

TNUoS charging for offshore generators and the Offshore Transmission Owner regime

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For more information please contact the TNUoS team at TNUoS.Queries@nationalgrid.com or call 01926 654633.

Contact Us



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TNUoS and OFTOs

What is TNUoS?

Transmission Network Use of System Charges (TNUoS) recover the costs of building, owning and maintaining transmission assets for GB Transmission Owners (TOs). Generation and demand are set charges which are cost reflective based on where they are located in the country, and also by how they use the transmission network. TNUoS tariffs are calculated, set and billed by us - National Grid Electricity System Operator (NGESO). 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 which will use them in the future. Under the rules of granting a generation licence, generators aren't permitted to own transmission assets, and so have to sell them once they've been constructed. Onshore TOs aren't 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 their future revenue is agreed with Ofgem, they are granted an offshore transmission licence and become an OFTO.

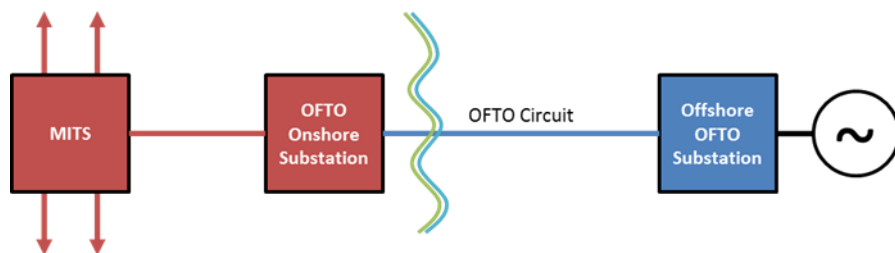
How long does it take to appoint an OFTO?

Once the offshore generator which built the transmission assets has energised their 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 until 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 to 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 substation:





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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 “OFTOt”), which it is paid by NGENSO out of TNUoS revenue. Most of this money will be paid by the generator that connects to the OFTO, the rest of the money will be paid by all other TNUoS customers out of the residual tariff.

There are three components to offshore local tariffs which 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 1MVA = 1MW). 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 1.8

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 1MW = 1MVA). 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.

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 (known as ETUoS; Embedded Transmission Use of System tariff).

Other charges

If the OFTO onshore substation is not connected to the MITS (via a non-MITS substation), 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 OFTOt (annual OFTO revenue) is £25m.

		Capital Cost	Percentage of Total Capital Costs	Amount of OFTOt	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						-0.441499
	Substation	137,500	45%	11,326,194			17.236752
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	£39.987203 /kW

¹ CUSC 14.15.127: a discount is applied to the offshore substation tariff to reflect the average cost of civil engineering for onshore substations. This is inflated by RPI every year. The tariff is 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 OFTOt revenue is then divided by each category according to the percentage split of the capital costs. There are some costs that are not paid for 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. 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 OFTOt assigned to the different components that make up the substation are divided by the rating and then multiplied by the generator's TEC (assuming 1MVA to 1MW). This provides a £/kW tariff for each component, which is summed to produce a local substation tariff.

Due to this calculation, generators only pay for 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 OFTOt 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	+	£17.236752/kW	=	£39.987203/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 £16m.

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 OFTOt revenue for this OFTO is £25m, the difference between what the generator pays (£16m) and the total OFTOt is paid by all TNUoS customers through the residual tariff.



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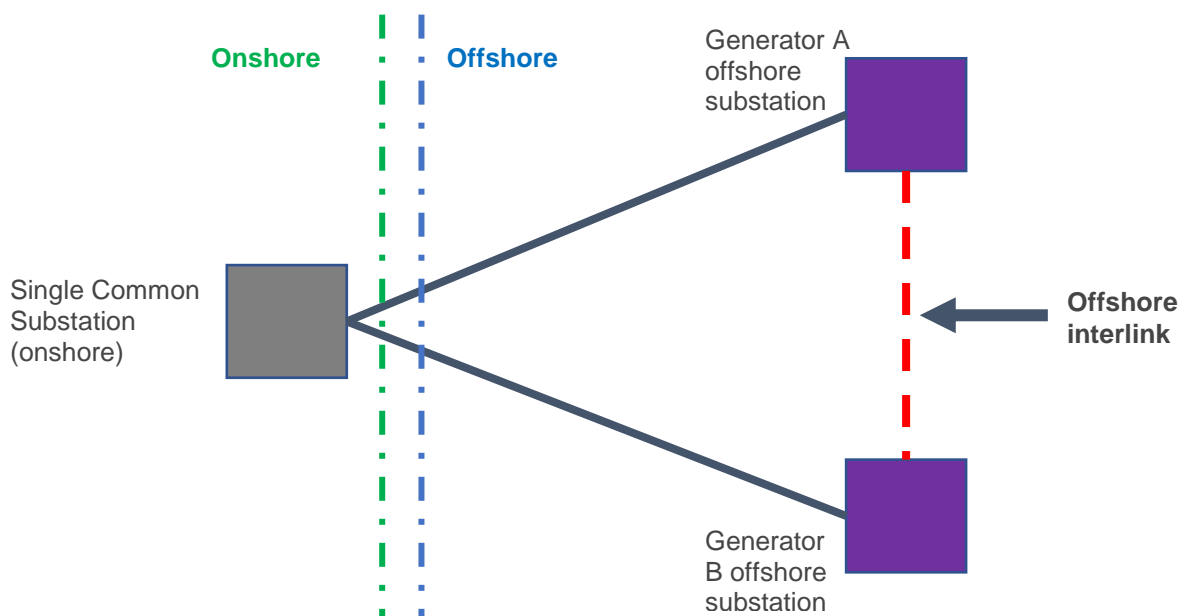
Appendix A: Offshore interlinks

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.



Contact us

For more information please contact the TNUoS team at TNUoS.Queries@nationalgrid.com or call 01926 654633.

Disclaimer

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

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

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