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Guidance: TNUoS charging for Offshore generators and the Offshore Transmission Owner regime





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1. TNUoS and OFTOs





What is TNUoS?

Transmission Network Use of System Charges (TNUoS) recovers the costs of building, owning and maintaining transmission assets for GB Transmission Owners (TOs). Generation and demand are set charges that are cost-reflective based on where they are located in the country and how they use the transmission network. TNUoS tariffs are calculated, set, and billed by us – National Energy System Operator (NESO). We recover revenue from generation and demand, and pay it to the TOs.

What are OFTOs?

Offshore Transmission Owners (OFTOs) are the owners of the transmission assets that connect offshore generators to the onshore network. They are appointed by Ofgem through a competitive tender process following the construction of the assets by the generator that will use them in the future. Under the rules of granting a generation licence, generators are not permitted to own transmission assets, and so have to sell them once they have been constructed. Onshore TOs are not allowed to own offshore transmission assets according to their transmission licences.

Once the transmission assets are transferred to the ownership of an OFTO, the generator becomes liable for offshore local TNUoS charges (see below).

To transfer the offshore transmission assets to the ownership of an OFTO, Ofgem runs a competitive tender process to identify its 'preferred bidders'. One of these bidders is then appointed as the eventual owner of the assets. Once its future revenue is agreed with Ofgem, they are granted an offshore transmission licence and become an OFTO.

How long does it take to appoint an OFTO?

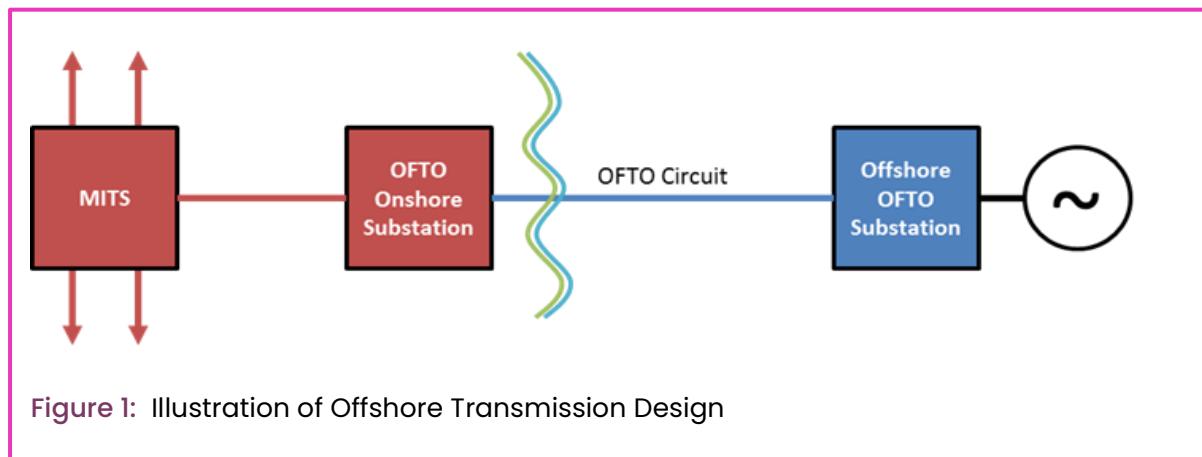
Once the offshore generator that built the transmission assets has energised its connection and can export electricity onto the national transmission system, the process of transferring the assets to an OFTO begins. Under normal circumstances, this process, from the invitation to tender, to the asset transfer may take 18 to 24 months. In exceptional circumstances, it may take longer than 24 months for the OFTO satisfies all the requirements to be granted an offshore transmission licence.



Why does offshore transmission differ to onshore transmission?

The criteria for offshore design are different from those for the onshore transmission network and are defined in the (GB) Security and Quality of Supply Standard (SQSS). These criteria help to reduce the high costs of building and maintaining offshore circuits and substations.

In general, under the Offshore Standard Design, an offshore generator will be connected to the Main Interconnected Transmission System (MITS) via a single radial circuit, with an offshore and onshore OFTO substations:



2. Generators and Offshore Local TNUoS Tariffs





What are offshore local TNUoS tariffs?

Offshore local TNUoS tariffs are the specific tariffs a generator connected to an OFTO pays for the offshore transmission infrastructure that it uses. They are calculated using the actual project costs incurred in the construction of the assets.

When the assets are transferred, the OFTO is granted an annual revenue stream by Ofgem (defined in their offshore transmission licence as "OFTO_t"), which is paid by NESO out of TNUoS revenue. Most of this money will be paid by the generator that connects to the relevant offshore transmission system, while the rest will be paid by all other TNUoS customers out of the residual tariff.

There are three components to offshore local tariffs that may apply:

- Offshore circuit tariff
- Offshore substation tariff
- ETUoS (if applicable)

An example calculation for these components is included below.

Offshore Local Circuit Tariffs

The local circuit tariff is calculated using the actual costs of the cable equipment. Generators pay for the cable, harmonic filtering and reactive compensation equipment installed in order to transmit their power to shore via the OFTO.

If the cable is a single circuit, then the generator pays for up to the maximum rating of the cable it is capable of using according to its TEC (assuming 1 MVA = 1 MW). If it is a double circuit, the generator may be liable to pay up to 100% of the cost of the equipment. This is done by calculating a security factor for the cable.

- The offshore security factor for single circuits with a single cable is 1.
- The offshore security factor for double circuits is:

$$\text{Offshore local security factor} = \frac{\text{Network export capacity (MVA)}}{\text{Sum of generation connected to the offshore network (MW)}}$$

The local security factor for multiple circuit connections is capped at the locational onshore security factor of 1.75



Offshore Local Substation Tariffs

To calculate the local substation tariff, the costs of any transformers, switchgear and the platform(s) they sit on are used. The generator will pay for the transformer and switchgear in proportion to their TEC (assuming 1 MW = 1 MVA). They will also pay only a proportion of the cost of the offshore platform, consistent with the lowest rating of either the transformer or the switchgear.

Embedded Transmission Use of System Tariffs (ETUoS)

If the OFTO connection to the MITS is via a distribution network circuit, then the generator may also need to pay a charge towards the distribution network costs (also known as $ETUoS_{OFTO}$; Embedded Transmission Use of System tariff).

Other charges

If the OFTO onshore substation is not connected to the MITS (i.e. it is connected to the MITS via a non-MITS substation and local circuit), then the generator may need to pay a local onshore circuit tariff.

Example calculation of offshore local tariffs

The table below shows how the capital costs of the offshore assets are converted into local tariffs. In this example, the generator has 400MW of TEC, and the circuit is a single cable (non-redundant – security factor of 1). The total OFTO_t (annual OFTO revenue) is £25m.

		Capital Cost	Percentage of Total Capital Costs	Amount of OFTO _t	Rating / Capability	Local Security Factor	Tariff
		(£k)		(£)	(MVA)		(£/kW)
Circuit	Offshore cable	100,000					
	Harmonic filtering equipment	1,000					
	Reactive plant	15,000					
	Circuit	116,000	38%	9,555,189	420	1	22.750451
Offshore Substation	Transformer	10,000	3%	823,723	640		1.287068
	Switchgear	2,500	1%	205,931	680		0.302839
	Platform	125,000	41%	10,296,540	640		16.088344
	Onshore civils cost adjustment ¹						-0.665605
	Substation	137,500	45%	11,326,194			17.012646
Other	Onshore substation	50,000	16%	4,118,616			Not Applicable
	Other	50,000	16%	4,118,616			Not Applicable
TOTAL CAPITAL COST		303,500					
						LOCAL OFFSHORE TARIFF	39.763097

¹ CUSC 14.15.132: a discount is applied to the offshore substation tariff to reflect the average cost of civil engineering for onshore substations. This is inflated by TOPI each year and reviewed at every price control period.

How are the offshore local tariffs calculated?

In this example, the capital costs of £303.5m for the project are divided into the categories where they have been incurred to produce a percentage split of the capital costs. The $OFTO_t$ revenue is then divided by each category according to the percentage split of the capital costs. There are some costs that are not paid by the generator and are instead paid by all TNUoS customers.

Circuit Costs

The circuit costs are divided by the MVA rating of the cable, multiplied by the security factor, and then converted into a tariff of £/kW (assuming 1 MVA = 1 MW). The generator will pay 100% or less of the revenue for the circuit, according to the security factor used in the calculation.

Offshore Substation costs

The $OFTO_t$ assigned to the different components that make up the substation is divided by the MVA ratings, and then converted into a tariff of £/kW (assuming 1 MVA = 1 MW). This provides a £/kW tariff for each component, which is summed with a discount included to reflect the onshore cost of civil works, to produce a local substation tariff.

Due to this calculation, generators only pay towards the substation equipment up to the MVA rating that is required to transmit their TEC onto the onshore network. Any excess capacity is paid out of general TNUoS by all TNUoS customers through the residual tariff.

Onshore Substation costs

Offshore generators do not pay towards these costs in their offshore local tariffs. The £4.1m $OFTO_t$ revenue for these costs in this example is recovered from all TNUoS customers through the residual tariff.

In this example, the total local offshore tariff the generator would pay would be:

Offshore local circuit tariff		Offshore local substation tariff		Total tariff
£22.750451/kW	+	£17.012646/kW	=	£39.763097/kW



The generator would pay this tariff multiplied by their TEC. With TEC of 400MW, the example generator would have an annual offshore local TNUoS liability of £15.9m.

The generator would need to pay this amount in addition to their annual liability for Wider TNUoS tariffs and any applicable onshore local circuit tariff.

What about the costs the generator doesn't pay for?

As the $OFTO_t$ revenue for this OFTO is £25m, the difference between what the generator pays (£15.9m) and the total $OFTO_t$ is paid by all TNUoS customers through the residual tariff.

3. Appendix: Offshore Interlinks



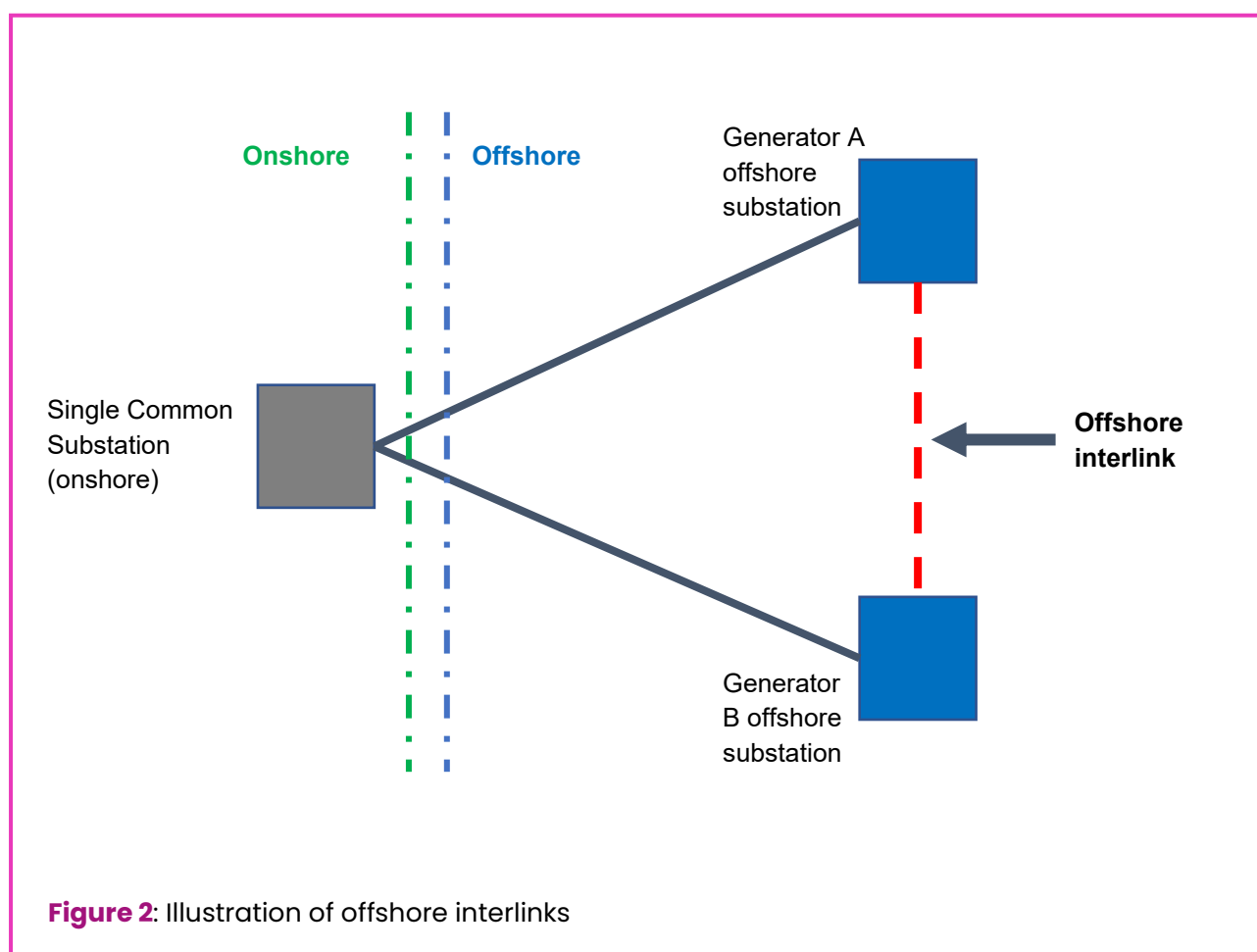


What are Offshore Interlinks?

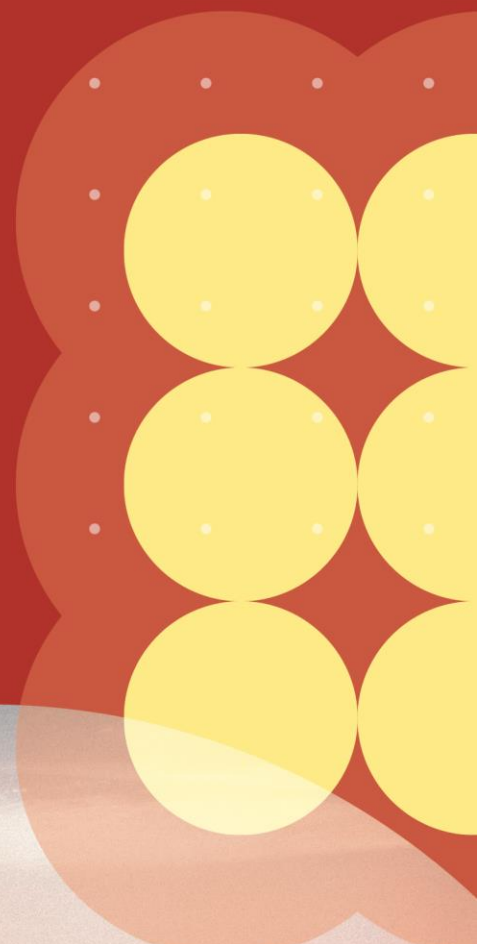
Offshore interlinks connect two offshore substations to provide redundancy in case of a constraint on either of the two transmission lines that connect the generators to the onshore substation. To qualify as an offshore interlink, the two offshore substations must be connected to a Single Common Substation as shown in the diagram below.

The methodology for how the cost of the offshore interlink should be paid for is in CUSC 14.15.85 to 14.15.87. The cost is split between the generators who are connected by the interlink according to the capacity that would be available to them in the event that there is a fault on their connection to the Single Common Substation.

If you have any questions about offshore interlinks, please get in contact with us to discuss the details of the project using the contact details below.



4. Contact Us





Contact us

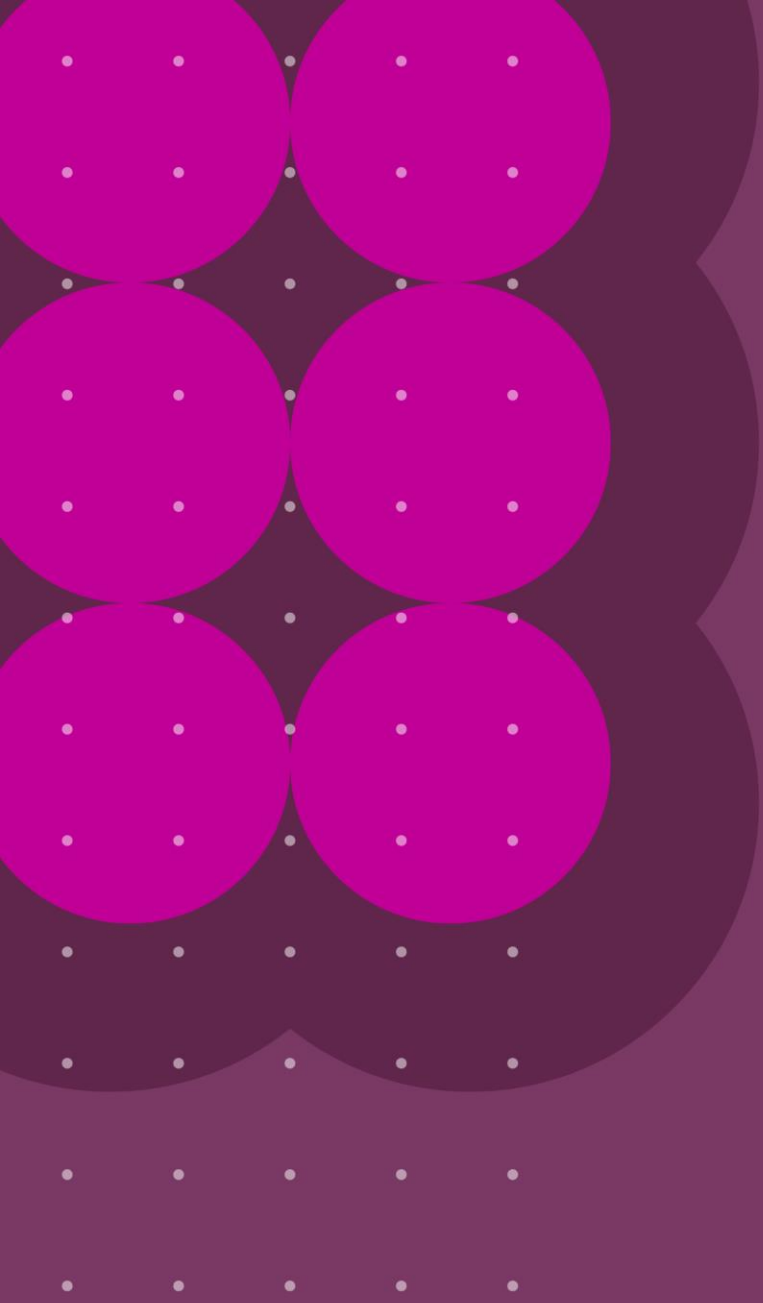
For more information, please contact the TNUoS team at TNUoS.Queries@neso.energy.

[Contact Us](#)

Disclaimer

In the event of any inconsistencies between this guidance note and the CUSC or the NESO Use of System Charging Methodology, then the CUSC or the NESO Use of System Charging Methodology will take precedence.

The CUSC all Code subsidiary documentation can be downloaded from the NESO Website. The Statement of the Use of System Charging Methodology and the CUSC can be downloaded from the website.



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