] As at 18th October 2017.
[55] See ECP.1.1 (ii) and ECP.6B in the GC0102 draft legal text for further details.

[Extract from the ScottishPower Generation Ltd response to the Workgroup consultation, dated 2nd October 2017]

"Looking at the third package it consists of a number of directives and regulations, with the two key pieces of legislation relating to requirements on electricity providers being "Directive 2009/72/EC common rules for the internal market in electricity ..." and "Regulation 714/2009 on conditions for access to the network for cross-border exchanges in electricity ...".
These two pieces of legislation seem to split requirements into two with 2009/72/EC dealing with the safety and minimum technical requirements, whilst 714/2009 deals with setting cross-border rules on trade, energy flows and charging.

In terms of 2009/72/EC this was introduced in 2012 with GB responding indicating its minimum technical requirements were as follows "Article 5: Electricity Safety, Quality and Continuity Regulations 2002, Electricity Transmission Licence, Electricity Distribution Licence, Electricity Interconnector Licence attached. Technical codes including the Grid and Distribution Codes may be found at

http://www.ofgem.gov.uk/Licensing/ElecCodes/Pages/ElecCode.aspx "

Currently this consultation is dealing with the "Regulation 2016/631 Requirements for grid connection of generators" which has been produced as a deliverable from 714/2009. Given the scope of 714/2009 it is surprising that such a technically detailed version of 2016/631(RFG) has been produced on the bases of a three word title in Article 8 paragraph 6 (b) "network connection rules;", however we are where we are.

Specifically dealing with no more stringent requirements, this seems to be based on a premise that any technical requirements not included in the connection codes 2016/631(RFG), 2016/1388(DCC) or 2016/1447(HVDC) are more stringent, and hence is not permissible. As previously stated minimum technical requirements are detailed within 2009/72/EC and not 714/2009 which defines the criteria for 2016/631(RFG). This is further emphased in the opening whereas section of 2016/431(RFG) where item (2) second sentence states "..... In addition Article 5 of Directive 2009/72/EC of the European Parliament and of the Council (2) requires that Member States or, where Member States have so provided, regulatory authorities ensure, inter alia, that objective technical rules are developed which establish minimum technical design and operational requirements for the connection to the system. ..." . This indicates that 2016/631(RFG) is an addition to any rules set by 2009/72/EC. Moreover it is clear that it was not the indention for the new network codes to remove existing national codes as 714/2009 which defines the requirements for drafting the network codes has in Whereas (7) third sentence "The network codes prepared by the ENTSO for Electricity are not intended to replace the necessary national network codes for non-cross-border issues." Given the above there does not seem to be any justification for the premise that technical requirements not included in the network codes are more severe and should not be allowed.

In summary in GB the current accepted minimum technical standards appear to be the Electricity Safety, Quality and Continuity Regulations 2002, Electricity Transmission Licence, Electricity Distribution Licence, Electricity Interconnector Licence, the Grid and Distribution Codes with additional requirements of the network codes being added as they are enacted. The only issue which may exist is which version of the various documents is currently the approved version. Following the initial submission in 2012 there does not appear to be any clear evidence that the modification process in "Directive 98/34/EC laying down a procedure for the provision of information in the field of technical standards and regulations" has been followed."

Workgroup Alternative Vote

The GC0102 Workgroup met on the 21 November 2017 to assess whether the potential alternative outlined within this Proposal form better facilitated the Grid Code Objectives than the baseline.

The Workgroup voted by majority that this proposal **does not** better facilitate the Grid Code objectives. The Chairman of the Workgroup stated that this potential alternative **did** better facilitate the Grid Code Objectives and as such this is now an official Workgroup Alternative Code Modification that will be submitted to the Authority with the Original solution for their decision.

Difference between this proposal and Original

This proposal will ensure that the GB code changes set out in GC0102 are not more stringent than the requirements set out in the RfG.

Justification for alternative proposal against Grid Code objectives

As per original.

Impact of the modification on the Relevant Objectives:

Relevant Objective	Identified impact
To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity	**Positive**
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)	**Positive**
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	**Positive**
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	**Positive**

To promote efficiency in the implementation and administration of the Grid Code arrangements	**Positive**

In broad term the reasons why this proposal better meet the Applicable Objectives are as per the Original whilst, in addition, ensuring that the proposal is compliant with the Electricity Regulation and the EU Network (connection) Codes as the original proposal; in applying more stringent requirements on connecting generators, demand facilities and HVDC system than permitted by the EU Network (connection) Codes; is incompatible with the Electricity Regulation and the EU Network (connection) Codes.

Furthermore, when compared with the original, this alternative also better facilitates efficiency in the implementation and administration of the Code arrangements as it ensure that the solution to the Original defect is approvable and implementable.

Impacts and Other Considerations

As per the Original.

Consumer Impacts

As per the Original.

Implementation

As per the Original.

Legal Text

Attached in Annex 1

End of Potential Alternative section and forms submitted to the Code Administrator

Grid Code: Workgroup Vote

The GC0102 Workgroup met on the 6 December to cast their Workgroup Vote. Fifteen of the sixteen Workgroup members voted that the Original Proposal was the best option.

Workgroup member	Grid Code Objectives					Overall
	(i)	(ii)	(iii)	(vi)	(v)	
Alan Creighton						
Original	Y	Y	Y	Y	N	Y
WACM1	-	-	-	-	N	N
Voting Statement: There seems to be no tangible difference between the WACM and the original now that the concern re ION, EON and FON has substantially been addressed.						
Alastair Frew						
Original	Neutral	Neutral	Neutral	Yes	Neutral	Yes
WACM1	Neutral	Neutral	Neutral	No	Neutral	No
Voting Statement: The original provides consistent approach to all users and is basically the same as current arrangements.						
Andrew Vaudin						
Original	N	Y	Y	Y	N	Y
WACM1	N	Y	Y	Y	N	Y
Voting Statement:						
Chris Marsland						
Original	Y	Y	Y	Y	Y	Y
WACM1	Y	Y	Y	Y	Y	Y
Voting Statement: When compared to the baseline, either proposal better facilitates the objectives as it implements our legal obligations under the network codes. The original is better than the WACM as it does not complicate the procedure for certain types of low impact generators and burden them with unnecessary paperwork/procedures						
Christopher Smith						
Original	Y	Y	Y	Y	Y	Y
WACM1						
Voting Statement: ION provides a useful mechanism towards compliance.						
David Spillett						
Original	N	N	N	Y	N	Y
WACM1	N	N	N	N	N	N
Voting Statement: WACM1 doesn't really appreciate the baseline and the need for a proportionate and efficient connection process.						
Garth Graham						
Original	Neutral	Yes	Neutral	No	No	No
WACM1	Neutral	Yes	Neutral	No	No	No
Voting statement: "The Original and the WACM are, on the face of it, better in terms of better facilitating competition in the generation and supply of electricity as the EU Network Codes will achieve this.						

Of the two, the WACM1 with the Banding level that better reflects the cross border trade affects and competition aspects for GB generation is 'best' when compared with the Original.
The Original and WACM1 (based on the legal text available prior to the vote on 6th December 2017) are more stringent than what is set out in the relevant legally binding decisions of the European Commission and thus the proposal(s) does not therefore efficiently discharge the obligations imposed upon the licensee.
Furthermore, given that the Original and WACM1 are not better in respect of the relevant legally binding decisions of the European Commission they do not better promote efficiency in the implementation and administration of the Grid Code arrangements.
Accordingly, overall the Original and WACM1 are not better."

Graeme Vincent						
Original	Y	-	Y	Y	-	Y
WACM1	N	-	Y	Y	-	Y
Voting Statement: Both the original and the WACM1 implement the European Regulations therefore are better than the baseline in respect of objectives.						
Gregory Middleton						
Original						
WACM1						
Voting Statement: When compared to the baseline, this proposal better facilitates the objectives as it implements our legal obligations under the network codes. The original is better as it does not cause problems with its application to off-shore installations.						
Isaac Gutierrez						
Original	Y	Y	Y	Y	Y	Y
WACM1	N	N	N	N	N	N
Voting Statement: SPR believes that there is no stringency in adding an ION as part of the compliance process. Although there will be more paperwork required for compliance, the ION will helps to address compliance issues in a systematic manner (based on SPR own experience with transmission connected large/medium Power Park Modules) and could work to the generator benefit under certain circumstances where compliance cannot be met and the TSO gives a reasonable timescale to address the issues (with potential further extensions if demonstrated that good progress towards solving the non-compliance issues has been done).						
Marko Grizelj						
Original	Y	Y	Y	Y	Y	Y
WACM1	Y	Y	Y	Y	Y	Y
Voting Statement: The original and WACM both facilitate the objectives better than the baseline as they ensure compliance with EU regulation.						
Mick Barlow						
Original	Yes	Yes	Yes	Yes	Yes	Y
WACM1	-	-	-	-	-	N
Voting Statement: While I agree in principle that any proposal should not be more stringent, I do not believe the WACM1 particularly enhances that principle.						
Mike Kay						
Original	-	-	-	Y	-	Y
WACM1	N	-	-	-	-	N
Voting Statement: The Alternative does not provide appropriate clarity for the connexion process and by the formality of the process seems to miss out key steps that otherwise would be clearly documented.						
Paul Youngman						

Original	Y	-	Y	Y	-	Y
WACM1	-	-	Y	Y	-	N
Voting Statement: Marginally more certainty and clarity of process in relation to the EU obligations						
Peter Woodcock						
Original	Y	Y	Y	Y	N	Y
WACM1	Y	Y	Y	Y	N	Y
Voting Statement: There are minor differences between the two options, however the original is better as it provides a harmonised connection process which is sensible.						
Rob Wilson						
Original	Y	-	Y	Y	-	Y
WACM1	N	N	N	N	-	N
Voting Statement: The original is better than the baseline as it achieves ENC compliance; while the alternative does achieve compliance this is not efficient as in removing the ION for types B&C it leaves generators with an unclear route to achieve connection which will also not promote competition.						

Vote 2: which option is considered to BEST facilitate achievement of the Applicable Grid Code Objectives. For the avoidance of doubt, this includes the existing baseline as an option.

Workgroup member	BEST Option
Alan Creighton	Original
Alastair Frew	Original
Andrew Vaudin	Original
Chris Marsland	Original
Christopher Smith	Original
David Spillett	Original
Garth Graham	WACM1
Graeme Vincent	Original
Gregory Middleton	Original
Isaac Gutierrez	Original
Marko Grizelj	Original
Mick Barlow	Original
Mike Kay	Original
Paul Youngman	Original
Peter Woodcock	Original
Rob Wilson	Original

4 Impact and Assessment

Impact on the Grid Code

The Grid Code (and the Distribution Code) will bear the primary impact of the EU Connection Code mods. Some consequential changes are anticipated in the STC code especially from HVDC (primarily Section K - Technical, Design and Operational Criteria and Performance Requirements for Offshore Transmission Systems).

Impact on Greenhouse Gas Emissions

Impact on Core Industry Documents

The Transmission/Distributions connections and compliance processes will need to be altered to ensure they accommodate the new EU requirements as set out in the modified Grid Code (and the Distribution Codes).

The electrical standards documents owned by the Transmission Owners will need amending to accommodate the new requirements.

Impact on EU Network Codes

Impact on Consumers

This GC0102 modification facilitates the implementation of consistent technical standards across the EU for the connection of new Generation or HVDC equipment.

Does this modification impact a Significant Code Review (SCR) or other significant industry change projects, if so, how?

The EU Network Code implementation is being undertaken as a significant programme of work within the GB industry. This GC0102 modification forms part of that programme, but is not part of an on-going SCR.

5 Relevant Objectives – Assessment by Proposer

The EU Connection Codes derive from the Third Energy Package legislation which is focused on delivering security of supply, supporting the connection of new renewable plant, and increasing competition to lower end consumer costs. As such they support the first three Grid Code objectives.

In addition, this GC0102 modification seeks to ensure GB compliance with EU legislation in a timely manner, which positively supports the fourth Grid Code applicable objective.

Please note that the Workgroup have assessed the Original solution and WACM1 against the Grid Code objectives as part of the Workgroup Vote which can be found in Section 3.

Impact of the modification on the Grid Code Relevant Objectives:	
Relevant Objective	**Identified impact**
To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity	**Positive**
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)	**Positive**
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	**Positive**
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	**Positive**
To promote efficiency in the implementation and administration of the Grid Code arrangements	**Neutral**

7 Implementation

This GC0102 modification must be in place to ensure the requirements of the EU Connection Codes are formally incorporated into the GB codes two years from the respective Entry Into Force dates (set out earlier in this Consultation).

It is critical that this work is concluded swiftly to allow industry the maximum amount of time to consider what they need to do to secure compliance.

This modification is required to be implemented into the Grid Code on 18th May 2018.

This GC0102 modification will be implemented into the Grid Code ten Business Days after an Authority decision to approve the proposed change.

8. Code Administrator Consultation: how to respond

If you wish to respond to this Code Administrator Consultation, please use the response pro-forma which can be found under the 'Industry Consultation' tab via the following link:

https://www.nationalgrid.com/uk/electricity/codes/grid-code/modifications/eu-connection-codes-gb-implementation-mod-3

Responses are invited to the following questions:

1. Do you believe GC0102 or its alternative solution better facilitates the Applicable Grid Code Objectives? Please include your reasoning.

2. Do you support the proposed implementation approach? If not, please provide reasoning why.

3. Do you have any other comments?

Views are invited on the proposals outlined in this consultation, which should be received by 5pm on 2 February 2018. Please email your formal response to: grid.code@nationalgrid.com

If you wish to submit a confidential response, please note the following, information provided in response to this consultation will be published on National Grid's website unless the response is clearly marked 'Private & Confidential', we will contact you to establish the extent of this confidentiality. A response marked 'Private & Confidential' will be disclosed to the Authority in full by, unless agreed otherwise, will not be shared with the Grid Code Review Panel or the industry and may therefore not influence the debate to the same extent as a non-confidential response.

Please note an automatic confidentiality disclaimer generated by your IT System will not in itself, mean that your response is treated as if it had been marked 'Private & Confidential'

Annex 1 – Grid Code Legal text

The legal text supporting this consultation comprises each of the amended existing sections of the Grid Code plus a new section, the European Compliance Processes (ECP), and an extract of the new European Connection Conditions (ECC) section relating only to the material covered in GC0102. The remainder of the ECC section is covered in GC0100 and GC0101. An alternative version of the ECP section is also provided embodying the alternative to this modification. For information only, the full ECC section and also ‘compare’ versions of each of the amended sections of the Grid Code to the current versions are also provided.

Annex 2 – Terms of Reference

Annex 3 – Workgroup Consultation Reponses

Annex 4 – Solution Doc 1 RfG System Management Requirements

Annex 5 – Solution Doc 2 Additional HVDC System Management Requirements

Annex 6 – Solution Doc 3 Slides from Compliance Workshop

http://www2.nationalgrid.com/UK/Industry-information/Electricity-codes/Grid-code/Modifications/GC0102/

Annex 7 – Mapping for Grid (and Distribution Codes)