SQSS Review Panel – Modification Proposal
[Review of Chapter 7 double busbar requirements]
Date Raised: [02 04 2014] **Revised:** [28 09 2016]
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Summary

At present, the GB SQSS mandates the use of double busbar (or equivalent) arrangements for the onshore substation of offshore transmission systems. A Cost Benefit Analysis, CBA, performed by DONG Energy and attached to this modification proposal demonstrates that this requirement is not economic and efficient for offshore wind farm connections, and recommend that it be removed from the SQSS.

Users Impacted

High

Large Generators (Offshore)

Offshore Transmission Owners

Medium

NETSO

Low

Description & Background

SQSS chapter 7 specifies the minimum requirements for design of offshore transmission systems and contains the following text with reference to busbars and switchgear in onshore substations (which form part of an offshore transmission system):

7.13.3.1 In the case of *offshore power park module* connections or multiple gas turbine connections, following a *planned outage* of any single section of *busbar* or mesh corner, no loss of *power infeed* shall occur;

From this requirement derives a need for double busbars in the onshore switchgear configuration for offshore wind farm connections. A CBA performed by DONG Energy demonstrates that this design approach is overly conservative, and the use of double busbar substations onshore results in a net increase in costs over a single bus design, when considering the failure rate of modern GIS equipment at typical wind farm export voltages and switchgear layouts. The CBA identifies that within a switchgear bay the component which contributes the highest to the unavailability is the circuit breaker, rather than the busbar or other components such as disconnectors and earth switches. Both single and double busbar switchgear bays usually include a common single circuit breaker. Therefore using double busbar switchgear does not increase the availability of the offshore transmission system.

Proposed Solution

It is recommended that the need for double bus substations is addressed, and subject to panel assessment, the deterministic requirement is removed if no net benefit can be demonstrated for this configuration of switchgear when considering the specific characteristics of offshore generation connections. It is proposed the relevant clauses are amended to allow the flexibility for offshore transmission systems to use either single or double busbars and meet the requirements of Chapter 7, depending on the complexity of the substation and how it will function operationally.

Assessment Against SQSS Objectives
[Will the proposed changes to the SQSS better facilitate any of the 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;*** The removal of unnecessary capital cost for offshore transmission systems would result in a reduction in the wider residual charge for all transmission system users and development of more efficient offshore transmission systems. ***(ii) ensure an appropriate level of security and quality of supply and safe operation of the National Electricity Transmission System;*** Pending panel assessment, the requirement for double bus substations may prescript an inappropriate level of system redundancy for offshore generation connections. ***(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*** N/A ***(iv) facilitate electricity Transmission Licensees to comply with their obligations under EU law.*** N/A

Impact & Assessment
Impact on the SQSS Amendment of Chapter 7 Section 7.13.3.1 requirements. ***Impact on the National Electricity Transmission System (NETS)*** Marginally reduced level of system security inasmuch as could be caused by a reduction in switchgear redundancy for offshore transmission systems. ***Impact on greenhouse gas emissions*** N/A ***Impact on relevant computer systems*** N/A ***Impact on core industry documents*** TBC, unlikely. ***Impact on other industry documents*** TBC, unlikely.

Supporting Documentation	
Have you attached any supporting documentation:	[YES]
If Yes, please provide the title of the attachment:	[Cost difference between single busbar and double busbar]

Recommendation
The SQSS Review Panel is invited to: Progress this issue to a workgroup for further analysis and discussion

Document Guidance

This document is used to raise a Modification Proposal at the SQSS Review Panel. Incomplete forms will not be processed and the Proposer may be asked to clarify any information that is not clear.

Guidance has been provided in square brackets within the document but please contact the SQSS Review Panel Secretary: Nick Martin (nick.martin@nationalgrid.com) if you have any queries.