

# NETS SQSS Review Plan

April 2022



**Contents**

- Contents .....2
- 1. Executive Summary .....3
- 2. Introduction .....4
- 3. NETS SQSS Review Topics .....4
  - 3.1 Offshore Transmission System .....4
  - 3.2 Demand Connection Criteria .....5
  - 3.3 Generation Connection Requirements .....5
  - 3.4 Main Interconnected Transmission System .....6
  - 3.5 Operational Standards .....6
  - 3.6 Introduction of CATO.....6
  - 3.7 Governance .....7
- 4. NETS SQSS Review Plan.....7
- 5. Stakeholder Engagement Activities.....8
- 6. Stakeholder Responses .....8
- 7. Other comments.....14
- 8. Next Steps .....15
- Appendix .....16**

## 1. Executive Summary

With the energy industry taking confident steps towards net-zero carbon operation, adaptation of the National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS) should be considered to facilitate this significant change. To achieve this, the National Grid Electricity System Operator (NGESO) RIIIO-2 business plan includes a targeted review of the NETS SQSS to enhance those areas where issues have been identified in consultation with stakeholders.

During 2021/22, the NGESO has engaged with stakeholders in the wider industry and co-created a focused list of issues that need to be addressed to ensure the NETS SQSS remains fit for the future. Stakeholders provided feedback on the proposed issues, identified additional topics and helped us shape the priorities through one-to-one conversations, discussions in key forums and a 3-week public consultation. This is to ensure that the topics and priorities are aligned with key industry objectives and the focus of stakeholders.

Feedback received was generally supportive of the NGESO's proposals with some stakeholders proposing changes to the scope and priorities. Some feedback included details that are expected to be addressed by the workgroups developing the modifications proposed. Other feedback included issues that are the subject of a different code/framework and would not fit under this plan.

Having considered all the feedback provided, we intend to progress three SQSS modifications in 2022/23. In provisional order of priority these will look at Section 7, Section 3, and Section 2 of the SQSS. We intend to commence the review of Section 3 and Section 7 in Q1 2022/23. Once either of these workgroups conclude, potentially in Q3 2022/23, we intend to commence the review of Section 2.

For the Section 7 'Generation Connection Criteria Applicable to an Offshore Transmission System' review, we will be looking at offshore connection criteria to assess the feasibility and the impact of changing the restriction on the infeed loss risk associated with an offshore DC converter to the normal loss of infeed risk, and to consider treatment of HVDC bi-pole configurations with no single common mode of failure. This will provide a timely clarity to the industry on the designs of radial connections and will set the stage for the future consideration of coordinated offshore designs.

For the Section 3 'Demand Connection Criteria Applicable to the Onshore Transmission System' review, we will be looking at the alignment of the demand connection criteria of the NETS SQSS with that in the Distribution Code (applicable through Engineering Recommendation P2/7). This will ensure consistency and coordination between the distribution and transmission systems, enable distributed energy resources to play a role in demand security, and facilitate a consistent treatment of embedded energy storage.

For the Section 2 'Generation Connection Criteria Applicable to the Onshore Transmission System' review, we will be looking at the explicit treatment of interconnectors and storage. This will stipulate the current practice, allow the introduction of a cap on the loss of outfeed risk, and complement an ongoing review by transmission licensees on the assumptions applied when designing storage connections.

In 2022/23 we will also look at scoping a modification for the main interconnected transmission system criteria to look at whether the security and economy backgrounds would require to be updated or not and to assess the interactions with the Networks Options Assessment (NOA) process. We will also monitor the progress of offshore network coordination with a view to progress any complementary SQSS modification in a timely manner.

We have also identified other areas that we intend to consider during the RIIIO-2 period. These include a potential review to the operational criteria applicable in England and Wales, the definition of Competitively Appointed Transmission Owners (CATOs), and potential simplification to the NETS SQSS governance. These will be progressed in line with the progress achieved in the supporting frameworks and provided that there is a clear driver for them.

Stakeholders' input is crucial to the successful development of this plan and will continue to be a cornerstone of its delivery. Throughout the process, stakeholders will be able to shape the solutions developed through the open governance code change process by participation in workgroups and industry consultations. They will also be able to directly engage with us to ensure that the plan remains dynamic and responsive to changes in the industry.

## 2. Introduction

The NETS SQSS sets the standards that both the TOs and the ESO must apply to develop and maintain the transmission system and operate that system respectively. The electricity industry has changed significantly since the NETS SQSS was firstly introduced, as there is a big and confident move towards the net-zero carbon energy system. Hence, the relevant codes and standards should adapt to this significant change. The NGESO RIIO-2 business plan proposes a targeted review of the NETS SQSS to enhance some areas, where a few issues have been raised constantly by stakeholders. The 2021/22 deliverable of the five-year period is to engage stakeholders and publish a prioritised list of issues with the identification of the quick wins to be achieved in 2022/23.

The NGESO has collected the initial thoughts of stakeholders representing TOs, DNOs, Generators and academia among others and presented this plan in various forums including the NETS SQSS Review Panel<sup>1</sup>, Grid Code Development Forum<sup>2</sup> and Open Networks WS1B meeting<sup>3</sup>. The changes were presented for public consultation<sup>4</sup> which ran from 17th Feb to 9th March. The industry experts have provided positive feedback and agreed that these topics represent key areas where changes are required to acknowledge the industry needs and the foreseen developments in the power system. However, they stressed that the proposed changes are significant, and that the efficiency of delivery is critically dependent on focused Terms of References and engaged workgroups.

## 3. NETS SQSS Review Topics

This section provides an overview of the main areas that are proposed to be addressed within the review process.

### 3.1 Offshore Transmission System

With the drive to connect a significant capacity of offshore wind, it is necessary to ensure that network design is coordinated, economic and efficient. This has been the subject of the ongoing collaboration between NGESO, the industry, and academia on Offshore Transmission Network Review<sup>5</sup> which is looking at various aspects of offshore network design and coordination. To supplement this work, the NETS SQSS needs to be kept up to date such that it removes any blockers and provides a clear signal for the right level of investment.

To that extent, three issues may need to be addressed in Section 7 of the NETS SQSS.

- The standard restricts the loss of infeed risk associated with any single offshore DC converter to the normal loss of infeed risk (1320 MW). This restriction, which was originally imposed due to the lack of the reliability data for DC converters of capacity exceeding that value, limits the consumers' exposure to events where frequency drops below 49.5 Hz. However, it could result in additional and potentially sub-optimal investment being required to meet such criteria. It could also result in unintended environmental impacts due to the increase in the numbers of cables and landing points required.
- The standard defines a DC bi-pole configuration as a single DC converter and places a restriction on the loss of infeed risk associated with any DC converter. This could prevent the deployment of DC bi-pole configurations that have no common mode of failure affecting them.
- The standard currently requires that offshore connections are radial connections with some limited redundancy. It means that, although the NETS SQSS does not prevent a degree of coordination on the offshore network, it is unlikely that it would drive that degree of coordination on its own. With the industry currently developing coordination technologies of offshore networks and exploring the potential

---

<sup>1</sup> NETS SQSS Review Panel

<https://www.nationalgrideso.com/industry-information/codes/security-and-quality-supply-standards/panel-meeting-documents>

<sup>2</sup> Grid Code Development Forum

<https://www.nationalgrideso.com/industry-information/codes/grid-code/development-forum-and-documents>

<sup>3</sup> Open Networks Project

<https://www.energynetworks.org/creating-tomorrows-networks/open-networks/whole-electricity-system-planning>

<sup>4</sup> SQSS Review Public Consultation

<https://www.nationalgrideso.com/calendar/nets-sqss-review>

<sup>5</sup> Offshore Transmission Network Review

<https://www.gov.uk/government/groups/offshore-transmission-network-review>

benefits, it may be necessary in the future to revise the requirements to ensure that the NETS SQSS drives the development of a coordinated offshore network.

We propose a review of the restriction on the loss of infeed risk to check whether it is appropriate to increase it, potentially to 1800 MW, and the implications of this increase both on the number of frequency excursions below 49.5 Hz and the cost of frequency response that the System Operator is required to hold to manage the system frequency in accordance with Section 5 of the NETS SQSS. We also propose a review of the suitability of the use of DC bi-pole configurations as a part of a compliant solution.

We also propose to keep monitoring the progress of the ongoing offshore coordination work and incorporate the necessary recommendations in the NETS SQSS. The urgency of this work would depend on what the developments of the offshore coordination work are and whether the current NETS SQSS could restrict the implementation of these recommendations or not.

### 3.2 Demand Connection Criteria

The DNO demand connection standard Engineering Recommendation P2 (EREC P2/7) has already undergone some revisions and further revisions are planned. Hence, there are three main discrepancies between Section 3 of the NETS SQSS and EREC P2/7:

- The NETS SQSS defines the size of a demand group based on the net transmission system demand. EREC P2/7, on the other hand, defines that size based on the total gross demand. This means that the level of the demand security that a DNO is required to provide could exceed what the transmission system is designed to provide, particularly in groups with a significant capacity of embedded small power stations.
- In providing demand security, EREC P2/7 allows the DNOs to rely on commercial contracts with distributed energy resources and on contributions from embedded small power stations. However, NETS SQSS Section 3 does not allow the use of commercial contracts and only takes the output of embedded small power stations to the extent that it reduces the group demand. This could lead to a discrepancy between the transmission network capacity and the distribution network capacity.
- The assumptions on the contribution from embedded large power stations towards demand security is different between the NETS SQSS Section 3 and that used in EREC P2/7 with the later referring to the Guidance on the Application of the Engineering Recommendation P2 (EREP 130)<sup>6</sup>.

These discrepancies could undermine the ability of both TOs and DNOs to ensure that investment on their networks is coordinated, economic, and efficient. It could also have the unintended effect of significantly delaying the connection of embedded storage – a risk that has been raised by stakeholders on several occasions. Therefore, it is proposed to revise the NETS SQSS demand connection criteria to ensure coordinated and consistent investment at the point of interface between the transmission and distribution systems.

### 3.3 Generation Connection Requirements

NETS SQSS Section 2 defines the rules that need to be met when connecting generation plants to the transmission system. This includes both the loss of infeed risk criteria and the minimum transmission connection capacity requirements. Both sets of criteria would complement each other to drive the volume of investment that provides adequate level of transmission system access and guarantees an operable transmission system.

The same rules applied to connect generation have been historically applied to connect interconnectors and storage plants. For the loss of infeed risk criteria, interconnectors were treated as generation. For transmission connection capacity requirements, additional scenarios were considered to allow interconnectors and storage plants to import full power from the transmission system.

This practice, however, has not been explicitly specified in the NETS SQSS. It also does not consider any restrictions on the limit to loss of power outfeed risk. To address this, Section 2 of the NETS SQSS can be revised to explicitly refer to interconnectors, considering the loss of infeed risk and the capacity requirements,

<sup>6</sup> EREP130

[http://www.dcode.org.uk/assets/files/Qualifying%20Standards/ENA\\_EREP\\_130\\_Issue%203\\_\(2019\).pdf](http://www.dcode.org.uk/assets/files/Qualifying%20Standards/ENA_EREP_130_Issue%203_(2019).pdf)

to mirror the requirements applicable to storage and interconnectors to cover their operation in both directions, i.e., generation and demand modes, and to specify any appropriate restriction on the loss of outfeed risk.

This work will complement other tools and enhancements that are being developed by Transmission Licensees to facilitate storage connections. This includes:

- An ongoing and continuous review undertaken by Transmission Licensees for what constitutes “conditions to be reasonably expected to arise” when assessing the connection for a specific site to consider the operational patterns for new technologies; and
- Focused pre-application discussions with Users to understand how they intend to operate their plants and whether this allows them to benefit from the flexibility available under design variation rules.

### 3.4 Main Interconnected Transmission System

As the generation mix continues to evolve and the processes of managing the uncertainty around which generation connections are going to materialise, it is necessary to ensure that the design criteria applicable to the main interconnected transmission system are kept up to date. This would necessitate a review to Section 4 of the NETS SQSS and the corresponding appendices to cover both the security and economy background assumptions including:

- Revising the scaling factors of existing generation technologies,
- Exploration of how to treat solar generation,
- Assessment of whether energy storage systems should be treated differently based on their MWh capacity,
- Looking at the interactions between NOA process, which is an economic assessment that looks at various future scenarios, and NETS SQSS Section 4, which is essentially a pseudo economic assessment that considers only one scenario. This will cover situations when the recommendations are not aligned.
- Consideration of how transmission capacity is to be calculated and if it is appropriate to extend that concept to include any flexibility that could be delivered by commercial services and operational measures in addition to what is delivered by physical network assets.

### 3.5 Operational Standards

This point is mainly related to Section 5 of the NETS SQSS, and it will investigate the pros and cons of relaxing the operational standard in England and Wales (currently all double circuit faults are secured under all operating conditions) to match that in Scotland: double circuit faults not required to be secured under normal operating conditions provided that there is no widespread disturbance. This may produce short to medium term savings on balancing costs. However, such savings could be offset on longer term as the requirements to reinforce the affected boundaries will diminish and the constraint cost will increase. Hence, the impact of changes on customers, risks NGET’s plant and interactions with NOA should be carefully evaluated.

The proposal for this change was driven by some discussions which foresee benefits to relax the operational standards in E&W especially at specific boundaries. It is worth noting that if the criteria were to be relaxed, certain boundaries would still have to comply to NETS SQSS clause 5.3 and the benefits of removing clause 5.4 will not extend to these boundaries. Therefore, the benefit case needs to be established first before pursuing this proposed change further.

### 3.6 Introduction of CATO

The Competitive Appointed Transmission Owner (CATO) regime aims to drive competition and consumer value through the introduction of competition to build, own and operate transmission assets. This new regime means the traditional transmission areas will not be monopolies in their defined region and certain transmission assets will go through competitive process to determine ownership. As this is the new concept being introduced in the system, it is not captured by NETS SQSS as it stands now. It could be as simple as changing one or two definitions but could expand to a significant piece of work.

The initial proposal is to change the definition of different transmission areas to include CATO. For example, when referring to traditionally NGET's transmission system, CATO's transmission system will be added adjacent to the term to become "NGET's transmission system and relevant CATO transmission systems". This will lead to consistency between existing TOs and CATOs, as they will be designed according to the same NETS SQSS requirements.

### 3.7 Governance

Currently the governance process for NETS SQSS modifications is complicated and requires modifications to Transmission Licences every time the NETS SQSS is amended. As the industry landscape changes more rapidly, it could be important to make the NETS SQSS more dynamic and allow addressing issues as they arise. It is not necessarily a NETS SQSS change and could be addressed by other methods. In addition, the Energy Code Reform work is being conducted by BEIS and this will impact how NETS SQSS is governed in the future.

## 4. NETS SQSS Review Plan

The plan to develop and apply changes to the NETS SQSS is displayed in Figure 1. The plan categorises the aimed changes into two main stages according to the planned time to achieve.

Stage 1 consists of the potential solution of the three quick win topics to be achieved in 2022/23. In Q1, we aim to initiate the review of the loss of infeed risk criteria and the offshore converter configurations in Section 7 and the modification to align Section 3 with EREC P2/7. In Q3, or upon the conclusion of one of the two workgroups, we intend to commence the review of Section 2 to clarify the treatment of storage and interconnectors.

The common attribute of the quick win topics is that they have a significant impact on network designs and relevant processes and a relatively clear and limited scope. This will facilitate the expedient conclusion of modifications. These modifications will provide timely clarity on assumptions that are critical for offshore network design, establish consistent treatment of demand and distributed energy resources between DNOs and TOs, clarify the design criteria for storage and interconnectors, and ensure that high frequency events remain manageable on the long term.

Feedback received on the prioritisation included a proposal to prioritise all the elements of Section 7 review and address it under a single workgroup. It also included a proposal to bring forward the review of Section 2. However, in order to expedite the conclusion on what is essentially a specific and clear modification to section 7, and to reduce the risk of overstressing the resources of the industry between three simultaneous modifications, we opted for not revising the priorities.

In parallel with the three modifications prioritised in year 2022/23, we plan to scope the work on the broader and more comprehensive review of Section 4 of the NETS SQSS and its interactions with the NOA process. This is to allow this modification to be taken forward as a top priority in 2023/24 as this has been a long-standing issue with multiple interactions with network design and investment processes.

Following the review of Section 4, we intend to address the remaining issues starting with the further review for the offshore design criteria in Section 7, the review of the operational criteria in England and Wales in Section 5, the introduction of CATOs in the NETS SQSS, and governance. This review will run over the following three years.

Priorities from year 2023/24 onwards are based on the current available information. However, many of these modifications are interactive with other ongoing works including Offshore Transmission Network Review, the early competition work, the energy codes reform. Also, the benefit case of the review of the operational criteria is still not strong. Therefore, we intend to keep the plan dynamic and reprioritise modifications to ensure alignment with the objectives of the industry.

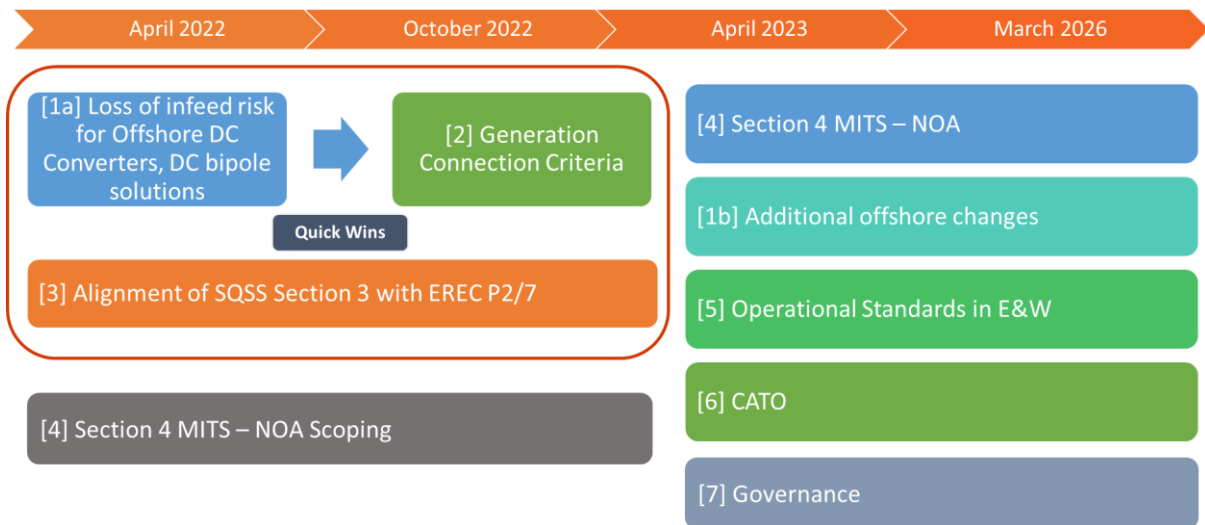


Figure 1. Timeline for the proposed NETS SQSS review and changes.

## 5. Stakeholder Engagement Activities

In 2021/22, we have been engaging with stakeholders through various means including one-to-one discussions, presentations at industry forums and public consultation between 17 February and 9 March.

Stakeholder groups:

- NGESO
- TO (NGET, SPT, SHET)
- DNO
- Generator/Developer
- Academic Representatives

Forums:

- SQSS Review Panel
- Grid Code Development Forum (GCDF)
- Open Networks WS1B meeting
- DNO Joint Forum

Public Consultation: 17 February – 9 March 2022

## 6. Stakeholder Responses

Through this section, the NGESO responds to the raised comments and concerns which are related to the NETS SQSS content and review process. The rest of comments, which are related to other codes and protocols are summarised in the next section.

Section 3.1 Offshore Transmission System	
Feedback/comment	NGESO response
The SQSS should not wait to ensure coordination with the offshore network, but should, where feasible and prudent, be proactive.	Modifications to the NETS SQSS requirement would need to be supported by a technical and economic assessment. For the offshore sections, these are likely to be very similar in scope to the work done under the offshore



	coordination work. Hence, our preference is to use that work as a starting point.
Consideration of offshore coordination work and resulting outcomes, as part of the same prioritised workgroup.	Decoupling the question of the capacity/configuration of the connection from an offshore platform to the onshore system from that of whether there should be a degree of interconnection between offshore platforms or not is likely to keep the workgroups focused and allows the timely delivery of a solution that is widely accepted by the industry.
The technical solutions required to achieve both changes and to ensure network security need to be conveyed to OEMs and developers well in advance.	Our top priority is to provide clarity on the size of converters and the feasibility of the use of bipolar configurations. Prioritising these two issues and decoupling them from the rest of the offshore coordination will keep the workgroup focused and reduces the risk of delays to the modification due to the potential complexity of the solution that would need to be developed. Appropriate dissemination of the work done on Offshore Transmission Network Review and holistic network design will provide additional clarity on the direction of change in terms of offshore network design.
We expect the review to consider the reliability of HVDC systems based on the latest available information and operational experience.	The details of the assessment will be decided by the workgroup. This is likely to include the use of the most up-to-date data available to them.

<b>Section 3.2 Demand Connection Criteria</b>	
<b>Feedback/comment</b>	<b>NGESO response</b>
Ensure the synchronicity between the DNOs and TOs in terms of the definition of demand (gross vs net) and assumptions regarding demand security will improve the pace at which storage connects.	Noted. The details of how to achieve that will be identified and discussed by the workgroup.
Considerations of the following topics: Demand side response, clusters of embedded generation and where DNO Active Network Management scheme or connection agreement constrain demand and/or export.	
The Grid Code may require updating to revise the data exchanged between NGESO and DNOs e.g., as part of the Week 24 submission.	

<b>Section 3.3 Generation Connection Requirements.</b>	
<b>Feedback/comment</b>	<b>NGESO response</b>
The TOs engage in with storage operators (and interconnectors) regarding asset operations and scenario planning. The requirement should be formalised in the SQSS as an integral part of scenario planning.	Variations to connection designs are already covered by clauses 2.15 to 2.18 of the NETS SQSS.

A clarification is required regarding the retrospectively application of the developed modifications.	The decision on whether a modification would apply retrospectively or not will be decided by the workgroup and will take into account an impact assessment. We note that any retrospective change to the SQSS will mostly impact Transmission Owners rather than Users.
Would the proposed outfeed limit for 'demand' mode and the infeed limit for 'generation' mode be equal and firm? a. i.e., the outfeed and infeed limits would both be 1800 MW and not subject to change? b. How would interconnector losses be treated for the outfeed limit?	That will need to be discussed and agreed by the workgroup and is likely to take into account various technical and commercial considerations.
What differences, if any, would be envisaged for a Multi-Purpose Interconnector compared to a conventional point-to-point link?	That will be dependent on the ownership of the assets and the commercial arrangements in place.

### Section 3.4 Main Interconnected Transmission System

Feedback/comment	NGESO response
There is not enough information available regarding proposed changes to Section 3.4.	So far, we have only highlighted the issues that need addressing. We will continue to scope the work in the coming months. Once scoping is complete, a modification will be raised and a workgroup with representation from stakeholders will be formed.
Consideration of the introduction of completely new backgrounds and whether it is appropriate to have more than two; A review of whether all demand should be treated as at its maximum during peak triads and whether there are alternative charging arrangements especially in negative charging zones; Consideration of how the requirements for co-located sites should be defined.	The technical elements raised will be discussed in the workgroup stage. However, the SQSS workgroup cannot recommend specific changes to the charging methodology which is within the remit of CUSC.

### Section 3.5 Operational Standards in England and Wales.

Feedback/comment	NGESO response
Clarification on the definition of events that will be considered in the relaxation of the operational standard to N-1. N-D events account for the loss of single assets such as a transmission tower, for example, that can impact two transmission circuits simultaneously. Investigation of relaxation of this standard should therefore explore all definitions and interpretation of N-1 to ensure the consequences are fully understood and risks accepted by all stakeholders.	The text in this document was updated to remove ambiguity.
The impact of relaxing the operational standard in England and Wales to N-1 under normal operating conditions should be considered on the security of	Noted. The workgroup developing the modification will need to decide on the scope and details of the assessment.

supply to customers for short, medium, and long terms.	
How this proposal to relax operational standards would align with other chapters of the SQSS standard related to network planning. It is not clear why the need to reinforce the network will decrease if the operational standards are reduced but the design standards are maintained.	Clauses 2.12, 2.13, clauses 4.11 to 4.13, and the NOA process mean that changes to the operational criteria could impact investment on the transmission system.
Given that the aim is to reduce short term network constraint costs, whether a derogation against the SQSS standard for the ESO to operate the network at N-1 under specific circumstances. We feel that operating to an N-1 standard may not be appropriate in all prevailing system conditions, and therefore we question the appropriateness of wholesale change to the standard to accommodate the cases where this might be applied.	Noted. A derogation option could be explored as an alternative to this modification.

<b>Sections 3.6 Introduction of CATO</b>	
<b>Feedback/comment</b>	<b>NGESO response</b>
We would like to understand the impact on generators connected to CATO owned network in future. The considerations being management of competing connection requirements. Connection co-ordination for assets shared by TOs and CATO. To keep the Interfaces with CATOs and TOs as similar as possible to enable seamless integration.	For details of the CATO regime and its development, please refer to Early Competition Programme. The technical standards applying to CATOs and incumbent TOs should not be different in principle.
Any plans for modifying the SQSS to reflect CATO could consider regional differences in application of the SQSS, and where these might be aligned to apply CATO terms to a referenced 'GB Transmission System'.	Existing regional differences should be reflected in the CATO regime and the introduction of CATO will not aim to change the existing arrangement among different Transmission regions.
The introduction of competition for asset ownership within traditionally single asset owner transmission areas through ongoing Pathfinder activities today, and the changes that may result from the Electricity Transmission Network Planning Review, may lead to misunderstanding in accountability for network compliance.	The responsibility of compliance should be defined by the CATO framework.

<b>Sections 3.7 Governance</b>	
<b>Feedback/comment</b>	<b>NGESO response</b>
It may be possible to adopt the approach for EREC P2/7 where the drafting of the Standard Distribution Licence Conditions means that subsequent versions of EREC P2, as approved by Ofgem, can be implemented without a change to distribution licences.	We will ensure any changes to the governance process will ensure the right level of engagement with the industry.

<p>Given the possible increased impact on transmission system users from any change in system security due to a change. In the market design arrangements, we do not believe it would be appropriate to delegate SQSS changes from the transmission licence at this time.</p>	<p>See above.</p>
<p>Please provide clarity on the “other methods” available to make the SQSS modifications process more dynamic.</p>	<p>Ensuring the modification proposals are well scoped and focused and that the terms of reference for workgroup are well-defined. Where modifications do not require detailed analysis, these can be achieved without a workgroup.</p>

<p><b>Which of the proposed modifications will have the most significant impact on your operations/investment plan? To what extent would that impact be?</b></p>	
<p><b>Feedback/comment</b></p>	<p><b>NGESO response</b></p>
<p>Subsequent offshore transmission networks that are parallel the Main Interconnected Transmission System will impact MITS performance, and therefore impact onshore network reinforcement plans. This impact must therefore be fully considered in modifications to Chapter 7 and parallel amendments made to Chapter 4 where necessary to maintain a consistent approach to the design of the MITS.</p>	<p>Linkage between the two workgroups will be explored and the details to be discussed during the pre-scoping phase or in the workgroup stage.</p>
<p>Changes to the SQSS potentially could create differences to P2/7.</p>	<p>The workgroup will determine how to best align SQSS with P2/7 as part of review.</p>
<p>The most important aspect of this review is the review between the relationship between storage and demand/generation capabilities. When considering the impact of storage behind a constraint, (i.e., Scotland) it is not appropriate to assume that storage will be generating when the wind is blowing. Not only is this situation very unlikely, but in fact, storage acts as a natural constraint mitigator. Where there is excess generation behind a constraint, storage acts as the sponge, mopping up excess power. The system design should reflect this, and the SQSS should enable this attribute and benefit to the system to be monetised (i.e., through commercial contracts) rather than penalised through network planning standards.</p>	<p>How to treat storage in a planning study is mainly dictated by how to determine what conditions which ought to be reasonably expected to arise within a year of operation. This is already being addressed by the review of the construction planning assumptions undertaken by the ESO and the 3 onshore TOs.</p>

<p><b>Are there any other areas that require review and may act as a barrier for net zero in NETS SQSS?</b></p>	
<p><b>Feedback/comment</b></p>	<p><b>NGESO response</b></p>

Section 2: to consider degree of interconnection with neighbouring countries and vulnerability to failure of a single country's grid.	A failure of a single country's whole grid would be triggered by a combination of events that is beyond what we are currently required to secure the National Electricity Transmission System against. However, the concept could be discussed as part of review.
The risk of loss Infeed should also be clarified with respect to DC bi-pole solutions as well as consideration on the assumptions used in 2008 for the definition of design requirements In Chapter 7.	We have now updated the plan such that bi-pole definition is considered in the response of Section 3.1.
Incorporate use of D and T connected storage into NOA methodology as alternative to transmission investment.	Commercial solutions and the use of flexible services will be assessed as means of compliance of the SQSS.

<b>Do you agree with the priorities and the delivery timescales described in Section 4? If not, please provide additional information that could allow us to revise the priorities.</b>	
<b>Feedback/comment</b>	<b>NGESO response</b>
The plan will entail a commitment to extensive industry involvement. It is important that NGESO reaches out to parties who have not historically been engaged in developing the SQSS but who are bringing new technologies to the market.	We will ensure we have the right level of representation from all related parties.
Apply same prioritisation of offshore transmission related themes 3.1 (a) and 3.1(b), as they are interrelated and will have an impact on offshore network and converter design for some projects in the pipeline.	The changes to be proposed in 3.1(b) are still under investigation and we would like to prioritise 3.1 (a) first so that the clearer changes are introduced in a timely manner and not be unnecessarily delayed by uncertainties.
The changes targeted by the quick wins might involve detailed and nuanced analysis, hence, aligning SQSS with EREC P2/7 by October 2022 may be ambitious.	The proposed changes to Section 3 to align with P2/7 has a target completion date of March/April 2023, given the complexities of the issue.
Further clarify and bring forward the review of connection requirements for storage and interconnectors.	How to treat storage in a section 2 planning study is mainly dictated by how to interpret what conditions which ought to be reasonably expected to arise within a year of operation. This is already being addressed by the review of the construction planning assumptions undertaken by the ESO and the 3 onshore TOs.
SQSS review timeline needs to be cognisant and aligned with key industry activities: HND publication, NOA publication, Electricity Transmission Network Planning Review and annual P2/7 network compliance assessments.	We will monitor the progress of these activities and try to ensure smooth interaction between SQSS modifications and these industrial processes.
As noted above, the operational standards in E&W, and the consideration of storage capability should involve extensive stakeholder engagement. We presume that the three-year proposed timeline is not a matter of leaving the issue aside and coming back to it later, but instead will entails a commitment to extensive industry involvement. It is important that NGESO reaches out to parties who have not historically been engaged in	We will reach out to the whole industry when setting up the workgroups and include various stakeholders.

developing the SQSS but who are bringing new technologies to the market.	
Does the plan take account of the ongoing offshore transmission co-ordination review? How heavily do the proposed NETS SQSS modifications depend on the ongoing offshore transmission co-ordination review?	We are working closely with the HND team to understand and facilitate the recommended changes to SQSS to enable the implementation of HND. These include changes to Section 7 and the impact of a meshed offshore network on the design of the MITS in Section 4.

## 7. Other comments

Feedback/comment	NGESO response
The offshore coordination may need solutions which enable better management of onshore network constraints and enable essential grid services. This could support the increase in loss of infeed strategy and aid in scoping of NOA.	Noted.
Storage capability is essential to achieve the net-zero target.	Noted.
The review should clarify the future of the annual NOA process in the context and interaction with the anticipated enduring coordinated offshore plan delivered through Holistic Network Design in 2022.	Noted, information has been passed to NOA and HND.
The scope of the review should include whether storage and interconnector connections should be assessed at a proportion of their registered capacity to reflect their operational regimes during system peak and onerous network conditions. The review should also consider changes to the CPA to maintain consistency between existing and future storage and interconnector connections.	There is ongoing the review of CPA undertaken by the ESO and the 3 onshore TOs. We will consider the review outcome and explore whether SQSS should be updated to reflect the outputs.
It is important not to confuse a network standard with a competitive investment process. Therefore, whilst it may be appropriate to find suitable wording that best describes asset owners, the detail of the proposals to 'expand to a significant piece of work' would need to be further understood, to what extent this Issue is also applicable to the Holistic Network Design of the offshore network, and whether this design standard is the appropriate place for such modifications. Other codes that reflect Interactions between the System Operator and Transmission Owners, such as the System Operator to Transmission Owner code (STC) might be more appropriate if further consideration of this area proposed more significant modification to define the relationship between asset owners and the ESO.	The rights and obligations of CATOs will be included in STC.
An assessment and review are required to establish the role of grid forming control in NETS SQSS: i. Minimum fault and inertia level and under N-1 condition including simultaneous faults and	SQSS cannot place a requirement on a customer to install a specific type of technology. The raised points are more related to the Grid Code and may require specific changes in the Grid Code.

<p>nearby apparatuses with older VSC or LCC technologies.</p> <ul style="list-style-type: none"> <li>ii. Boundary definitions, quality/type of data provision and requirements for interactions assessments, especially in converter-dominated areas</li> <li>iii. Planning and study techniques definition to avoid low voltage propagation issues, voltage-induced-frequency-instability issues that are already seen on the GB network</li> <li>iv. Set the basis for converter-based generation technology-agnostic requirements in terms of grid following or grid forming, or a combination of both.</li> </ul>	
<p>Section 5: some stakeholders raised issues regarding the reduced SCLs and its relevance to SQSS. They have also raised the limitation on MW ramping rates of wind power compared to interconnectors, however, the later point is more related to Grid Code requirements</p>	<p>NGESO has already started a wide investigation to tackle the challenge of the reduction of SCLs on the National Electricity Transmission System. The involved teams and stakeholders are exploring potential solutions and the possible consequential standards change if required.</p>
<p>The current backgrounds In the TNUoS Transport and Tariff Model are already very out of date. The timescale for review of these backgrounds Including technology types and scaling factors should be carefully considered during the scoping exercise and potentially brought forward in order to help accelerate development of storage and correctly Incentivise demand location in particular.</p>	<p>The purpose of the SQSS is to determine the right level of investment and providing the correct financial signal to customers is within the remit of CUSC.</p>
<p>The introduction of CATO into the E&amp;W transmission network leaves responsibility for network compliance assessment unclear from the perspective of transmission assets not owned by TO. This may not directly impact the contents of main SQSS chapters, it requires clarification to ensure that application of the standard is thorough and complete for both the near- and long-term requirements of the electricity transmission network.</p>	<p>Noted, CATO responsibility is not in scope of this SQSS review.</p>
<p>A review of the Value of Lost Load (VOLL) would be pertinent to ensure that this assessment, and therefore our design standard that it underpins, remain reflective of the role that electricity plays in functioning society, both today and in the future out to 2050.</p>	<p>A change to the Value of the Lost Load has potentially far outreaching implications and is likely to affect multiple processes. A change to such value is unlikely to fit under the NETS SQSS governance.</p>

## 8. Next Steps

The SQSS review plan timeline in 2022/23 is shown below. The quick win topics will be raised in two stages. In Q1 of 2022/23, modifications on the offshore design and demand connection criteria will be raised in the panel meeting. In Q3, depending on the timing of the panel meeting, modification for generation connection

requirements will be raised. In the meantime, we will continue to engage with stakeholders to discuss the plan for these modifications.

Date	Milestone
09 March 2022	Public consultation closed.
09 March onwards	Engage with stakeholders and provide ESO responses.
31 March 2022	Publication of final report of SQSS review plan.
Q1 2022/2023	Raise modification proposals for: <ol style="list-style-type: none"> <li data-bbox="579 584 1329 640">1. Assessment of the limit of offshore DC converters and DC bi-pole solution</li> <li data-bbox="579 651 1177 680">2. Alignment of SQSS Section 3 with EREC P2/7</li> </ol>
Q3 2022/2023	Raise modification proposals for: <ol style="list-style-type: none"> <li data-bbox="579 748 1329 804">3. Generation Connection Requirement (storage and interconnector definition and loss of outfeed risk)</li> </ol>

## Appendix

The details of the stakeholder responses to the consultation can be found on the website. [NETS SQSS Review](#)