GSR021: Operational & Planning Criteria for 220kV Transmission Assets: Industry Consultation

What stage is this document at?

01	Workgroup Report
02	Industry Consultation
03	Report to the Authority

This proposal seeks to modify the NETS SQSS to adopt the 275kV planning and operational voltage limits for 220kV and to modify the defined term "supergrid" to include 220kV by aligning this with the Grid Code definition which considers any voltage above 200kV as a supergrid voltage.

This proposed NETS SQSS Modification is open for Industry Consultation. Any interested party is able to make a response in line with the guidance set out in Section 5 of this document.

Published on: **[DD / MM / YYYY]**
Length of Consultation: **20 Working Days**
Responses by: **[DD / MM / YYYY]**

The NETS SQSS Review Panel recommends:
That GSR021 should be implemented as it better facilitates the applicable NETS SQSS objectives.

High Impact:
None identified

Medium Impact:
None identified

Low Impact:
None identified

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About this Document

This Industry Consultation outlines the information required for interested parties to form an understanding of a potential defect within the National Electricity Transmission System Security and Quality of Supply Standards (NETS SQSS) and seeks the views of interested parties in relation to the issues raised by this document.

Parties are requested to respond by [DD / MM / YYYY] to the following email address: .box.sqss@nationalgrid.com

Document Control

Version	Date	Author	Change Reference
0.1	03/06/2015	Bless Kuri	Draft Industry Consultation
1.0	[DD MM YYYY]	Bless Kuri	Final Industry Consultation

Any Questions?

Contact:

Nick Martin

Code Administrator

nick.martin@nationalgrid.com

01926 654757

Proposer:

Bless Kuri

SHE Transmission

bless.kuri@sse.com

01738 456526

1 Executive Summary

1.1 With the introduction of 220kV assets on the National Electricity Transmission System (NETS), the planning and operational criteria in the NETS SQSS needs to be modified to include this new voltage level. The first 220kV assets will be introduced to the NETS with the commissioning of the Kintyre – Hunterston subsea AC link which consists of two 220kV subsea cables between Crossaig on the Kintyre peninsula and Hunterston in Scotland in 2015.

1.2 Planning and operational voltage limits are specified in Section 6 of the NETS SQSS for the onshore part of the NETS and in Section 10 for the offshore part. Currently, pre-fault voltage limits, steady state voltage limits and voltage step limits are specified by explicit transmission voltage level within the onshore criteria. This means that no onshore voltage criteria are defined for voltage levels other than those explicitly specified within the onshore voltage criteria.

1.3 Within Section 6 and the relevant onshore sections, a number of secured events are qualified by the term 'supergrid'. It is important to provide clarity on whether 220kV should be considered as a supergrid voltage or not and to unambiguously specify the applicable voltage limits for the same.

1.4 This proposal seeks to modify the NETS SQSS to adopt the 275kV planning and operational voltage limits for 220kV and to modify the defined term 'supergrid' to include 220kV by aligning this with the Grid Code definition which considers any voltage above 200kV as a supergrid voltage.

1.5 This consultation document sets out the rationale for the modification proposal and presents the proposed modification and the outcome of the impact of the proposal on the NETS SQSS, Users, core industry documents and other industry documents.

1.6 Views are invited upon the proposals outlined in this Industry Consultation, which should be received by [DD MM YYYY]. Further information on how to submit a response can be found in Section 5 of this document.

2 Why Change?

2.1 The first 220kV assets will shortly be introduced onto the National Electricity Transmission System (NETS) with the commissioning of the Kintyre-Hunterston subsea AC link that shall consist of two 220kV subsea cables between Crossaig on the Kintyre peninsula and Hunterston. These connect to the onshore transmission network via two 220/132kV transformers at Crossaig (Scottish Hydro Electric Transmission) and two 400/220kV supergrid transformers at Hunterston (Scottish Power Transmission).

2.2 It is envisaged that further 220kV AC projects will be developed for inclusion on the NETS, especially with the connection of some offshore wind farms. Indeed a number of contracted offshore developers / offshore transmission owners (OFTOs) have indicated plans to connect to the onshore transmission system at 220kV. The 220kV nominal voltage is largely dictated by the submarine cable technology currently available.

2.3 Whilst this modification proposal seeks to include 220kV nominal voltage within the NETS SQSS, it also recognises that as technology advances, the voltage ratings of subsea cables are likely to rise. Thus, it is possible that nominal voltages other than those currently in operation on the NETS will emerge in the foreseeable future.

2.4 This change is necessary in order to ensure that new assets at the 220kV voltage level are planned and operated to a common set of criteria which facilitates equipment and design standardisation, helping to achieve investment efficiency and safer systems of electricity transmission.

3 Solution

3.1 Planning and operational voltage limits are specified in Section 6 of the NETS SQSS: “Voltage Limits in Planning and Operating the Onshore Transmission System” and Section 10: “Voltage Limits in Planning and Operating an Offshore Transmission System”. Section 6 voltage limits are applicable to Sections 2, 3, 4 (onshore part of the Main Interconnected Transmission System (MITS)) and Section 5, whilst Section 10 voltage limits are applicable to Sections 7, 8, 9 and 4 (offshore part of the MITS).

3.2 Within the onshore chapters of the NETS SQSS, distinction is made between supergrid assets and transmission assets in general. “Supergrid” is a defined term within the NETS SQSS, referring to the “part of the transmission system operated at a nominal voltage of 275kV and above”. As currently defined, 220kV assets would not be considered as supergrid assets.

3.3 Section 10 of the NETS SQSS, which specifies voltage limits for offshore transmission systems, provides voltage limits for all nominal voltages less than 400kV down to 132kV inclusive. Thus there is no ambiguity with voltage limits at 220kV on the offshore transmission system. There is also no reference made to the defined term “supergrid” in the offshore chapters of the NETS SQSS.

3.4 Pre-fault voltage limits, steady state voltage limits and voltage step limits are specified by explicit transmission voltage levels within the onshore criteria meaning that onshore voltage limits are effectively not defined at any transmission voltage that is not explicitly specified on the onshore transmission system. Within Section 6 and the relevant onshore sections, a number of secured events are qualified by the defined term “supergrid”. It is therefore important to provide clarity on whether 220kV should be considered as a supergrid voltage or not and to unambiguously specify the applicable voltage limits for the same.

3.5 This proposal seeks to modify the NETS SQSS to adopt the 275kV planning and operational voltage limits for 220kV and to modify the defined term “supergrid” to include 220kV by aligning this with the Grid Code definition which considers any voltage above 200kV as a supergrid voltage.

4 Impact & Assessment

NETS SQSS Review Panel Assessment

4.1 National Grid

The view of National Grid is…

4.2 Scottish Power Transmission Limited (SPT)

The view of SPT is…

4.3 Scottish Hydro Electric Transmission plc. (SHE Transmission)

The view of SHE Transmission is that the proposed modifications do not impact on any of its systems or procedures.

4.4 Offshore Transmission Owners (OFTOs)

The view of the OFTO representatives is…

4.5 Generators

The view of the Generator representative is…

4.6 Distribution Network Operators (DNOs)

The view of the DNO representative is…

4.7 Ofgem

The view of the Authority is…

Impact on the NETS SQSS

4.8 Introducing voltage limits for the new 220kV nominal voltage without changing the limits for any other currently specified voltages will have no impact upon the NETS SQSS. It is important to ensure that the drafting changes to the NETS SQSS text, to facilitate this modification, do not unduly impact upon any other NETS SQSS criteria.

4.9 The proposed definition for the term “supergrid”, which covers a wider voltage range, would mean that more assets would now be included when considering secured events involving supergrid assets. However, the additional assets would only be the assets at the new 220kV nominal voltage at this stage. Therefore, modifying the term “supergrid” in the NETS SQSS to align with the Grid Code definition will therefore have no impact on the NETS SQSS given that there are currently no system nominal voltages between 132kV and 275kV in the NETS SQSS.

4.10 GSR021 requires amendments to the following parts of the NETS SQSS:

(a) Section 6: Voltage limits in planning and operating the onshore transmission system

- Table 6.1 Pre-fault planning voltage limits;
- Table 6.3 The steady state voltage limits in planning timescales; and
- Table 6.5 The steady state voltage limits in operational timescales.

(b) Section 11: Terms and Definitions

- Definition of the term 'supergrid'

4.11 The text required to give effect to this proposal is contained in Annex 1 of this Industry Consultation document.

Impact on the National Electricity Transmission System (NETS)

4.12 The proposed changes will have no impact on the NETS.

Impact on GSR008 Modification Proposal

4.13 The GSR008 Modification Proposal covers regional variations and wider issues and is now with the Authority for approval. As this 220kV proposal is introducing a new voltage, the same modifications proposed to the NETS SQSS text would be applicable to the GSR008 NETS SQSS text also with no impact identified.

Impact on NETS SQSS Users

4.14 The proposed changes will provide clarity to NETS SQSS Users with regards to planning and operational criteria for 220kV. No impact is envisaged on User systems required to accommodate the modification.

Impact on Greenhouse Gas Emissions

4.15 The proposed modification will have no impact on Greenhouse Gas Emissions.

Assessment Against NETS SQSS Objectives

4.16 The NETS SQSS Review Panel considers that the proposed changes would better facilitate the NETS SQSS objectives:

(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;

By including 220kV in the planning and operational criteria, this will allow consistent designs and equipment standardisation which helps with ensuring efficiency in the long term.

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

Inclusion of 220kV in the planning and operational criteria will allow consistent designs across sites which helps standardise site design and maintenance regimes. This enhances the safe operation of the NETS.

(iii) facilitate effective competition in the generation and supply of electricity, and (so far as consistent therewith) facilitating such competition in the distribution of electricity; and

The proposal has a neutral impact on this objective.

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

The proposal has a neutral impact on this objective.

Impact on Core Industry Documents

4.17 An impact assessment of the proposed modification was carried out on the Grid Code, Distribution Code and a number of key Engineering Recommendation Documents and associated Engineering Technical Reports. The findings from this are available in Table 1 of the attached Panel Paper.

Impact on Other Industry Documents

4.18 The proposed modification does not impact on any other industry documents.

Implementation

4.19 The NETS SQSS Review Panel proposes that GSR021 should be implemented 10 business days after an Authority decision. Views are invited on this proposed implementation date.

5 Consultation Responses

5.1 Views are invited upon the proposals outlined in this consultation, which should be received by [DD MM YYYY].

Your formal responses may be emailed to:

.box.sqss@nationalgrid.com

5.2 Responses are invited to the following questions:

(i) Do you support the introduction of planning and operational criteria to include 220kV in the NETS SQSS?

(ii) Do you agree that the planning and operational criteria for 220kV should be aligned to the current 275kV criteria?

(iii) Do you support the proposal to align the definition of the term 'supergrid' in the NETS SQSS to that in the Grid Code?

(iv) Do you support the proposed implementation approach of 10 business days following an Authority decision?

5.3 If you wish to submit a confidential response please note the following:

(i) Information provided in response to this consultation will be published on National Grid's website unless the response is clearly marked "Private and Confidential". We will contact you to establish the extent of the confidentiality. A response marked "Private and Confidential" will be disclosed to the Authority in full but, unless agreed otherwise, will not be shared with the NETS SQSS Review Panel or the industry and may therefore not influence the debate to the same extent as a non confidential response.

(ii) Please note that an automatic confidentiality disclaimer generated by your IT System will not in itself mean that your response is treated as if it had been marked "Private and Confidential".

Annex 1 - Proposed Legal Text

This section contains the proposed legal text to give effect to the proposals. The proposed new text is in red and is based on NETS SQSS Version 2.2, Dated March 5 2012.

Voltage Limits:

Table 6.1 Pre-fault planning voltage limits

Nominal voltage	Minimum	Maximum
400kV	390 kV (97.5%)	410 kV (102.5%) Note 1
275kV	261 kV (95%)	289 kV (105%)
220kV	209 kV (95%)	231 kV (105%)
132kV in SPT's transmission system and SHETL's transmission system.	Note 2	139 kV (105%)
<275kV in NGET's transmission system and <132kV in SPT's transmission system and SHETL's transmission system.	Note 3	105%

Notes… (no notes applicable for 275kV, hence 220kV)

Table 6.3 The steady state voltage limits in planning timescales

Nominal voltage	Minimum	Maximum
400kV	380kV (95%) Note 1	410kV (102.5%) Note 2
275kV	248kV (90%)	289kV (105%)
220kV	198kV (90%)	231kV (105%)
132kV	Note 3	139kV (105%)
<132kV	Note 3	105%

Notes… (no notes applicable for 275kV, hence 220kV)

Table 6.5 The steady state voltage limits in operational timescales

Nominal voltage		Transmission System		
		NGET	SPT	SHETL
400kV	Minimum	360kV (90%)	360kV (90%)	360kV (90%)
	Maximum	420kV (105%) Note 1	420kV (105%) Note 2	420kV (105%) Note 2
275kV	Minimum	248kV (90%)	248kV (90%)	248kV (90%)
	Maximum	303kV (110%)	303kV (110%) Note 3	303kV (110%) Note 3
220kV	Minimum	198kV (90%)	198kV (90%)	198kV (90%)
	Maximum	242kV (110%)	242kV (110%) Note 5	242kV (110%) Note 5
132kV	Minimum	119kV (90%)	119kV (90%)	119kV (90%)
	Maximum	145kV (110%)	145kV (110%) Note 4	145kV (110%) Note 4
Less than 132kV	Minimum	94%	95%	94%
	Maximum	106%	105%	106%

Notes

1. May be relaxed to 440kV (110%) for no longer than 15 minutes
2. May be relaxed to 440kV (110%) for no longer than 15 minutes following a major system fault
3. May be relaxed to 316kV (115%) for no longer than 15 minutes following a major system fault
4. May be relaxed to 158kV (120%) for no longer than 15 minutes following a major system fault
5. May be relaxed to 253kV (115%) for no longer than 15 minutes following a major system fault

Definition of the Defined Term: “Supergrid”:

That part of the National Electricity Transmission System operated at a nominal voltage of ~~275kV~~ 200kV and above.