

National Grid Electricity Transmission PLC (NGET), Scottish Hydro Electric Transmission Ltd (SHET), Scottish Power Transmission Ltd (SPT), Offshore Transmission Operators, Distribution Network Operators, Generators, SQSS users and other interested parties

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Dear Colleagues

Modification to the SQSS¹ – Operational and Planning criteria for 220 kV Transmission Assets (GSR021)

Summary

This letter sets out the Authority's decision regarding the proposal GSR021, to modify the National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS or SQSS) version 2.2 dated 2 March 2012. GSR021 proposes modifications to the SQSS Chapter 6. The Authority's decision is to reject the proposed changes in GSR021.

Background

With the recent commissioning of the Kintyre-Hunterston subsea AC link, consisting of two 220kV subsea cables between Crossaig on the Kintyre peninsula and Hunterston, the first 220kV assets have been introduced onto the National Electricity Transmission System (NETS). These connect to the Onshore Transmission System via two 220/132 kV transformers at Crossaig (Scottish Hydro Electric Transmission) and two 400/220 kV supergrid transformers at Hunterston (Scottish Power Transmission). It is envisaged that further 220 kV AC projects will be developed for inclusion on the NETS. A number of contracted offshore developers/offshore transmission owners (OFTOs) have indicated plans to connect to the Onshore Transmission System at 220 kV. The 220 kV voltage is largely dictated by the submarine cable technology currently available.

The GSR021 modification proposal was raised to address the treatment of 220 kV transmission assets within the SQSS. A GSR021 consultation by the SQSS Panel was published on 21 September 2015, inviting views on the proposals. The Report to the Authority was submitted on 23 December 2015 following discussion at the SQSS Panel meeting on 2 December 2015.

Modification proposal

The SQSS (Chapter 6) sets out the pre-fault voltage limits, steady state voltage limits and voltage step limits, specified by explicit transmission voltage levels for the Onshore Transmission System. It should be noted that these voltage limits apply to the "interface between the Onshore Transmission System and a customer".

Onshore voltage limits are only defined at transmission voltages that are explicitly specified as a nominal voltage within Chapter 6. Within Chapter 6, a distinction is also made between

¹ <http://www2.nationalgrid.com/uk/industry-information/electricity-codes/sqss/the-sqss/>

supergrid assets and transmission assets in general. "Supergrid" is a defined term within the SQSS, referring to the "part of the transmission system operated at a nominal voltage of 275 kV and above" within Chapter 11 (terms and definitions). Therefore, 220 kV transmission assets are not covered by the requirements of Chapter 6 or the definition of "supergrid" within the current SQSS.

Chapter 10 of the SQSS, specifies the voltage limits for Offshore Transmission systems for all nominal voltages less than 400 kV down to 132 kV inclusive. Chapter 10 voltage limits are applicable to Chapters 4, 7, 8, and 9. Thus the workgroup assessing GSR021 explained that there is no ambiguity with voltage limits at 220 kV on the Offshore Transmission System. There is also no reference made to the defined term "supergrid" in the offshore chapters of the NETS SQSS.

This proposal seeks to modify the SQSS to include 220 kV as a nominal voltage for the Onshore Transmission System and to adopt the same percentage voltage limits for planning and operating 220 kV transmission assets as are used for those at the 275 kV nominal voltage. In addition, this proposal seeks to modify the defined term "supergrid" to include 220 kV, thus aligning it with the Grid Code definition which considers any voltage above 200 kV as a supergrid voltage. This was the preferred approach of the workgroup as it is consistent with the IEC standard voltages and would ensure that the voltage limits can readily be specified to within standard equipment design voltages. This approach will be referred to as '*approach 1*' in the context of this letter.

An alternative approach not pursued by the workgroup was based on modifying the 275 kV criteria by introducing a voltage range for which the existing 275 kV would be applied. This voltage range would include the 220 kV nominal voltage. While this approach would remove the need to update the NETS SQSS for any potentially new future nominal voltages within such a voltage range, it was felt that the benefits of standardisation of equipment voltage ratings could be lost, with the possibility of introducing confusion in the interpretation of voltage limits in the standard when compared against standard equipment design voltages. This approach will be referred to as '*approach 2*' in the context of this letter.

Interaction with GSR008-1

SQSS modification proposal GSR008-1 proposes to remove the regional variations on the 275 kV high voltage limit in operational timescales. The relaxation to allow the 275 kV voltage to rise to 115% (316 kV) in Scotland was removed. The proposal also changed the 275 kV high voltage limit from 110% (303 kV) to 109% (300 kV) on the NETS. This is in recognition of the IEC standard voltages where equipment operated at a nominal voltage of 275 kV is rated to 300 kV.

The workgroup proposed that the GSR008-1 modification to remove the regional variation and the high voltage relaxation should be applied to the proposed 220 kV criteria in this proposal. However, the high voltage limit of 109% proposed in GSR008-1 should not be applied to the 220 kV criteria as the standard maximum system voltage for 220 kV is 245 kV in IEC. Instead the 110% (242 kV) limit should be retained for the 220 kV voltage as proposed in the GSR021 Modification Report.

Consultation by the SQSS Panel

A response was received from Vattenfall. They were supportive of the modification proposal but suggested that having introduced 220 kV into the NETS SQSS for use on the onshore NETS, it may be necessary to introduce this voltage level into the Connection and Use of System Code (CUSC) to establish a transparent connection and use of system charging basis. The Connection and Use of System Code (CUSC) was updated on 1 April 2016 following the implementation of CMP213 to introduce a methodology to include expansion factors for AC subsea links of all voltages, such as the 220 kV Kintyre – Hunterston link, in Section 14: Charging Methodology. However, further consideration will need to be given to allow for 220 kV lines that are not subsea, and this may require a future CUSC modification.

Authority's assessment of the proposed modification

We agree with the workgroup's change to the definition of the term "supergrid" in Chapter 11. We also agree that the voltage levels proposed by this modification proposal are aligned with IEC 60038. However, we are not convinced of the workgroup's proposed approach to including these in the SQSS.

First, the workgroup have not provided sufficient justification for their proposal to adopt approach 1 (as described in section 3 above) for Chapter 6 while approach 2 is already used in Chapter 10 of the SQSS. We further note that the voltage limits as set out in paragraph 27, part VII "Supplies to Installations and to other Networks" of the Electricity Safety, Quality and Continuity Regulations (ESQCR) 2002 are based on approach 2. We think that the modification as proposed will produce unjustified and potentially confusing inconsistency between Chapters 6 and 10 of the SQSS and between the SQSS and ESQCR.

We are also concerned that in the near future more changes to the SQSS may be required to reflect equipment being installed on the network at voltages different to the discrete voltages identified in the SQSS.

In terms of the timing of making the proposed changes to the SQSS, we note that the current installation of 220 kV transmission assets does not include any customer interfaces and therefore the proposed voltage limits do not apply to this installation. We do note though the possibility of 220 kV transmission network assets (as indeed those at other voltage levels) containing customer interfaces being installed in the future.

Given the above concerns, we believe that the workgroup and the SQSS Panel should consider the consistency between Chapters 6 and 10 voltage limits and review the options available to them to find an enduring solution that withstands the current technological limitations, whilst avoiding frequent and unnecessary changes to the SQSS.

Assessment against the SQSS objectives

1.1. 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

We think that the modification proposal in isolation has a neutral impact in relation to this particular objective at this point in time. The 220 kV transmission assets already commissioned do not incorporate customer interfaces. However, we think that there is inconsistency between the application of voltage limits between Chapters 6 and 10 of the SQSS which, unless fully justified, may have a negative impact on the achievement of this objective.

1.2. Ensure an appropriate level of security and quality of supply and safe operation of the National Electricity Transmission System

We think that the modification proposal has a neutral impact on this particular objective at this point in time. The 220 kV transmission assets already commissioned do not incorporate customer interfaces.

1.3. Facilitate effective competition in the generation and supply of electricity, and (so far as consistent therewith) facilitating such competition in the distribution of electricity

We think that the modification proposal has a neutral impact on this particular objective at this point in time. The 220 kV transmission assets already commissioned do not incorporate customer interfaces.

² http://www.legislation.gov.uk/uksi/2002/2665/pdfs/uksi_20022665_en.pdf

1.4. Facilitate electricity Transmission Licensees to comply with their obligations under EU law

We think that the modification proposal has a neutral impact on this particular objective at this point in time as it is not driven by changes in EU legislation.

Decision notice

This letter sets out the Authority's decision to reject the proposed changes and ask for further clarification.

We have concluded that implementation of the modification proposal will not better facilitate the achievement of the objectives of the SQSS for the reasons given above.

Future work

The Authority expects the SQSS Panel to review all possible options for an enduring change to the nominal voltages within the SQSS which could withstand temporary technological limitations in a revised proposal. We would also like the Panel to consider the consistency between the approaches to defining voltage limits in Chapters 6 and 10 of the SQSS.

Any queries regarding the content of this letter should be made to Katherine Taaffe (Katherine.Taaffe@ofgem.gov.uk, 0207 901 7014) in the first instance.



Min Zhu

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Signed on behalf of the Authority and authorised for that purpose