Modification proposal:	**GSR026: Adding Non-Standard Voltages to the SQSS (GSR026)**		
Decision:	The Authority[1] approves[2] the proposed changes to the National Electricity Transmission System Security and Quality of Supply Standards (NETS SQSS)		
Target audience:	National Grid Electricity Transmission PLC, transmission licensees and other interested parties		
Date of publication:	10 December 2020	Implementation date:	1 April 2021

Background

The SQSS sets out the criteria and methodology for planning and operating the National Electricity Transmission System (NETS). It currently specifies the requirements for operating equipment at 400kV, 275kV and 132kV. Requirements for operating equipment at other nominal voltages are not defined in the SQSS. It is possible that equipment at other nominal voltages (e.g. 380kV, 220kV, 110kV) could be connected to the NETS in the near future.

On 1 July 2016, we issued our decision to reject modification proposal GSR021 'Operational and Planning Criteria for 220kV Transmission Assets'[3]. This was due to inconsistent methods for updating SQSS Chapters 6 and 10, and concern that the modification addressed only one discrete voltage (220kV) whilst equipment may be installed on the NETS at different discrete voltages.

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.

[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.
[3] Ofgem decision letter for GSR021: https://www.ofgem.gov.uk/system/files/docs/2016/07/authority_decision_letter_gsr021.pdf

The modification proposal

GSR026 is proposed by the Electricity System Operator (ESO) and seeks to remove references to specific nominal voltages and replace them with voltage ranges to ensure that all future possibilities are captured, and there is better alignment with the approach followed in European Connection Network Codes[4]. It is proposed alongside a Grid Code modification, GC0142[5], which seeks to ensure that the specification and performance requirements for connecting equipment at all possible nominal voltages are captured in the Grid Code. GSR026 proposes:

- To change the definition of 'Supergrid' such that it refers to parts of the NETS operated at a nominal voltage of 200kV, as in the Grid Code, form the current 275kV. This aligns the definition with the definition of 'Supergrid' in the Grid Code.
- To replace the nominal voltages explicitly referenced with nominal voltage ranges in four tables: Table 6.1 *Pre-Fault Steady State Voltage Limits and Requirements in Planning Timescales*, Table 6.2 *Steady State Voltage Limits and Requirements in Planning Timescales*, Table 6.3 *Pre-Fault Steady State Voltage Limits and Targets in Operational Timescales*, and Table 6.4 *Steady State Voltage Limits and Targets in Operational Timescales*. In these tables:
    - 400kV is replaced with 'Greater than 300kV'
    - 275kV is replaced with '200kV up to and including 300kV'
    - 132kV is replaced with '132kV up to and including 200kV'
    - Reference to Non-Embedded Customers is included to the Voltages to be Achievable at Interfaces to Distribution Networks.

We note that:

- the changes to tables 6.1, 6.2, 6.3 and 6.4 of the SQSS do not modify the applicable voltage limits, which were beyond the scope of this modification.
- no changes are proposed to SQSS Chapter 10 *Voltage Limits in Panning and Operating an Offshore Transmission System*. The requirements here differ to those in Chapter 6 of the SQSS, and refer to the following nominal voltages; 400kV, less than 400kV down to 132kV inclusive, and less than 132kV. We requested clarity on why explicit reference to 400kV was retained; the ESO stated that this had been discussed as part of the development of the modification, however deemed out of the scope of GSR026 and

[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] Our decision on Grid Code modification proposal GC0142 can be found on our website: https://www.ofgem.gov.uk/publications-and-updates/gc0142-adding-non-standard-voltages-grid-code

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would require greater consideration. The ESO notes that this is alluded to in 'note 1' under table 10.1 which states that "*For 400kV, the maximum limit is aligned with the equivalent onshore limit pending review in the light of technological developments*".

- the nominal voltage ranges proposed in GSR026 do not fully align with those proposed in GC0142, due to existing differences. For example, GC0142 proposes to modify Protection Arrangements requirements such that requirements previously applicable to 275kV are applicable for the range 132kV to 300kV, whilst GSR026 proposes to modify voltage limits over this range in two parts; 132kV to 200kV and 200kV to 300kV. We note that such differences are currently present, and where different requirements are set for different operating voltages, narrower voltage ranges have been proposed to maintain existing differences. Further, the Grid Code specifies voltage ranges that equipment must be capable of operating within, as required by the European Connection Network Codes, whilst the NETS SQSS relates to how the ESO will operate the system.

Industry Consultation

An industry consultation was undertaken, closing 24 August 2020. Two consultation responses were received, both of which supported the modification proposal.

One respondent commented on Table 6.4, which lists the Voltages to be achievable at Interfaces to Distribution Networks and Non-Embedded Customers at *132kV* and 'at less than 132kV'. They commented that *132kV* should be amended to '132kV and above', to cater for a connection operating at a nominal voltage above 132kV. This was discussed by the SQSS Panel who agreed that the change was not required as it could have unintended consequences because connections at a voltage greater than 132kV should follow the requirements for voltage limits on the Transmission Network, and that it is unlikely that any voltages on the Distribution Network would be above 132kV.

NETS SQSS Panel recommendation

The NETS SQSS Panel considered the proposal and consultation responses at the Panel meeting on 3 September 2020. The Panel unanimously recommended that GSR026 be implemented.

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Decision notice

This letter sets out the Authority's decision on the proposed changes to the NETS SQSS and the reasons for that decision. We have concluded that:

- implementation of the modification proposal will better facilitate the achievement of objective (i), (ii) and (iv) of the NETS SQSS;[6] and
- approving the modification is consistent with our principal objective and statutory duties.[7]

Reasons for our decision

We consider GSR026 to better facilitate NETS SQSS objective (i), (ii) and (iv), and have a neutral impact on the objective (iii).

(i) facilitate the planning, development and maintenance of an efficient, coordinated and economical system of electricity transmission, and the operation of that system in an efficient, economic and coordinated manner;

The SQSS currently specifies the requirements for operating equipment at 400kV, 275kV and 132kV. Requirements for operating equipment at other nominal voltages are not defined in the SQSS. The modification proposal ensures that equipment connected at current and future nominal voltage levels within the NETS have clear operational 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 operational requirements, and therefore better facilitates this SQSS objective.

We note that, as mentioned above, GSR026 does not modify the voltage limits currently prescribed in the SQSS, but ensures they are applicable to an appropriate voltage range. The voltage ranges proposed in GSR026 do not fully align with those proposed in GC0142, due to

[6] The NETS SQSS Industry Governance Framework: https://www.nationalgrideso.com/sites/eso/files/documents/NETS%20SQSS%20Industry%20Governance%20Framework%20v1.0%20%2830-03-12%29.pdf

[7] The Authority's statutory duties are wider than matters which NGET must take into consideration and are detailed mainly in the Electricity Act 1989 as amended.

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existing differences between SQSS and Grid Code requirements. We consider this approach to be appropriate.

(ii) ensure an appropriate level of security and quality of supply and safe operation of the National Electricity Transmission System;

Voltage limits and operational requirements for equipment connected to the transmission system (HV) at nominal voltages other than 400kV, 275kV and 132kV are not present in the current SQSS. The modification proposal ensures that voltage limits and operational requirements for equipment connected to the NETS at any nominal voltage are specified within the SQSS. It therefore better facilitates this SQSS objective.

(iv) facilitate electricity Transmission Licensees to comply with their obligations under EU law.

Three European Connection Network Codes are part of a suite of European Regulations developed following implementation of the European Third Energy Package[8]: The Requirement for Generators[9], Demand Connection Code[10] and High Voltage Direct Current code[11]. 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 SQSS (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 SQSS objective.

Implementation

In this letter we have set out our decision to approve the changes to the NETS SQSS proposed in GSR026. For these changes to take effect we will need to modify the relevant conditions of the electricity transmission licence so they refer to the new version of the NETS SQSS. We

[8] 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
[9] 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
[10] 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
[11] 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 (refer to as the HVDC); https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32016R1447

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intend to shortly consult on a new licence modification proposal in order to implement GSR026 from 1 April 2021.

Peter Bingham
Chief Engineer, Systems and Networks
Signed for and on behalf of the Authority

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