

STC Modification Proposal Form

CM085: To clarify OFTO reactive power requirements at <20% output

Overview: It is unclear what the requirements are on OFTOs to provide access to reactive power capability at low windfarm outputs. This modification seeks to clarify that where reactive capability is available it should be provided which is operationally useful to the ESO

Modification process & timetable



Status summary: The Proposer has raised a modification and is seeking a decision from the Panel on the governance route to be taken.

This modification is expected to have a: Low impact

OFTOs and generators (specifically offshore windfarms)

Proposer's recommendation of governance route	Self-Governance modification to proceed to Code Administrator Consultation
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Who can I talk to about the change?	Proposer: Rob Wilson Robert.wilson2@nationalgrideso.com 07799 656402	Code Administrator Contact: Sally Musaka Sally.musaka@nationalgrideso.com 07790 778 560
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What is the issue?

It has become apparent that the requirements on OFTOs to provide access to reactive power capability at low windfarm outputs are unclear with the consequence that there have been instances when reactive capability has been withheld. Having predictable and firm access to reactive capability is essential to the ESO in operating the system. Where this cannot be assured it leads to the ESO having to spend money in taking additional operational actions.

Why change?

This modification seeks to clarify that where reactive capability is available at low windfarm outputs, access to this by the ESO should be provided by the OFTOs.

The particular case that this seeks to address is where, as part of an offshore windfarm connection, onshore reactive compensation has been installed often to compensate for the capacitive impact of an offshore cable network. At low windfarm outputs clearly this onshore reactive capability remains and if it is instructible by the ESO is a considerable help in maintaining system voltage within acceptable limits.

What is the proposer's solution?

OFTOs are generally required to fulfil SQSS voltage obligations, and the provision of reactive range is set out in the STC section K which stems in turn from the requirements on generators as set out in the Grid Code.

Below 20% output, while OFTOs may continue to provide voltage control utilising any available reactive capability this is not set out as a definitive obligation. It is proposed to make minor changes to the STC text to confirm that any reactive capability that is available should be provided when requested by the ESO. This change will not require any changes to equipment but will help to clarify an area of uncertainty.

Following discussions with the OFTOs it is apparent that there are concerns regarding the regular utilisation of reactive equipment, for example synchronous compensators, for general system reasons rather than as part of the compliant operation of a windfarm, and the additional costs that might be incurred associated with wear and tear. However, the ESO still needs to determine the overall most efficient solutions for consumers which in this case are likely to be using the equipment that is already there rather than prompting further system reinforcements.

The legal text has been written and revised to try to achieve a balance while helping to clarify that equipment that forms part of a TO or OFTOs regulatory asset base should generally be available unless there is good reason.

Draft legal text

The operating envelope of a power park module is set out as follows in the Grid Code:

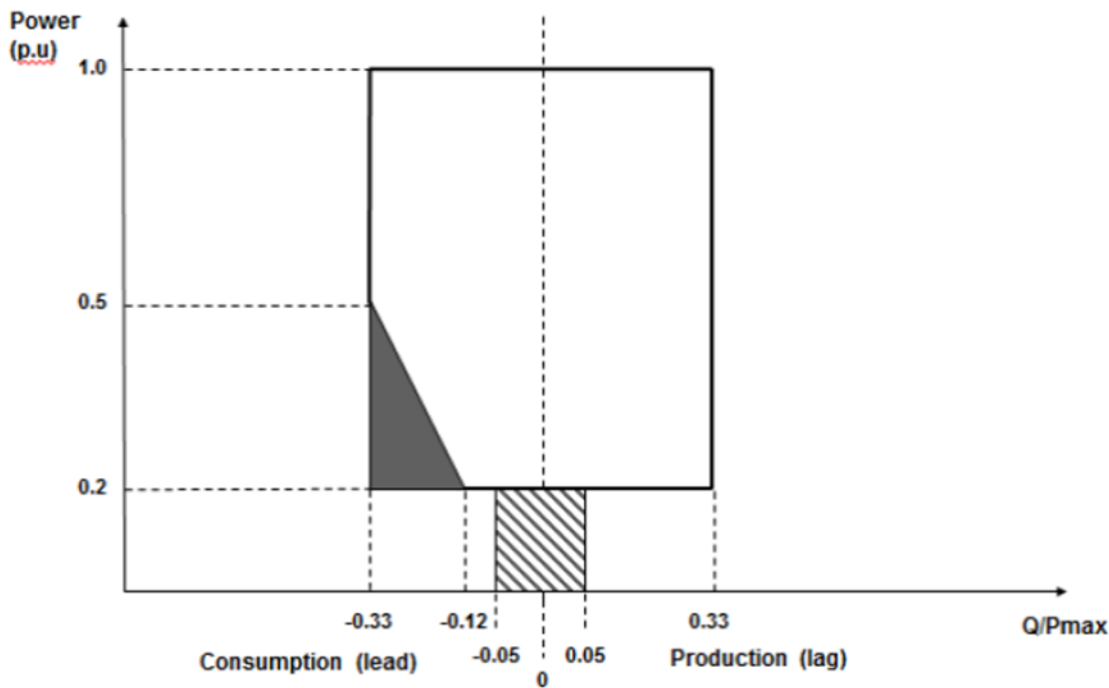


Figure ECC.6.3.2.4(c)

This diagram sets out the expected operating envelope for a power park module in terms of its reactive range at varying active power outputs, being expressed as a maximum requirement (the thick black line) down to 20% of active power output. Further details are in the text (ECC6.3.2.4.4) which accompanies the diagram.

The two shaded areas are not within the expected requirement for PPMs and there is not a definitive reactive requirement below 20% output for PPMs although ECC.6.3.8.4.1 states:

'When operating below 20% Maximum Capacity the automatic control system may continue to provide voltage control using any available reactive capability. If voltage control is not being provided, the automatic control system shall be designed to ensure a smooth transition between the shaded area below 20% of Active Power output and the non-shaded area above 20% of Active Power output.'

These requirements in the ECC section apply to more recent generators, generally those commissioned after April 2019, and to whom the Requirements for Generators (RfG) European Network Code (as retained in GB law) applies. There are similar requirements in the CC section (CC6.3.2(c)) which apply to older generators.

In the STC, the requirements on OFTOs for reactive range stem from this and are set out in Section K: TECHNICAL, DESIGN AND OPERATIONAL CRITERIA AND PERFORMANCE REQUIREMENTS FOR OFFSHORE TRANSMISSION SYSTEMS, annex 1 for pre-RfG equipment and annex 2 for post-RfG.

The proposed legal text changes are as follows shown as red mark-up:

STC Section K Annex 1

2.4 When transferring Active Power equivalent to less than 20% of the Interface Point Capacity:

2.4.1 the automatic control system may continue to provide voltage control utilising any available reactive capability and, if applicable, as instructed by The Company *where this can be achieved without unduly affecting such equipment. For the avoidance of doubt this is not an absolute design requirement;*

2.4.2 If voltage control is not being provided:

(a) the automatic control system shall be designed to be capable of a smooth transition between the shaded area bounded by CD and the non-shaded area bound by AB in Figure K1 below; and

(b) the Reactive Power delivered at the Interface Point shall be within a range of +/-5% of the Interface Point Capacity expressed in MVar.

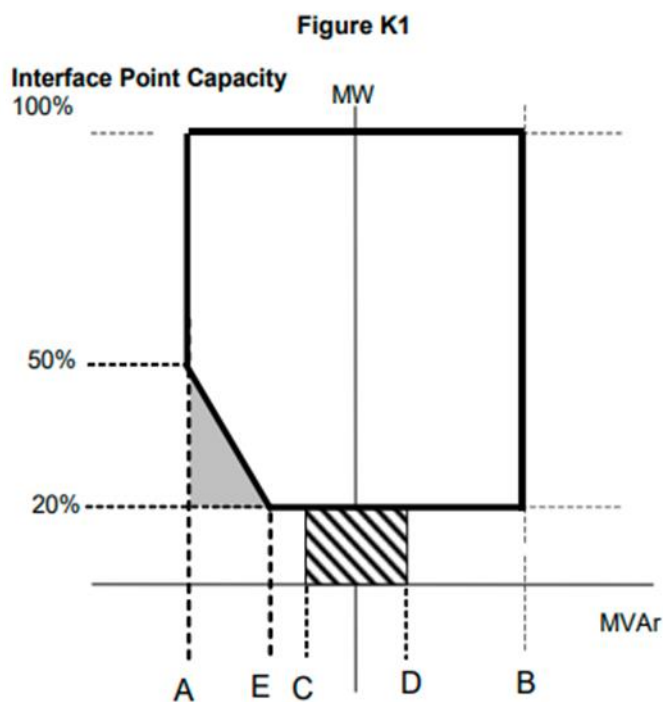


Figure K1

STC Section K Annex 2

1.3.2 The Reactive Capability requirements at the Interface Point applicable to Offshore Transmission Licensees are the same as EU Generators undertaking OTSDUW Build as defined in ECC.6.3.2.4. The Reactive Power capability that an Offshore Transmission System must be able to provide at the Interface Point may be delivered using a combination of Plant owned by the Offshore Transmission Owner concerned and Plant owned by a Generator or Generators connected to that Offshore Transmission System. Where Generator Plant is out of service, the Reactive Power capability requirements will be reduced pro-rata to the maximum Active Power capability of Generator Plant in service.

1.3.2.1 When transferring Active Power equivalent to less than 20% of the Interface Point Capacity, the automatic control system may continue to provide voltage control utilising any available reactive capability and, if applicable, as instructed by The Company where this can be achieved without unduly affecting such equipment. For the avoidance of doubt this is not an absolute design requirement;

What is the impact of this change?

Proposer's assessment against STC Objectives	
Relevant Objective	Identified impact
(a) efficient discharge of the obligations imposed upon transmission licensees by transmission licences and the Act	Positive
(b) development, maintenance and operation of an efficient, economical and coordinated system of electricity transmission	Positive By ensuring the availability of reactive equipment this will help the ESO to efficiently operate the system
(c) facilitating effective competition in the generation and supply of electricity, and (so far as consistent therewith) facilitating such competition in the distribution of electricity	Neutral
(d) protection of the security and quality of supply and safe operation of the national electricity transmission system insofar as it relates to interactions between transmission licensees	Positive
(e) promotion of good industry practice and efficiency in the implementation and administration of the arrangements described in the STC	Positive Helps to clarify an area of the STC
(f) facilitation of access to the national electricity transmission system for generation not yet connected to the national electricity transmission system or distribution system;	Neutral
(g) compliance with the Electricity Regulation and any relevant legally binding decision of the European Commission and/or the Agency.	Neutral

Proposer's assessment of the impact of the modification on the stakeholder / consumer benefit categories	
Stakeholder / consumer benefit categories	Identified impact
Improved safety and reliability of the system	Positive Helps to ensure cost effective and secure operation of the system.

Lower bills than would otherwise be the case	Positive In clarifying the availability and use of existing equipment this modification avoids the ESO having to over-invest in additional reactive support.
Benefits for society as a whole	Positive Efficient and secure operation of the electricity transmission system.
Reduced environmental damage	Neutral
Improved quality of service	Neutral

When will this change take place?

Implementation date

5 January 2023

Date decision required by

14 December 2022

Implementation approach

OFTOs will need to be aware of this change to make sure that reactive capability is available unless there is a good reason for it not to be – such as a fault or ongoing maintenance.

Proposer's justification for governance route

Governance route: Self-Governance modification to proceed to Code Administrator Consultation

This modification is a minor clarification only; no changes to equipment will be required and there is no impact on any parties other than it providing the ESO with some helpful certainty in the availability of reactive power, an essential part of operating the system.

Self-Governance Criteria

It depends on the material effect of the modification as to whether it should be subject to Standard or Self-Governance. If you are proposing that your modification should be subject to Self-Governance, you must explain how it meets the below criteria.

The modification is unlikely to discriminate between different STC Parties and is unlikely to have a material effect on:

- Existing or future electricity customers;
- Competition in the generation, distribution, or supply of electricity or any commercial activities connected with the generation, distribution or supply of electricity,
- The operation of the National Electricity Transmission System
- Matters relating to sustainable development, safety or security of supply, or the management of market or network emergencies
- The STC Panel's governance procedures or the STC Panel's modification procedures

Interactions

- | | | | |
|--|---|--------------------------------|-------------------------------|
| <input type="checkbox"/> Grid Code | <input type="checkbox"/> BSC | <input type="checkbox"/> CUSC | <input type="checkbox"/> SQSS |
| <input type="checkbox"/> European
Network Codes | <input type="checkbox"/> Other
modifications | <input type="checkbox"/> Other | |

None

Acronyms, key terms and reference material

Acronym / key term	Meaning
BSC	Balancing and Settlement Code
CM	Code Modification
CUSC	Connection and Use of System Code
STC	System Operator Transmission Owner Code
SQSS	Security and Quality of Supply Standards

Reference material

- None