SQSS Chapter 7: Guidance

This guidance has been drafted by the offshore wind industry, with the secretariat provide by RenewableUK. This is not intended to be a legal document.

Members of the working group that compiled this guidance were

Nicola Barberis Negra	Lead Grid Connection Specialist	Ørsted
Aled Moses	Senior Regulatory Affairs Advisor	Ørsted
Alan Mason	Senior Electrical Engineer	EDPR
Adam Morrison	Head of Electrical	EDPR
Chris Smith	Senior Electrical Engineer Offshore	Innogy
Allan Kelly	OFTO manager	Mainstream
Bieshoy Awad	Power System Engineer	National Grid ESO
Anis Yaakob	Power System Engineer	National Grid ESO
Craig Bennoch	Senior Electrical Engineer	Scottish Power Renewables
David Partington	Senior Electrical Engineer	Scottish Power Renewables
Ahmed Shafiu	Engineering Manager	Siemens
Mike Lee	Engineering Director	Transmission Investment

1. Scope

1.1.1. This guidance document has been developed in order to clarify specific issues that have been raised by industry participants and were attributed to the ambiguity of the intention of specific clauses of the NETS SQSS. While this document aims to clarify the logic, the intention, and the applicability of these specific clauses, it does not provide comprehensive guidance on how these clauses need to be met; and it does not provide comprehensive guidance on the use of the NETS SQSS in general or the Offshore Generation Connection Criteria in particular; it also does not have any legal status and is not a licence requirement on any party.

1.1.2. The issues addressed in this guidance are:

- 1.1.2.1. The definition of the First Onshore Substation and clarification that its impact on charge allocation is minimal;
- 1.1.2.2. The specification of the reactive power output of an Offshore Power Station;
- 1.1.2.3. Variations to Connection Design;
- 1.1.2.4. The use of dynamic ratings of cables; and
- 1.1.2.5. The minimum number of bays required to be provided by an Onshore Transmission Licensee for an offshore connection.

1.1.3. References to the Grid Code, the Connection and Use of System Code (CUSC), and the System Operator Transmission Owner Code (STC) are intended to provide clarity on how these codes interact with the NETS SQSS requirements. In order to avoid duplication, the details related to these codes were kept to a minimum. Further clarity should be sought by reference to these codes and any associated guidance.

1.1.4. This document was compiled using inputs from National Grid ESO and experts from the offshore wind industry. It comprises two parts

- 1.1.4.1. Part 1: includes contents that have been agreed by all parties participating in the drafting; and
- 1.1.4.2. Part 2: includes the Electricity System Operator's view on issues where at least one party did not agree to these view.

Part 2 has been discussed with the SQSS Review Panel which supported the publication of the views provided by National Grid ESO.

2. Background

2.1.1. In offshore generation projects, the developer builds both the Offshore Power Station (User's assets) and Offshore Transmission System assets. The Offshore Transmission System assets are then sold to an Offshore Transmission Owner (OFTO) who would be required to own, maintain, and where necessary further develop these assets.

2.1.2. In this document,

- 2.1.2.1. "User" refers to the party that owns and operates the Power Station and does not cover them in their capacity as the party that develops the Offshore Transmission System (OTSDUW User) ahead of the transfer of these assets to an OFTO.
- 2.1.2.2. "OFTO" refers to the party that develops and owns the Offshore Transmission Network. This includes the OTSDUW User, up until the assets are transferred to an OFTO, then the OFTO.

2.1.3. The Offshore Transmission System is required to be developed and operated to comply with the NETS SQSS. However, to reduce or optimise the cost for the project, non-standard

arrangement may be used, arrangements that do not meet the minimum deterministic criteria of the NETS SQSS, or arrangements that exceed that minimum.

2.1.4. It became evident to the industry that there is a need to clarify some issues that were frequently raised by offshore developers to provide consistent guidance in these situations.

2.1.5. In order to reduce the uncertainty around the use of such arrangements, it was necessary to consider and clarify

2.1.5.1. how such arrangements fit in the context of the NETS SQSS;

2.1.5.2. the consequential impact, or the absence of impact as the case may be, on compliance with other codes, processes, and policies; and

2.1.5.3. where applicable, how the contracts between different parties would need to be managed to minimise the risks on all parties.

PART 1:

Items in Part 1 have been agreed with all parties participating in the industry workgroup

3. The first onshore substation

3.1. Relevant SQSS Definitions

First Onshore Substation	The first onshore substation defines the onshore limit of an offshore transmission system. An offshore transmission system cannot extend beyond the first onshore substation. Accordingly, the security criteria relating to an offshore transmission system extend from the offshore GEP up to the interface point or user system interface point (as the case may be), which is located at the first onshore substation. The security criteria relating to the onshore transmission system extend from the interface point located at the first onshore substation and extend across the remainder of the onshore transmission system. The security criteria relating to an onshore user system extend from the user system interface point located at the first onshore substation and extend across the remainder of the relevant user system. The first onshore substation will comprise, inter alia, facilities for the connection between, or isolation of, transmission circuits and/or distribution circuits. These facilities will include at least one busbar to which the offshore transmission system connects and one or more circuit breakers and disconnectors. For the avoidance of doubt, if the substation does not include these elements, then it does not constitute the first onshore substation. The first onshore substation may be owned by the offshore transmission owner, the onshore transmission owner or onshore user system owner as determined by the relevant transmission licensee and/or distribution licensee. Normally, in the case of there being transformation facilities at the first onshore substation and unless otherwise agreed, if the offshore transmission owner owns the first onshore substation, the interface point would be on the HV busbars and, if the first onshore substation is owned by the onshore transmission owner or onshore user system owner, the interface point or user system interface point (as the case may be) would be on the LV busbars.
Busbar	*The common connection point of two or more transmission circuits*
Offshore Transmission Circuits	*Part of an offshore transmission system between two or more circuit breakers which includes, for example, transformers, reactors, cables, overhead lines and DC converters but excludes busbars and onshore transmission circuits*
Onshore Transmission Circuits	*Part of the onshore transmission system between two or more circuit breakers which includes, for example, transformers, reactors, cables, overhead lines and DC converters but excludes busbars, generation circuits and offshore transmission circuits*

Generation Circuit	*The sole electrical connection between one or more generating units and the Main Interconnected Transmission System i.e. a radial circuit which if removed would disconnect the generating units*

3.1.1. There is no definition of a substation in the NETS SQSS or CUSC. The general assumption is that a fenced facility that is owned by a Transmission Licensee and containing some transmission plant, e.g. a circuit breaker, and some isolation facilities constitutes a substation. Such a substation may or may not meet the criteria that is required for the First Onshore Substation and, hence, may or may not be a suitable location for the Transmission Interface Point.

3.2. Background

3.2.1. The NETS SQSS defines the concept of a "First Onshore Substation." This substation could be owned by either the Onshore Transmission Owner or the Offshore Transmission Owner. There are several references to the First Onshore Substation in Section 7 of the NETS SQSS. This include clauses 7.1, 7.8, 7.9, 7.10 and 7.11.

3.2.2. It was felt that the following issues are not sufficiently clear:

3.2.2.1. The intention behind the definition of a First Onshore Substation;

3.2.2.2. The impact of minor changes to a substation design on whether the substation would be the First Onshore Substation or not; and

3.2.2.3. Whether assets located at an OFTO substation would be charged for differently if the substation did not meet the criteria necessary for it to be the First Onshore Substation or not.

3.2.3. It has been felt that if the onshore substation was not the first onshore substation as defined in SQSS, then there may be cost implications. However, charging for different transmission assets is the subject of CUSC, rather than the NETS SQSS and that the concept of the First Onshore Substation is not defined in CUSC.

3.3. The concept of the First Onshore Substation

3.3.1. The intention of the First Onshore Substation in the SQSS is to define the location of the Interface Point which sets the demarcation point between:

- The ownership of the OFTO assets versus ONTO assets, and
- The applicability of the relevant design criteria of Section 2 versus Section 7.

3.3.2. For a substation to meet the conditions of the First Onshore Substation, it needs to have at least one busbar, i.e. a common point of connection between two circuits, and at least one circuit breaker and disconnector. However, the presence of a busbar, a circuit breaker and disconnector in a substation owned by the OFTO does not automatically make it the First Onshore Substation.

3.3.3. Whereas the NETS SQSS assumes a default Transmission Interface Point (which is HV busbar if OFTO owns the First Onshore Substation and LV busbar if the ONTO owns the First Onshore Substation), it does not preclude any other choice. However, in all cases, the default Transmission Interface Point is located at the First Onshore Substation and may only extend beyond the First Onshore Substation, with agreement between the developer and the ESO. An example of alternative Interface Point is shown in Figure 1 of Annex 1.

3.3.4. Appendix 1 shows examples of substation configurations and their suitability to be the First Onshore Substation.

3.4. Charging Implications

3.4.1. The charging methodology is defined in Section 14 of the CUSC. It is independent of the definitions of the First Onshore Substation in the NET SQSS. The intention of the definition of the First Onshore Substation in the NETS SQSS is to define the location of the Transmission Interface Point which sets the demarcation point between the ownership of the OFTO assets against Onshore TO assets, and the applicability of the relevant design criteria of NETS SQSS Section 2 versus Section 7.

3.4.2. It is the ownership of a transmission asset affects how this asset is charged for. Assets owned by the Offshore TO will form a part of their Regulated Asset Base and will be charged for accordingly. Charging for assets located within an Offshore TO substation is not affected by whether this Offshore TO substation meets the criteria of the First Onshore Substation or not.

3.4.3. Further guidance on the Charging Methodology and allocation of different charges is available on the National Grid Website at https://www.nationalgrid.com/uk/electricity/charging-and-methodology/charging-policy-and-guidance.

4. Reactive Power Output of Offshore Power Stations

4.1. Relevant NETS SQSS Clauses

Section 7

7.13 The connection of a particular *offshore power station* shall meet the criteria set out in paragraphs 7.14 to 7.23 under the following background conditions:

7.13.1 the active power output of the *offshore power station* shall be set to deliver active power at the *offshore grid entry point* equal to its *registered capacity*;

7.13.2 the reactive power output of the *offshore power station* shall normally, and unless otherwise agreed, be set to deliver zero reactive power at the *offshore grid entry point* with active power output equal to *registered capacity*; and the reactive power delivered at the *interface point* shall be set in accordance with the reactive requirements placed on the *offshore transmission licensee* set out in Section K of the STC (System Operator – Transmission Owner Code); and…

4.2. Background

4.2.1. It was felt that it is not clear whether proceeding with a design to have a non-zero reactive power delivery arrangement at the offshore grid entry point would be deemed SQSS compliant or not, and what implications would be to the developer during the transfer of assets to a future OFTO.

4.3. The default requirements

4.3.1. The specification of the background conditions in Paragraphs 7.13 and the Generation Connection Capacity Requirements specified in Paragraphs 7.13 to 7.18 aim to ensure that the Offshore Transmission Network is of sufficient capacity to allow the transmission of the active power generated at the Offshore Grid Entry Point and the provision of the reactive power requirements specified in Section K of the STC at the Interface Point without violating any of the operational limits of that network.

4.3.2. The default position is that Offshore Power Stations are not required to provide any reactive capability at the Offshore Grid Entry Point. This means that any reactive power required to allow the provision of the dynamic reactive capability required by the STC at the Interface

Point (or to compensate for any cable reactive gains) will need to be provided by the Offshore Transmission Assets. This default position is specified in Paragraph 7.13.2 of the NETS SQSS and in CC.6.3.2 (e) (i) of the Grid Code.

4.3.3. This means that being compliant with the SQSS is also compliant with the Grid Code.

4.4. Deviating from the default requirements

4.4.1. Deviation from this default position is permitted by the Grid Code, the STC, and the NETS SQSS, and projects have been approved on this basis. It should be permitted, provided that an agreement can be reached between the System Operator, the Offshore Transmission Owner and the Generator in respect of the reactive power capability that the Generator would need to provide at the Offshore Grid Entry Point.

4.4.2. This allows Offshore Power Stations to contribute towards meeting the reactive power requirements at the interface point as specified in Section K of the STC or, subject to any restrictions in commercial frameworks between the System Operator, the Offshore Transmission Owner and the Generator, to help in managing reactive power flows, losses in the system and voltages within the offshore transmission system.

4.4.3. To achieve the agreement above, it will be necessary to assess the implications on all parties involved. This includes:

- the savings on offshore transmission assets (mainly reactive power compensation equipment);
- any cost to the use of reactive power that the Electricity System Operator will be asked to incur over the lifetime of the project.

4.4.4. Once this agreement has been achieved, the reactive power requirements will be:

- stipulated in the Connection Site Specification produced and maintained by the OFTO;
- stipulated in the Bilateral Agreement between the Generator and the System Operator;
- stipulated in any Mandatory Services Agreement and/or Commercial Services Agreement between the Generator and the System Operator; and
- used as a basis of setting the reactive power delivered by the Power Park Modules as specified in Paragraph 7.13.2 of the NETS SQSS.

PART 2:

Items in Part 2 contains NGESO views on items where one or more of the parties participating in the industry workgroup have disagreed with. These items have been raised with the NETS SQSS Review Panel which recommended the publication of view of NGESO.

5. Variations to Connection Designs

5.1. Relevant NETS SQSS Clauses

Section 7

7.4 In planning *offshore* generation connections, this Standard is met if the connection design either:

7.4.1 satisfies the deterministic criteria detailed in paragraphs 7.6 to 7.18; or

7.4.2 varies from the design necessary to meet paragraph 7.4.1 above in a manner which satisfies the conditions detailed in paragraphs 7.20 to 7.23.

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7.20 Variations, arising from a generation customer's request, to the generation connection design necessary to meet the requirements of paragraphs 7.6 to 7.18 shall also satisfy the requirements of this Standard provided that the varied design satisfies the conditions set out in paragraphs 7.21.1 to 7.21.3. For example, such a generation connection design variation may be used to take account of the particular characteristics of an *offshore power station*.

7.21 Any generation connection design variation must not, other than in respect of the generation customer requesting the variation, either immediately or in the foreseeable future:

7.21.1 reduce the security of the *MITS* to below the minimum planning criteria specified in Section 4; or

7.21.2 result in additional investment or operational costs to any particular customer or overall, or a reduction in the security and quality of supply of the affected customers' connections to below the planning criteria in this section or Section 8, unless specific agreements are reached with affected customers; or

7.21.3 compromise any *transmission licensee's* ability to meet other statutory obligations or licence obligations.

7.22 Should system conditions subsequently change, for example due to the proposed connection of a new customer, such that either immediately or in the foreseeable future, the conditions set out in paragraphs 7.21.1 to 7.21.3 are no longer satisfied, then alternative arrangements and/or agreements must be put in place such that this Standard continues to be satisfied.

7.23 The additional operational costs referred to in paragraph 7.21.2 and/or any potential reliability implications shall be calculated by simulating the expected operation of the *national electricity transmission system* in accordance with the operational criteria set out in Section 5 and Section 9. Guidance on economic justification is given in Appendix G.

5.2. Background

5.2.1. The process of requesting that the generation connection is based on a Variation to Connection designed, widely referred to as "Customer Choice," is not sufficiently clear in terms of

5.2.1.1. who has the right to request that variation;

5.2.1.2. whether it has to be supported by a cost benefit analysis or not;

5.2.1.3. any specific criteria that a Variation to Connection Design is required to meet; and

5.2.1.4. whether the final design would be compliant with the NETS SQSS or not.

5.3. Clarification

5.3.1. A Variation to Connection Design is allowed under the NETS SQSS to give the User an opportunity to tailor their connection design to suit their needs. It may include the request for investment above the standard, e.g. to increase the security of the connection. It may also include the request of investment below the standard, e.g. to reduce connection charges or facilitate earlier connection date.

5.3.2. It is unlikely that a Transmission Licensee will object to a Variation to Connection Design that is requested by the User unless this Variation to Connection Design fails to meet the criteria specified in the NETS SQSS.

5.3.3. The User is the only party that can request their connection to be subject to a Variation to Connection Design. In some cases, a Transmission Owner or the Electricity System Operator could suggest such variation however it would only be progressed after it has been formally requested by the User.

5.3.4. The User may need to do their own analysis prior to requesting that the connection is based on a Variation to Connection Design to ensure that this request fits their business case. However, there is no requirement to share this analysis with any Licensee as a part of the connection application process.

5.3.5. The OFTO, the Onshore TO, and the Electricity System Operator will have to ensure that the variation requested meets the conditions in Paragraph 7.21 and 2.16 of the NETS SQSS. In general, TOs will be required to ensure that operational, contractual, and financial measures are in place to ensure these conditions are met. These measures will be reflected in the Construction Agreement and the Bilateral Agreement between the User and the Electricity System Operator.

5.3.6. In some occasions, there may be some need to run an assessment to identify any operational costs or additional investment that may arise from such variation.

5.3.7. Generation connections that are based on a Variation to Connection Design requested by the User and compliant with Paragraphs 7.21 and 2.16 are compliant with the NETS SQSS in accordance with Paragraphs 7.4.2 and 2.4.2.

6. Dynamic and Short Term Ratings

6.1. Relevant NETS SQSS Clauses

Section 7

7.13 The connection of a particular *offshore power station* shall meet the criteria set out in paragraphs 7.14 to 7.23 under the following background conditions:

7.13.1 the active power output of the *offshore power station* shall be set to deliver active power at the *offshore grid entry point* equal to its *registered capacity*;

7.13.2 the reactive power output of the *offshore power station* shall normally, and unless otherwise agreed, be set to deliver zero reactive power at the *offshore grid entry*

point with active power output equal to *registered capacity*; and the reactive power delivered at the *interface point* shall be set in accordance with the reactive requirements placed on the *offshore transmission licensee* set out in Section K of the STC (System Operator – Transmission Owner Code); and

7.13.3 conditions on the *national electricity transmission system* shall be set to those which ought reasonably to be expected to arise in the course of a year of operation. Such conditions shall include forecast demand cycles, typical *power station* operating regimes and typical *planned outage* patterns modified where appropriate by the provisions of paragraph 7.16.

7.14 The transmission capacity of the offshore transmission circuits for the connection of one or more offshore power stations shall be planned such that, for the background conditions described in in paragraph 7.13, with no local system outage and prior to any fault, there shall not be any of the following:

7.14.1 Equipment loadings exceeding the pre-fault rating;

7.14.2 Voltages outside the pre-fault planning voltage limits or insufficient voltage performance margins; or

7.14.3 System instability.

Section 11

Pre-fault rating

The specified pre-fault capability of transmission equipment. Due allowance shall be made for specific conditions (e.g. ambient / seasonal temperature) agreed time dependent loading cycles of equipment and any relevant procedures. In operational timeframes dynamic ratings may also be used where available

6.2. Background

6.2.1. The deterministic criteria in Paragraph 7.14 requires that the various parts of the offshore transmission system are of sufficient rating to allow the transfer of the full capacity of the Offshore Power Station without any equipment exceeding pre-fault ratings.

6.2.2. For an offshore cable with no redundancy requirement, the pre-fault rating is equal to its continuous rating.

6.2.3. A significant reduction in capital cost could be achieved via the use of dynamic ratings and short-term ratings in design timescales and additional pre-fault capacity could be made available on that cable where dynamic ratings could be used. However, a strict interpretation of the NETS SQSS definition restricts the use of such ratings to operational timescales (Section 11 – pre-fault ratings)

6.2.4. As, it was felt beneficial to clarify how this could be achieved in accordance with the NETS SQSS rules, and whether this requires a design variation.

6.3. NETS SQSS Compliance

6.3.1. It is the responsibility of the owner of the asset to specify its continuous ratings.

6.3.2. This will need to be in accordance with the best industry practice in order to avoid commercial implications that may arise at the time when the ownership of the offshore assets is transferred to the OFTO or if, for any reason, these ratings cannot be made available.

6.3.3. The NETS SQSS criteria, relevant to the thermal loading of a cable, will be met if

6.3.3.1. The cable rating declared by the OFTO is sufficient to meet these criteria; or

6.3.3.2. As a part of Variation to Connection design in cases where the cable rating declared by the OFTO is not sufficient to meet these criteria.

6.3.4. If the cable rating declared is sufficient to allow the deterministic criteria to be met, then the system will be compliant with these criteria. If, for any reason, the continuous ratings cannot be made available, then the OFTO will have to issue a temporary restriction on that capacity. The ESO will restrict the User's output accordingly in line with the Offshore Restrictions on Availability clauses in the Bilateral Agreement between the User and the ESO.

6.3.5. If the cable rating declared are below what is sufficient to allow the deterministic criteria to be met, then the system will be compliant subject to a Variation to Connection Design and additional Restrictions on Availability clauses. To allow the User to generate the full output, the OFTO may declare an enhanced rating. If this enhanced rating is not available, the additional Restrictions on Availability clauses will be invoked.

6.3.6. The arrangement in paragraph 6.3.5 has been used in several offshore windfarm connections with the use of dynamic and short term cable ratings being treated as a Variation to Connection Design.

7. Substation bays and minimum requirements

7.1. Substation bays

7.1.1. A substation bay[1] comprises the space, infrastructure and electrical equipment required to populate the bay and connect a transmission circuit to a busbar. The transmission plant in a bay will include any circuit breaker(s) required to energise and/or disconnect the circuit from the busbar and suitable isolators/disconnectors to allow isolation of the circuit and circuit breaker for maintenance purposes.

7.2. Minimum requirements

7.2.1. The requirement to have one or more bays at any substation is intrinsically related to the ability to meet the NETS SQSS loss of infeed risk criteria relevant to both the circuit and the busbar that are connected by such bays as well any other busbar coupler circuit breaker and busbar section circuit breaker connected to the same busbar.

7.2.2. For offshore connections, the criteria relevant to the substation bays at the interface point are summarised in the table below.

Element	Paragraphs	Permitted loss of infeed	Notes
transformer circuit (at the onshore AC transformation facility)	7.12.1	50% of the windfarm capacity up to the Normal Infeed Loss Risk	The high "Mean Time To Repair" a transformer justify the redundancy requirement. Only for windfarms with capacity higher than 120MW
HVDC converter (at the onshore DC conversion facility)	7.12.2	Normal Infeed Loss Risk	Based on reliability data available for HVDC convertor
Cables	7.8	Infrequent Infeed Loss Risk	Despite the potentially high "Mean Time To Repair" a cable. The low risk

[1] Term is not defined in any industry document.

			of faults and the cost of an extra cable do not justify the redundancy
Overhead lines	7.11	Infrequent Infeed Loss Risk	For overhead line circuits at 132kV, two overhead line circuits could be justified based on the windfarm capacity and the length of the circuit. (Paragraph 7.9). For overhead line circuits at 220kV or above, the minimum windfarm capacity where having two circuits is justified is 1250MW (Paragraph 7.10)
Bus coupler circuit breakers, Bus section circuit breakers and busbars	2.6.3 to 2.6.6 and 7.12.3	Infrequent Infeed Loss Risk	Circuit breaker and busbar faults are very rare compared to other events

Table 4.1: SQSS requirements for elements that may connect to a substation bay

7.2.3. Application of these criteria would allow as much generation as possible to be connected to the same busbar at the same point of connection (one bay) provided that the total infeed loss risk for a fault outage on that busbar does not exceed the Infrequent Infeed Loss Risk. All of such generation capacity could be connected via a single overhead line circuit or cable circuit.

7.2.4. Where the windfarm capacity exceeds the Infrequent Infeed Loss Risk, additional connection points to independent busbar sections, additional cable circuits, and additional overhead line circuits will need to be included in the design to ensure compliance and limit the infeed that could be lost following a secured event.

7.2.5. The presence of any other generation that is connected to the same busbar to which the offshore windfarm connects to may require the provision of additional connection points. This will depend on the site configuration and the ease of adding busbar section circuit breakers at an appropriate location.

7.2.6. Additional arrangements have to be made such that

- any loss of infeed due to a transformer fault does not exceed the least of 50% of the windfarm capacity or the Normal Infeed Loss Risk
- any loss of infeed due to a HVDC converter fault does not exceed the Normal Infeed Loss Risk.

7.2.7. Such arrangements usually include the installation of circuit breakers to ensure that a fault on the relevant transformer and/or HVDC converter can be isolated without having to disconnect other transformer(s), HVDC converter(s), cable section(s), overhead line section(s), or busbar(s).

7.2.8. Where a User requires an additional connection point, the User will be expected to make their connection application on the basis of a Variation to Connection Design. In such case, any additional bays will be funded by the User in order to comply with Paragraph 2.16.2 of the NETS SQSS.

Annex 1: First Onshore Substation Examples

Figure 1
The substation contains one busbar and multiple circuit breakers therefore it could be chosen as the First Onshore Substation.

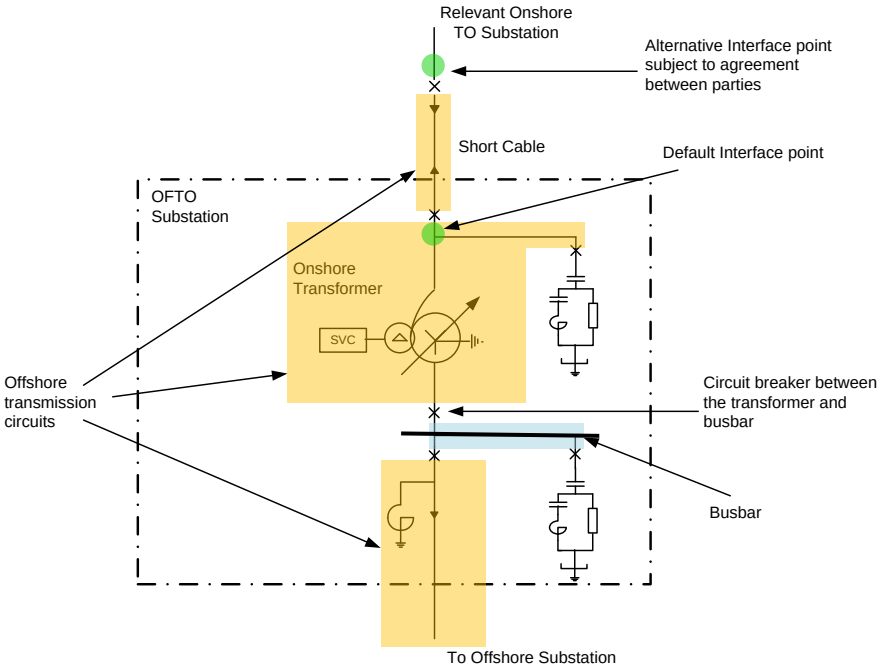
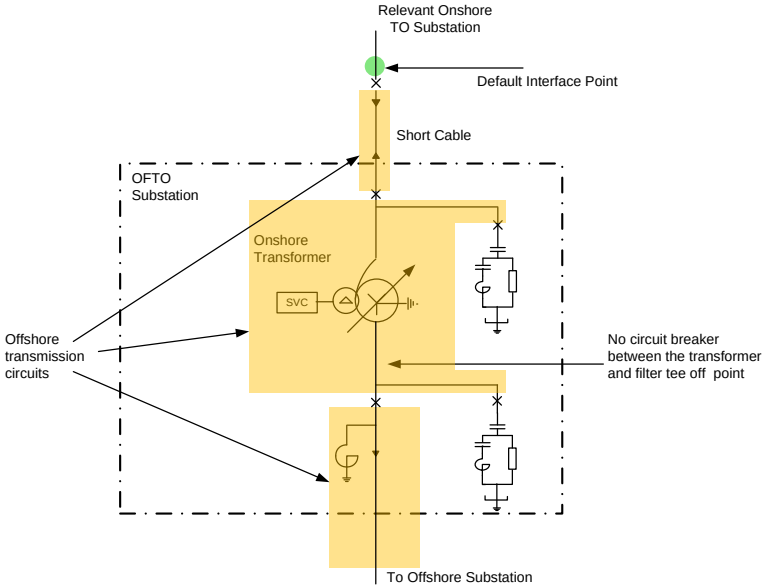


Figure 2
The substation contains no busbars hence it does not meet the criteria of a First Onshore Substation. will not qualify as the First Onshore Substation



In comparison to Figure 1, with one less circuit breaker, the transformer circuit and the cable circuit connect directly to each other with no busbar in between.

Figure 3
In this figure, there are three Transmission Circuits connected in series with no busbars between them. Hence the OFTO substation does not meet the definition of the First Onshore Substation.

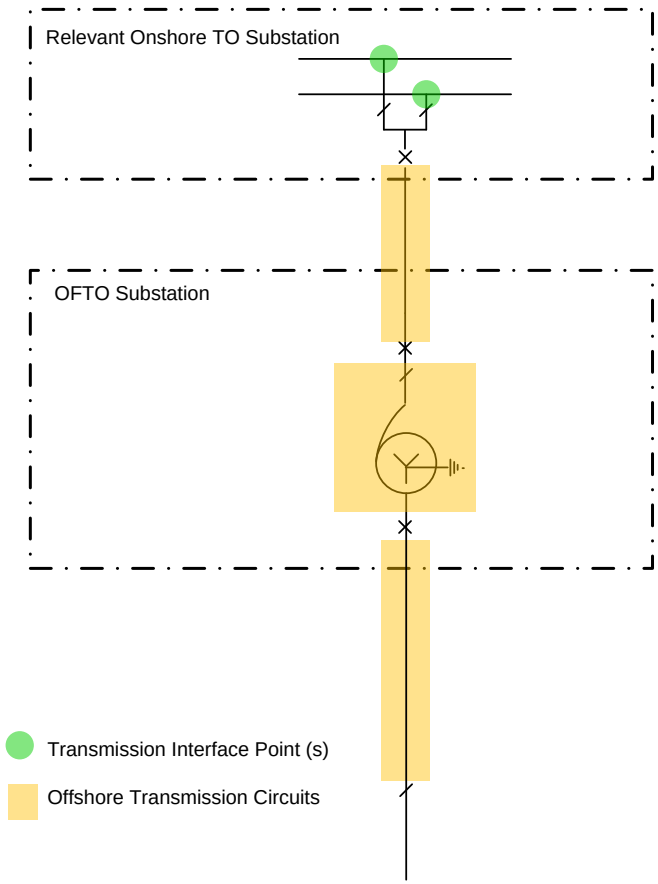


Figure 4
This OFTO substation has two sets of double busbars to which the two Offshore Transmission Circuits are connected. The substation could be chosen as the First Onshore Substation.

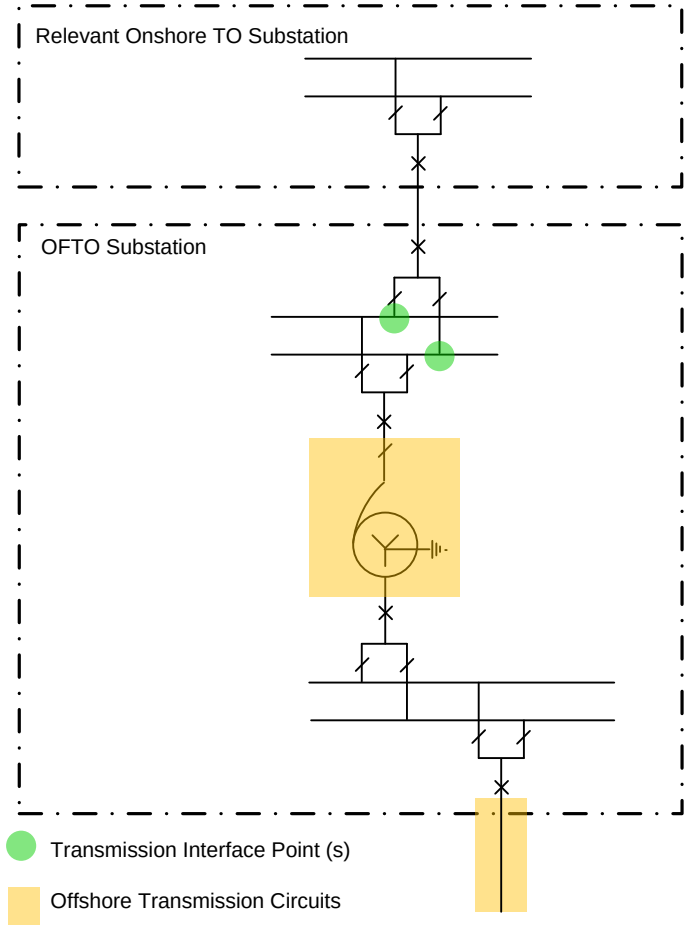


Figure 5
This OFTO substation has a set of double busbars to which the two Offshore Transmission Circuits are connected. The substation could be chosen as the First Onshore Substation.

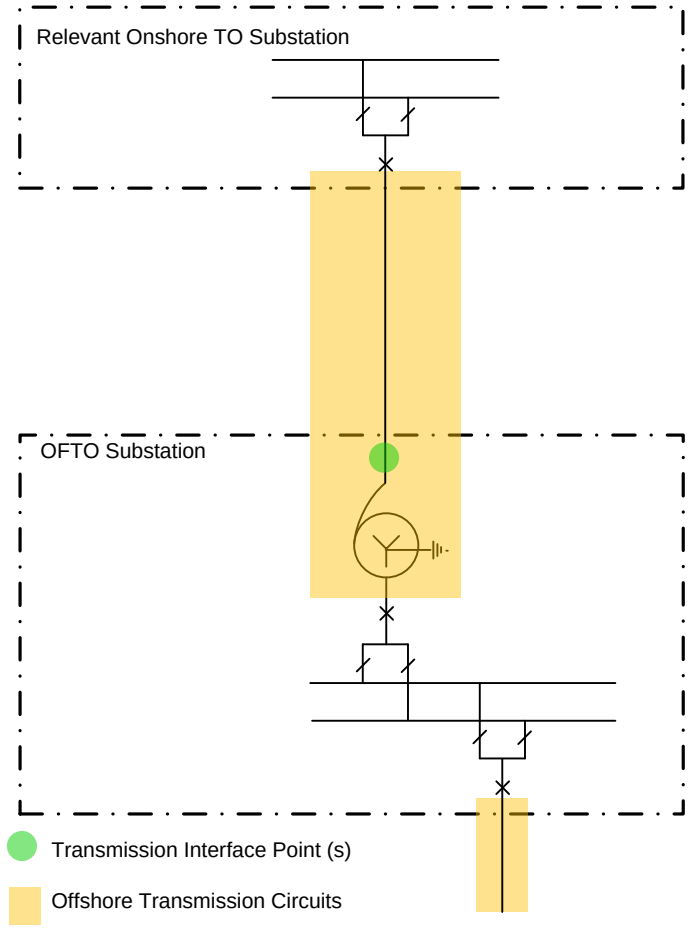


Figure 6
This OFTO substation has no busbars. The three circuits are connected directly to each other. Hence the OFTO substation does not meet the definition of the First Onshore Substation