

# Stage 01: Modification Proposal

## Grid Code

# GC103

**Mod Title:** The introduction of harmonised Applicable Electrical Standards in GB to ensure compliance with the EU Connection Codes

### Purpose of Modification:

This modification will set out within the Grid Code the compliance obligations in the EU Connection Codes as they relate to Electrical Standards

**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 **21 July 2017** and will be presented by the Proposer to the Panel on **27 July 2017**. The Panel will consider the Proposer's recommendation and determine the appropriate route.



**High Impact:** None



**Medium Impact:** Transmission Owners (including OFTOs and Interconnectors), Distribution Network Operators, Transmission System Users System Operator and Generators



**Low Impact:** None

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

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### Any Questions?

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## Timetable

The Code Administrator recommends the following timetable:

Workgroup Meeting 1	dd month year
Workgroup Meeting 2	dd month year
Workgroup Meeting 3	dd month year
Workgroup Report presented to Panel	dd month year
Code Administration Consultation Report issued to the Industry	dd month year
Draft Final Modification Report presented to Panel	dd month year
Modification Panel decision	dd month year
Final Modification Report issued the Authority	dd month year
Decision implemented in Grid Code	dd month year

### ***What***

The Grid Code will need to be amended 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 / removal of corresponding existing GB requirements to line up with, and not be more stringent than, the requirements in the new EU Network Codes/ Guidelines.

### ***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, testing and operational requirements. This modification is also therefore, critical to facilitate/demonstrate Member State compliance to these three EU Connection Network Codes (RfG, DCC and HVDC).

### ***How***

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

## 2 Governance

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

We believe that Urgency is required for this proposal and we set out the reasons for this below.

### **Reason for Urgency**

SSE Generation Ltd., having taken account of the Ofgem urgency criteria<sup>1</sup>, believes the issues we have set out in this Grid Code Modification proposal GC0103 to be linked to an **imminent issue**, which is date related, that if not urgently addressed may cause (i) a **significant commercial impact** on parties, consumers and other stakeholder(s); and (ii) a party to be in breach of relevant **legal requirements**.

### **Imminent Issue**

The European Network Codes, as they relate to connections<sup>2</sup>, need to be implemented into the (national) industry codes and, in particular, in this case the (GB) Grid Code (and Distribution Code as regards distribution connection). The first of the three connection Network Codes, namely the RfG, was published on 14<sup>th</sup> April 2016 and entered into (legal) force twenty days later and is already applicable, with certain obligations linked to two years after entry into force (i.e. May 2018). We believe that our proposal GC0103 will; if it follows the normal Grid Code Modification timescales; not be submitted to the Authority for approval (or be implemented, if approved) within the time required by the RfG.

As we set out in our proposal GC0103 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, testing and operational requirements. This modification is also therefore, critical to facilitate/demonstrate Member State compliance to these three EU Connection Network Codes (RfG, DCC and HVDC).

Without the solution we set out in our proposal GC0103 this means that 'New' connecting parties (as defined in the RfG, the DCC and HVDC codes) when connecting to the GB electrical system will erroneously be asked to comply with the one of the various existing Electrical Standards in GB which (i) were not drafted in the context of the RfG (plus DCC and HVDC); (ii) are not harmonised within GB and therefore do not support the intention of RfG (plus DCC and HVDC); (iii) are more stringent than the requirements imposed by the RfG (plus DCC and HVDC); and (iv) do not facilitate a level playing field between new connecting parties in GB

### **Legal Requirements**

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<sup>1</sup> [https://www.ofgem.gov.uk/system/files/docs/2016/02/urgency\\_criteria.pdf](https://www.ofgem.gov.uk/system/files/docs/2016/02/urgency_criteria.pdf)

<sup>2</sup> RfG, DCC and HVDC.

This we believe could, if not corrected via our proposal GC103 result in National Grid being in breach of a number of relevant legal requirements including, in particular, the RfG, DCC and HVDC Network Codes which, in turn, also means they may breach a number of relevant legal requirements as well such as the (national) Acts (requiring compliance with the law) and their Transmission Licence (which, likewise, requires compliance with the law).

In addition, we believe that the TSO, if it applied more stringent requirements on new connecting parties would also be in breach of Regulation 714/2009, in terms of Article 8(7)<sup>3</sup>, as regards the affect on cross border trade.

Furthermore, we are concerned to ensure that the TSO is not placed in a position of possibly breaching Competition Law, and in particular Article 102 of the TFEU<sup>4</sup>.

This is because in applying more stringent requirements than permitted by RfG (or indeed DCC in terms of demand side response providers or HVDC) on new transmission connected parties this results, demonstrably, in greater upfront costs (and ongoing financing costs) being placed on those parties (to meet these more stringent requirements) as well as the ongoing operational & maintenance costs for maintain this requirement into the future.

These additional costs, in turn, would have to be reflected in the prices those parties; such as generators and demand side response; bid into in the Capacity Mechanism auctions.

Thus those parties could (would?) be placed at a financial disadvantage compared to interconnectors assets (in which National Grid often has a 50% stake) competing in that same auction. This, it may be argued, could amount to an 'abuse of a dominant position'<sup>5</sup> on the part of National Grid (in contravention of competition law).

On top of this, there is also a potential competition law aspect in terms of the ongoing use of the interconnector assets (in which National Grid has a substantial financial interest).

GB parties, such as generators and demand side response, newly connecting to the system that have to meet the more stringent requirements (than those required by the RfG / DCC / HVDC codes) arising from the existing electrical standards will (as noted above) have to reflect the higher costs of doing so in their market prices. This, in turn, affects the price differential between GB based assets and imported electricity. The part that the price differential(s) between the GB market and, for example, those in France and Holland play in terms of flows over, and thus

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<sup>3</sup> "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."

<sup>4</sup> Further information can be found at paragraph 2.21 of Ofgem's Enforcement Guidelines [https://www.ofgem.gov.uk/system/files/docs/2016/12/enforcement\\_guidelines.pdf](https://www.ofgem.gov.uk/system/files/docs/2016/12/enforcement_guidelines.pdf)

<sup>5</sup> Further information on this can be found on this by reference to the European Commission's factsheet - [http://ec.europa.eu/competition/publications/factsheets/antitrust\\_procedures\\_102\\_en.pdf](http://ec.europa.eu/competition/publications/factsheets/antitrust_procedures_102_en.pdf) See, for example, the statement on page 1 of the factsheet about 'What is an Abuse' "*To be in a dominant position is not in itself illegal. A dominant company is entitled to compete on the merits as any other company. However, a dominant company has a special responsibility to ensure that its conduct does not distort competition*".

revenue received (and profits obtained) by, the interconnectors was highlighted by the National Grid in oral submissions to the House of Commons Energy & Climate Change Select Committee on 24th November 2015<sup>6</sup> as well being reflected in what National Grid said in their announcement<sup>7</sup> of their 2015/16 results, such as: “*The Group’s Other activities contributed £183m more to operating profit than last year on a constant currency basis, led by increased revenues in the French Interconnector business due to higher price arbitrage between the UK and mainland Europe”<sup>8</sup> [emphasis added]. A similar statement was made, in the same National Grid announcement, in respect of the interconnector to Holland, “*National Grid’s share of post-tax results of joint ventures for the year was £59m, an increase of £13m compared with 2014/15. This reflected a significant increase in the contribution from the BritNed Interconnector reflecting increased power price differentials between the Netherlands and the UK”<sup>9</sup> [emphasis added].**

### **Significant Commercial Impact**

We believe that in addition to the legal aspects noted above that there are significant commercial impacts on parties; namely (1) new connecting parties and (2) the TSO; if our proposal GC0103 is not treated as urgent.

In terms of new connecting parties; such as generation and demand side response; requiring them to meet more stringent electrical standards than permitted by the EU Network Codes will increase the costs those parties have to bid into the Capacity Mechanism auction which, if they are priced out of that auction, will have a significant commercial impact on those parties.

In addition, if the actions of the TSO are found to have breached any (or all) of the legal requirements noted above, it would seem likely that those parties could (would?) seek financial redress directly from the TSO (as the breaching party) which will have a significant commercial impact on the TSO as it appears difficult to see how this financial redress could be considered as a ‘reasonable’ cost in the context of Article 9 (Cost Recovery) in the connection EU Network Codes.

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<sup>6</sup> <https://www.parliament.uk/business/committees/committees-a-z/commons-select/energy-and-climate-changecommittee/inquiries/parliament-2015/security-of-supply/publications/>

<sup>7</sup> [http://investors.nationalgrid.com/~/\\_media/Files/N/National-Grid-IR/results-centre/full-year-results-statement-2015-16.pdf](http://investors.nationalgrid.com/~/_media/Files/N/National-Grid-IR/results-centre/full-year-results-statement-2015-16.pdf)

<sup>8</sup> Page 12, National Grid Results for the year ending 31<sup>st</sup> March 2016.

<sup>9</sup> Page 37, National Grid Results for the year ending 31<sup>st</sup> March 2016

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

The RfG, DCC and HVDC EU Network Codes 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 these codes and consider the approach for implementation has been undertaken in Grid Code/Distribution Code issue groups GC0048 (RfG); GC0090 (HVDC); GC0091 (DCC).

However, this 'pre-work' has not considered aspects relating to the electrical standards; although this matter was examined in GC0094 (which was raised on 16<sup>th</sup> May 2016). This proposal GC0103 builds upon GC0094.

The electrical standards contain the technical specifications, policies and procedures that must be complied with by all Users connected to or seeking connection to the electrical system.

Information on the current electrical standards can be found at:

These standards seek to maintain an appropriate level of reliability and security for the transmission system. Users are required to meet these requirements for their equipment directly connecting to the electrical system.

Currently these standards are 'owned' by the Transmission Owners – National Grid for England & Wales and SHE Transmission and SP Transmission for Scotland.

Similar standards are 'owned' by the Distribution Network Operators in GB which Users currently have to comply with if they wish to connect to the distribution system.

In England and Wales the electrical standards 'owned' by National Grid have been combined into a single Relevant Electrical Standards document. Extensive work was carried out prior to GC0094 being raised to make sure that that documentation was up to date and that all changes have been appropriately reflected to industry following the change control process established under GCRP. The Scottish Transmission Owners also sought to update their standards and SHE Transmission produced an interface document setting out their general adoption of the RES with documented exceptions.

These differences and inconsistencies in the current electrical standards within GB cause difficulty for Users as it takes time and effort to check connection designs against each (different) set. In addition, costs may vary based on these differences which can hinder investment decisions. Users also feel that there is a lack of transparency in the justification for the regional variations and the governance of the change process is inefficient.

In the context of GC0094, industry raised an issue regarding the regional differences in the electrical standards and inconsistency in how they apply to the Users at their connection points, and industry advocated having a single set of GB standards wherever possible allowing for specific regional differences.

These items, when combined with the implementation of the three EU Network Codes that relate to connection to the electrical system for generation (RfG) demand (DCC) and HVDC (HVDC) assets, means that there is now a need for a single harmonised GB electrical standards to ensure that the obligations within those EU Network Codes are met.

Given that the obligations in these EU Network Codes apply to 'New' Users (as defined in the respective EU Network Codes) only and not to 'Exiting' Users (unless a substantial modification to the Connection Agreement arises in their particular case); and in order to avoid confusion; it is proposed that the single harmonised GB electrical standards introduced by this proposal GC0103 would be known as the '*Applicable Electrical Standards*' and would not be more stringent than the requirements in the EU Network Codes/ Guidelines.

Furthermore, applying the current electrical standards to 'New' Users would, if more stringent than the requirements in the EU Network Codes/ Guidelines, be incompatible with EU law.

For the avoidance of doubt, the existing '*Relevant Electrical Standards*' together with (for example) the Scottish and distribution equivalents etc., would remain applicable to 'Existing' Users (only).

However, if an 'Existing' User substantially modified their installation / connection agreement and came under the EU Network Codes/ Guidelines then they too would become obligated to comply with the '*Applicable Electrical Standards*' only (and not the '*Relevant Electrical Standards*' etc.,) from the appropriate date in their specific case.

### **Technical Skillsets**

- Understanding of the GB regulatory frameworks (particularly Grid Code and Distribution Code)
- High level understanding of the EU Network Codes/ Guidelines and their potential impact
- Operational/technical understanding of equipment which are bound by these codes
- Where appropriate, knowledge of the obligations 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>

GB Electrical Standards:

<http://www2.nationalgrid.com/UK/Industry-information/Electricity-codes/Grid-code/Electrical-Standards-Documents/>

## 5 Solution

Through previous discussions at the GCRP and at the April 2016 GCDF it has been highlighted that there are several ways in which this issue can be resolved, including:

Below are the options outlined previously to resolve this issue:

- The Scottish TOs adopt the England & Wales standards (the RES) and create interface documents detailing any remaining differences. While a viable solution this does require work to keep up to date.
- Create a core set of standards for the Transmission System. This potentially leads to an inconsistency of application at 132kV.
- Undertake a wider review of the Transmission and Distribution standards together to create a core set of standards. Variations to the standards will be subject to justification. This potentially solves the current issues and any future issues which may arise.

Having considered these potential options; as well as (i) taking account of the requirements arising from the GB implementation of the EU Network Codes/ Guidelines, (ii) the need not to apply more stringent obligations on 'New' Users than the requirements in the EU Network Codes/ Guidelines, and (iii) the discussions held at the GCDF and with the ENA; it is proposed with this Proposal GC0103 that a joint GCRP/DCRP Workgroup be set-up to review the current electrical standards and the potential solutions with a view to creating a single harmonised set of electrical standards, to be known as the '*Applicable Electrical Standards*', to be applied to all 'New' connections to the GB electrical system depending on whether they are generation, demand or HVDC (based on the scopes of application set out in the EU Network Codes/ Guidelines, which is explored further below, using a generation example).

These '*Applicable Electrical Standards*' would be incorporated into the Grid Code and any subsequent changes to them would, for the avoidance of doubt, be subject to public consultation and NRA (Ofgem) approval.

Following the creation of the '*Applicable Electrical Standards*' the Grid Code and the Distribution Code would need to be amended appropriately to achieve consistent application across the Transmission and the Distribution systems.

Using the context of generation as an example; at the 6<sup>th</sup> July 2017 GC0100 Workgroup discussion the Proposer (National Grid) provided a summary table of the RfG technical requirements (see below) as they apply to 'New' connecting generation.

As can be seen, the technical requirements are incremental; building up from Type A to Type B then Type C and finally Type D. Similarly, depending on further Workgroup deliberation, it is possible (probable?) that the '*Applicable Electrical Standards*' will likewise be incremental in the context of generation. For example, it would seem that there would be no need for the Type A related '*Applicable*

*Electrical Standards'* to address Fault Ride Through matters; although this would be required for a Type B (plus C and D) generator.

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 LFMS-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				•

## 6 Impacts and Other Considerations

*i. The Grid Code and Distribution Code will bear the primary impact of the EU Connection Code modifications. 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. In particular, Appendix F of*

*the BCA for new generator's will need to be modified to ensure requirements there do not exceed those required within the RfG.*

*iii. 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 Codes/ Guidelines implementation is being undertaken as a substantial programme of work within the GB industry. However, this modification does not impact on any 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
<p><b>To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity</b></p> <p>The proposed solution will allow the System Operator / Distribution Network Operators to efficiently apply the EU Network Code/ Guidelines requirements to the Users of the system through the National Industry Codes.</p>	<p><b>Positive</b></p>
<p><b>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)</b></p> <p>The proposed solution will assist the Users of the Transmission and the Distribution system during the connection process.</p> <p>A single harmonised set of electrical standards will also help enable competition in the construction of connection assets as, at the moment, it is not clear what standard CATO's should use.</p> <p>A common set of standards will also provide a level playing field between generators in different parts of GB compared to the current situation in which a generator in, say, Carlisle has different connection requirements and standards to one in, say, Glasgow and yet another set for one located in, say, Inverness.</p>	<p><b>Positive</b></p>
<p><b>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</b></p> <p>The creation of a harmonised set of standards would ensure that changes to standards are managed in a controlled, open and transparent manner and ensure that where a clear action to improve a standard is discovered, it can be applied across the country at the same time.</p>	<p><b>Positive</b></p>
<p><b>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</b></p> <p>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.</p> <p>This proposal ensures that harmonised rules for grid connection for</p>	<p><b>Positive</b></p>

power-generating modules, demand and HVDC assets are 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.

Furthermore, this modification ensures GB compliance with EU legislation in a timely manner and does so in a way that is not more stringent than EU law permits.

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

**Positive**

Applying harmonised rules for grid connection for power-generating modules, demand and HVDC assets reduces the administrative costs and burden for Users (in being able to seek connection on the basis of a uniform approach) and the System Operator (when assessing compliance) in the administration of the Grid Code arrangements

## 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.

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.

## 9 Legal Text

Not yet agreed.

## 10 Recommendations

Panel is asked to:

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