

# Stage 01: Modification Proposal

## Grid Code

# GC0102

## Mod Title:

## EU Connection Codes GB Implementation – Mod 3

What stage is this document at?

01	Modification Proposal
02	Workgroup Report
03	Code Admin Consultation
04	Draft Final Modification Report
05	Report to the Authority

### 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

**The Proposer recommends that this modification should be:** assessed by a Workgroup to form the final proposals for the mod and then proceed to Workgroup Consultation.

This modification was raised on **13 June 2017** and will be presented by the Proposer to the Panel on **21 June 2017**. The Panel will consider the Proposer's recommendation and determine the appropriate route.



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



**Low Impact:** None identified

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### Any Questions?

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## Timetable

The Code Administrator will update the timetable.

**The Code Administrator recommends the following timetable: To be discussed and finalised at the June Panel meeting.**

Workgroup Meeting 1	6 July 2017
Workgroup Meeting 2	August 2017
Workgroup Meeting 3	September 2017
Workgroup Consultation (15 Working days)	September 2017
Workgroup Meeting 4	October 2017
Workgroup Report presented to Panel	15 November 2017
Code Administration Consultation Report issued to the Industry	17 November 2017
Draft Final Modification Report presented to Panel	12 December 2017
Modification Panel Recommendation vote	20 December 2017
Final Modification Report issued the Authority	10 January 2018
Authority decision due (25WDs)	14 February 2018
Decision implemented in Grid Code	01 March 2018

## 1 Summary

### ***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 impacted users will need to comply with.

This will be a combination of completely new requirements inserted into the Grid Code, 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 impacted 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.

Given the complexity and wide-ranging impact of the changes proposed in this mod, the proposer believes that self-governance or fast track governance arrangements are not appropriate in this case.

Instead, 'Normal' Grid Code governance processes should be followed.

### 3 Why Change?

This Proposal is one of a number of Proposals which seek to implement relevant provisions of a number of new EU Network Codes/Guidelines which have been introduced in order to enable progress towards a competitive and efficient internal market in electricity.

Some EU Network Guidelines are still in development and these may in due course require a review of solutions developed for Codes that come into force beforehand. The full set of EU network guidelines are;

- Regulation 2015/1222 – Capacity Allocation and Congestion Management (CACM) which entered into force 14 August 2015
- Regulation 2016/1719 – Forward Capacity Allocation (FCA) which entered into force 17 October 2016
- **Regulation 2016/631 - Requirements for Generators (RfG) which entered into force 17 May 2016**
- **Regulation 2016/1388 - Demand Connection Code (DCC) which entered into force 7 September 2016**
- **Regulation 2016/1447 - High Voltage Direct Current (HVDC) which entered into force 28 September 2016**
- Transmission System Operation Guideline (TSOG) - entry into force anticipated Summer 2017
- Emergency and Restoration (E&R) Guideline - entry into force anticipated Autumn 2017

RfG, DCC and HVDC were drafted to facilitate greater connection of renewable generation; improve security of supply; and enhance competition to reduce costs for end consumers, across EU Member States.

These three codes specifically set harmonised technical standards for the connection of new equipment for generators, demand, and HVDC systems (including DC-Connected Power Park Modules respectively).

Significant work to progress GB understanding of the codes and consider the approach for implementation has been undertaken in Grid Code/Distribution Code issue groups **GC0048 (RfG)**; **GC0090 (HVDC)**; **GC0091 (DCC)**.

This has been widely attended, including DNOs and smaller parties. Additional stakeholder engagement has been undertaken to ensure the impacts of the three EU codes is understood, as well as to provide an opportunity to feed into the approach.

The technical requirements involved in Mod 3 will be discussed with the workgroup and the proposals will be finalised before doing a workgroup consultation.

Through proposing these modifications under Open Governance, we will finalise our proposals; and undertake a final industry consultation to confirm they are appropriate, before submitting papers to Ofgem to request a decision.

### ***Technical Skillsets***

- Understanding of the GB regulatory frameworks (particularly Grid Code and Distribution Code)
- High level understanding of the EU codes and their potential impact
- Operational/technical understanding of equipment which are bound by these codes
- Where appropriate, knowledge of the obligations, compliance and operational processes of GB Network Operators and the GB National Electricity Transmission System Operator

### ***Reference Documents***

Demand Connection Code legal text:

<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R1388&from=EN>

Requirements for Generators legal text:

<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0631&from=EN>

High Voltage Direct Current legal text:

<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R1447&qid=1494236788524&from=EN>

Mod 3 of the EU Connection Codes is covering two elements of RfG, HVDC and DCC – System Management and Compliance. Historically, there have been system management requirements and compliance processes defined in the code. If the EU Codes requirements already exist in GB then the existing code requirements will be adopted unless there is a conflict with the EU Code.

The 3 EU Connection Codes have similar requirements for system management and compliance. The approach is to finalise the requirements for RfG first and then the same requirements can be adopted for DCC and HVDC.

### 1. System Management requirements of RfG and HVDC EU Connection Codes

- The existing GB codes cover a majority of the system management requirements that are included in the EU Connection Codes. Mod 3 will be looking at implementing the RfG, DCC and HVDC system management requirements.
- System management includes any interfacing requirements between the TOs and the DNOs that allow managing the transmission system post any events or under normal operational times. These requirements include – Protection Settings, Monitoring, Operational metering, Synchronising, Modelling etc.
- Where the requirements already exist, then the current GB Code requirements will be adopted unless there is a conflict with the EU Code.
- The table below highlights the articles for RfG, DCC and HVDC, where the system management requirements may have to be defined if they don't already exist in GB.

RfG	DCC	HVDC
Article 13(6 - 7)	Article 16 - Protection	Article 24 - Power Quality
Article 14(4)	Article 17 - Control Requirements	Article 28 - Energisation and Synchronisation of HVDC Converter Stations
Article 14(5) (a) - Control schemes	Article 18 - Operational Metering/Data Exchange	Article 29 - Interaction between HVDC Systems or other plants and equipment
Article 14(5)(b/c) - Protection	Article 20 - Power Quality	Article 31 - Subsynchronous torsional interaction damping capability
Article 14(5)(d) - Operational Metering	Article 21 - Simulation Models	Article 32 - Network Characteristics
Article 15(2)(g) - Ancillary Services monitoring (FSM)		Article 33 - HVDC System Robustness
Article 15(3) - Automatic Disconnection		Article 34 - Electrical Protection Schemes and Settings
Article 15(4) - Robustness		Article 35 - Priority Ranking of Protection and Control

Article 15(6) (a) - Pole slipping Protection		Article 36 - Changes to protection and control schemes and settings
Article 15(6)(b)(i) - (iv) - Dynamic System Monitoring, Quality of supply monitoring, fault recording		Article 51 - Operation of HVDC Systems
Article 15(6)(C) - Simulation Models		Article 52 - Parameters and Settings
Article 15(6)(d) - Installation of devices for system operation		Article 53 - Fault Recording and Monitoring
Article 15(6)€ - maximum ramp rate limits		Article 54 - Simulation Models
Article 15(6)(f) - earthing		
Article 16(4) - synchronising		
Article 19(3) - angular stability		
Article 21(3)(f) - power oscillation damping		

## 2. Compliance

- Compliance Process for generators and other transmission connected parties has existed in GB for over 20 years. It's purpose is to ensure that Transmission connected parties satisfy the requirements of the Grid Code along with any requirements in the Bilateral Agreement.
- Mod 3 will be covering the compliance aspect of all 3 Connection Codes – RfG, HVDC and DCC.
- Compliance is split into two parts – the Operational Notification process and the Compliance testing procedures.
- The Connection Codes introduces new compliance processes – equipment certificates which will have to be considered by the workgroup.
- Where the requirements already exist, then the current GB Code requirements will be adopted unless there is a conflict with the EU Code.
- The current position on the Compliance requirements is –
  - Majority of the Notification procedures across RfG, DCC and HVDC are similar to existing GB requirements. Where there is a new requirement, the process will have to be defined. Once RfG Compliance processes have been defined, similar requirements in DCC and HVDC will mirror the RfG processes.
  - The current position on RfG compliance testing is as below –
    - Type D Generators – As per current GB practice
    - Type C & B Generators – Will require compliance testing along with some compliance through equipment certificates acceptable
    - Type A Generators (mass market) – Compliance mainly through equipment certificates.



- The table below highlights the articles for RfG, DCC and HVDC, where the system management requirements may have to be defined if they don't already exist in GB.

DCC		HVDC		RfG	
Article 22	General Provisions	Article 55	General provisions	Article 29	General provisions
Article 23	Energisation Operational Notification	Article 56	EON for HVDC systems	Article 30	Operational notification of type A power-generating modules
Article 24	Interim Operational Notification	Article 57	ION for HVDC systems	Article 31	Operational notification of type B, C and D power-generating modules
Article 25	Final Operational Notification	Article 58	FON for HVDC systems	Article 32	Procedure for type B and C power-generating modules
Article 26	Limited Operational Notification	Article 59	Limited operational notification for HVDC systems/derogations	Article 33	Procedure for type D power-generating modules
Article 31	General Provisions	Article 60	General provisions	Article 34	Energisation operational notification for type D power-generating modules
Article 32	Procedures for demand units within a demand facility or a closed distribution system connected at a voltage level of or below 1 000 V	Article 61	EON for DC-connected power park modules	Article 35	Interim operational notification for type D power-generating modules
Article 33	Procedures for demand units within a demand facility or a closed distribution system connected at a voltage level above 1 000 V	Article 62	ION for DC-connected power park modules	Article 36	Final operational notification for type D power-generating modules
Article 34	Responsibility of the demand facility owner, the distribution system operator and the closed distribution system operator	Article 63	FON for DC-connected power park modules	Article 37	Limited operational notification for type D power-generating modules
Article 35	Tasks of the relevant system operator	Article 64	Limited operational notification for DC-connected power park modules	Article 40	Responsibility of the power-generating facility owner
Chapter 2	Compliance Testing	Article 67	Common provisions for compliance testing	Article 41	Tasks of the relevant system operator
Article 36	Common provisions for compliance testing	Article 68	Common provisions on compliance simulation	Article 42	Common provisions for compliance testing

Article 37	Compliance testing for disconnection and reconnection of transmission-connected distribution facilities	Article 69	Responsibility of the HVDC system owner and DC-connected power park module owner	Article 43	Common provisions on compliance simulation
Article 38	Compliance testing for information exchange of transmission-connected distribution facilities	Article 70	Tasks of the relevant system operator	Article 44	Compliance tests for type B synchronous power-generating modules
Article 39	Compliance testing for disconnection and reconnection of transmission-connected demand facilities	Article 71	Compliance testing for HVDC systems	Article 45	Compliance tests for type C synchronous power-generating modules
Article 40	Compliance testing for information exchange of transmission-connected demand facilities	Article 72	Compliance testing for DC-connected power park modules and remote-end HVDC converter units	Article 46	Compliance tests for type D synchronous power-generating modules
Article 41	Compliance testing for demand units with demand response active power control, reactive power control and transmission constraint management	Chapter 3	Compliance Simulations	Article 47	Compliance tests for type B power park modules
Chapter 3	Compliance Simulation	Article 73	Compliance simulations for HVDC systems	Article 48	Compliance tests for type C power park modules
Article 42	Common provisions on compliance simulations	Article 74	Compliance simulations for DC-connected power park modules and remote-end HVDC converter units	Article 49	Compliance tests for type D power park modules
Article 43	Compliance simulations for transmission-connected distribution facilities			Article 50	Compliance tests for offshore power park modules
Article 44	Compliance simulations for transmission-connected demand facilities			Article 51	Compliance simulations for type B synchronous power-generating modules
Article 45	Compliance simulations for demand units with demand response very fast active power control			Article 52	Compliance simulations for type C synchronous power-generating modules
Article 46	Compliance monitoring for transmission-connected distribution facilities			Article 53	Compliance simulations for type D synchronous power-generating modules
Article 47	Compliance monitoring for transmission-connected demand facilities			Article 54	Compliance simulations for type B power park modules

				Article 55	Compliance simulations for type C power park modules
				Article 56	Compliance simulations for type D power park modules
				Article 57	Compliance simulations applicable to offshore power park modules

- i. *The Grid Code and 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)*
- ii. *The Transmission/Distributions connections and compliance processes will need to be slightly altered to ensure they accommodate the new EU requirements as set out in the modified Grid Code and Distribution Codes.*
- iii. *The electrical standards documents owned by the Transmission Owners may need amending to accommodate the new requirements*
- iv. *No system changes are anticipated as a result of implementing the EU Connection Codes*

***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 mod forms part of that programme, but is not part of an on-going SCR.

***Consumer Impacts***

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

## 7 Relevant Objectives

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	Neutral

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. It therefore directly supports the first three Grid Code objectives.

Furthermore, this modification is to ensure GB compliance of EU legislation in a timely manner, which positively supports the fourth Grid Code applicable objective.

## 8 Implementation

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

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

Not yet agreed

## 10 Recommendations

Panel is asked to:

- Approval 'normal' code governance procedures be used
- Refer this proposal to a Workgroup for continuing the formation of proposals