

Modification proposal:	Grid Code GC0142: Adding Non-Standard Voltages to the Grid Code (GC0142)		
Decision:	The Authority ¹ directs ² that the proposed modification to the Grid Code be made		
Target audience:	National Grid Electricity System Operator (NGESO), the Grid Code Review Panel, Grid Code users and other interested parties		
Date of publication:	10 December 2020	Implementation date:	24 December 2020

Background

The Grid Code details the technical requirements for connecting to and using the National Electricity Transmission System (NETS). It currently references the specification and performance requirements for adding equipment of explicit nominal voltages 400kV, 275kV and 132kV, to the NETS. The specification and performance requirements for adding equipment of other nominal voltages are not defined in the Grid Code. It is possible that equipment of other nominal voltages (e.g. 380kV, 220kV, 110kV) could be connected to the NETS in the near future.

There are currently two 220kV assets on the NETS, two 220kV subsea cables at the Kintyre-Hunterston link connecting to the Onshore Transmission System via two 400/220kV supergrid transformers at Hunterston (Scottish Power Transmission) and via two 220/132kV transformers at Crossaig (Scottish Hydro Electric Transmission), on the Kintyre peninsula). There are currently no user impacts of this as no user equipment is connected at 220kV.

The modification proposal

The modification proposal seeks to remove references to specific nominal voltages (400kV, 275kV and 132kV) and replace them with voltage ranges to ensure that the

¹ References to the "Authority", "Ofgem", "we" and "our" are used interchangeably in this document. The Authority refers to GEMA, the Gas and Electricity Markets Authority. The Office of Gas and Electricity Markets (Ofgem) supports GEMA in its day to day work. This decision is made by or on behalf of GEMA.

² This document is notice of the reasons for this decision as required by section 49A of the Electricity Act 1989.

specification and performance requirements for connecting equipment at all nominal voltages are captured. It is proposed alongside a National Electricity Transmission System Security and Quality of Supply Standards (NETS SQSS) modification, GSR026³, which seeks to ensure that requirements for operating equipment at all possible nominal voltages are captured in the SQSS. Both modifications enable consistency between the Grid Code and SQSS, and are better aligned with the approach followed in European Connection Network Codes⁴.

We note that GC0142 was submitted to us on 21 September 2020. On 15 October 2020, we published our decision⁵ to send the modification back to the Grid Code Review Panel ("GCRP") for further work as we identified a number of instances where references to specific nominal voltages remain in the Grid Code. Subsequently, GC0142 was amended by the proposer, NGENSO, and re-submitted to us for approval on 19 November 2020.

GC0142 proposes to make changes to the connection conditions in the European Connection Conditions ("ECC") section of the Grid Code, so as not to cause confusion with existing users whose requirements are set out in the Connection Conditions section of the Grid Code. It also proposes to make changes to sections of the Planning Code ("PC"), Operating Code ("OC") and Data Registration Code ("DRC") sections of the Grid Code. It proposes to replace references to specific nominal voltages (400kV, 275kV and 132kV) and replace them with applicable voltage ranges. The specific changes proposed can be found in Annex 2 of the GC0142 Final Modification Report⁶.

Whilst GC0142 proposes to replace references to explicit voltages with voltage ranges, it aims to retain the principles of the current Grid Code and so does not modify the applicable voltage range. This was made evident in the Code Administrator Consultation where one respondent noted that the voltage range applicable to ECC.6.2.2.2 and ECC.6.2.3.1.1 differs from other changes proposed, e.g. ECC.6.1.4.1. When asked to clarify the rationale for the difference, NGENSO explained that ECC.6.1.4.1 at present

³ Our decision on SQSS modification proposal GSR026 can be found on our website: <https://www.ofgem.gov.uk/publications-and-updates/gsr026>

⁴ The European Connection Network Codes were introduced as part of the European Third Energy Package. More information on the European Third Energy Package can be found on our website: <https://www.ofgem.gov.uk/electricity/transmission-networks/european-wide-initiatives/eu-legislation>

⁵ Ofgem decision send back GC0142: <https://www.ofgem.gov.uk/ofgem-publications/167041>

⁶ The Final Modification Report for GC0142 can be found on NGENSOs website: <https://www.nationalgrideso.com/industry-information/codes/grid-code-old/modifications/gc0142-adding-non-standard-voltages-grid>

specifies limits in grid voltage variations at 400kV, 275kV, 132kV, 110kV and below 110kV, the 110kV limit being defined as a result of the need to comply with the European Connection Network Codes. The requirements for 275kV, 132kV and 110kV are identical and therefore grouped together in proposed changes. The references in ECC.6.2.2.2.2 and ECC.6.2.3.1.1 are generally at present only to 400kV and 275kV so the change proposed in each case as part of GC0142 is to 'greater than 132kV' to avoid including equipment at non-transmission voltages because different protection requirements or standards may be applicable at sub-transmission levels (where references to 132kV are present proposed changes are to '132kV and below').

NGESO also note that changes proposed to Table ECC.6.7.1(b) retain a voltage gap from 33kV to 66kV as this was present in the Grid Code in its current form. Addressing the issue was out of the scope of GC0142 and is being investigated by the Distribution Code Review Panel Engineering Recommendation P24 Working Group⁷.

GC0142 also recommends changes to a number of Electrical Standards listed in the Annex to the General Conditions of the Grid Code, which have been highlighted to the relevant TOs, who are responsible for the standards, for review. The Electrical Standards highlighted for review are:

- in England and Wales; Current Transformers for Protection and General Use on the 132kV, 275kV and 400kV Systems.
- in Scottish Hydro-Electric Transmission Ltd.'s Transmission System;
 - NGTS 3.2.3: Metal-Oxide surge arresters for use on 132, 275 and 400kV systems. Issue 2 May 1994.
 - NGTS 3.2.4: Current Transformers for protection and General use on the 132, 275 and 400kV systems. Issue 1 September 1992.
 - NGTS 3.2.5: Voltage Transformers for use on the 132, 275 and 400 kV systems. Issue 2 March 1994.
 - NGTS 3.2.6: Current and Voltage Measurement Transformers for Settlement Metering of 33, 66, 132, 275 and 400kV systems. Issue 1 September 1992.

⁷ Information on the Distribution Code Review Panel Engineering Recommendation P24 Working Group can be found here: <http://www.dcode.org.uk/dcrp-er-p24-working-group.html>

Grid Code Review Panel recommendation

The Grid Code Review Panel (“GCRP”) issued a Code Administrator Consultation on 13 July 2020 receiving 3 responses all in favour of GC0142. One respondent commented on differences in voltage ranges relevant to different Grid Code clauses, noted above. They also requested clarity on whether or not the non-standard voltages (i.e. other than 400kV, 275kV and 132kV) would eventually be included in Technical Guidance Note Electricity (“TGN(E)”) 288⁸ as this may increase costs for offshore windfarm connecting through an HVDC link or any other project where TGN(E) applies. NGEN state they recognise the potential impacts of including non-standard voltages to TGN(E) or other Electrical Standards, however noted this was out of the scope of GC0142.

The GCRP met on 27 August 2020 and agreed that a number of changes to the proposed legal text proposed by the consultation respondent above were typographical (they have been included in the proposed legal text where appropriate) and proceeded to a recommendation vote. The GCRP unanimously voted that GC0142 should be implemented. Following our decision on 15 October 2020 to send the modification back to the GCRP for further work, the proposer amended the legal text of GC0142 to include further changes. This was presented at the GCRP Special Panel meeting on 16 November 2020, and the GCRP considered the changes to be minor and not require further industry consultation. On 16 November 2020 the GCRP unanimously voted to recommend that GC0142 should be implemented, and considered GC0142 to better facilitates the Grid Code objectives.

Our decision

We have considered the issues raised by the modification proposal and in the Final Modification Report dated 19 November 2020. We have considered and taken into account the responses to the industry consultation on the modification proposal which are included in the Final Report⁹. We have concluded that:

⁸ TGN(E) 288 can be viewed on NGEN website here:

https://www.nationalgrid.com/sites/default/files/documents/TGN%28E%29_288_0.pdf

⁹ Grid Code proposals, final reports and representations can be viewed on NGEN’s website at:

<https://www.nationalgrideso.com/industry-information/codes/grid-code/modifications>

- implementation of the modification proposal will better facilitate the achievement of the objectives of the Grid Code;¹⁰ and
- approving the modification is consistent with our principal objective and statutory duties.¹¹

Reasons for our decision

We consider this modification proposal will better facilitate Grid Code objectives (i), (ii), (iii), (iv) and (v).

(i) to permit the development, maintenance and operation of an efficient, co-ordinated and economical system for the transmission of electricity

GC0142 ensures that current and future nominal voltage levels within the NETS have clear equipment specification and performance requirements. Currently all High Voltage equipment connected to the NETS are at 400kV, 275kV or 132kV, with the exception of two 220kV assets. 220kV is a common EU transmission voltage. It is possible that this, along with equipment of other common voltages (e.g. 380kV, 110kV) could be connected to the GB system in the near future. The modification proposal ensures that equipment connected at any such nominal voltage has applicable specification and performance requirements, and therefore better facilitates this Grid Code objective.

(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)

The Grid Code currently only specifies the performance requirements for equipment connecting to the NETS at 132kV, 275kV and 400kV. GC0142 specifies the performance requirements for equipment connecting to the NETS at voltages other than 400kV, 275kV and 132kV. It therefore clarifies the connection requirements for a wider range of

¹⁰ As set out in Standard Condition C14(1)(b) of the Electricity Transmission Licence, available at: <https://epr.ofgem.gov.uk/>

¹¹ The Authority's statutory duties are wider than matters which the Grid Code Panel Review must take into consideration and are detailed mainly in the Electricity Act 1989 as amended.

equipment, promoting competition, and therefore better facilitates this Grid Code objective.

(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

The Grid Code currently only specifies the performance requirements for equipment connecting to the NETS at 132kV, 275kV and 400kV. GC0142 specifies the performance requirements for equipment connecting to the NETS at voltages other than 400kV, 275kV and 132kV. It therefore clarifies the connection requirements for a wider range of equipment, promoting security, and therefore better facilitates this Grid Code objective.

(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.

Three European Connection Network Codes are part of a suite of European Regulations developed following implementation of the European Third Energy Package: The Requirement for Generators¹², Demand Connection Code¹³ and High Voltage Direct Current code¹⁴. The codes include requirements for connecting at nominal voltages within a voltage range (e.g. from 300kV to 400kV), and at nominal voltages not covered by the Grid Code (e.g. 110kV). The modification proposal ensures that equipment connected at any nominal voltage has applicable specification and performance requirements, and therefore is better aligned with the European Connection Network Codes. The modification therefore better facilitates this Grid Code objective.

¹² Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a network code on requirements for grid connection of generators (referred to as the Requirement for Generators); https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:JOL_2016_112_R_0001

¹³ Commission Regulation (EU) 2016/1388 establishing a network code on demand connection; https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2016.223.01.0010.01.ENG&toc=OJ:L:2016:223:TOC

¹⁴ Commission Regulation (EU) 2016/1447 of 26 August 2016 establishing a network code on requirements for grid connection of high voltage direct current systems and direct current-connected power park modules (referred to as the HVDC); <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32016R1447>

(v) to promote efficiency in the implementation and administration of the Grid Code arrangements

The Grid Code currently only specifies the performance requirements for equipment connecting to the NETS at 132kV, 275kV and 400kV. GC0142 specifies the performance requirements for equipment connecting to the NETS at voltages other than 400kV, 275kV and 132kV. It therefore ensures that the performance requirements for connecting equipment to the NETS at all nominal voltages are specified, thereby better facilitating this Grid Code objective.

Decision notice

In accordance with Standard Condition C14 of the Transmission Licence, the Authority hereby directs that Grid Code modification proposal Grid Code GC0142 'Adding Non-Standard Voltages to the Grid Code' be made.

Peter Bingham

Chief Engineer

Signed on behalf of the Authority and authorised for that purpose