



Dynamic Reactive Compensation Equipment – Ownership Models

Annex 5 – Ownership models

- This Annex sets out:
 - (i) the current technical and commercial treatment of DRCE for onshore and offshore wind farms and
 - (ii) the proposed technical and commercial treatment of DRCE for onshore and offshore wind farms

Current set up - Onshore Windfarms

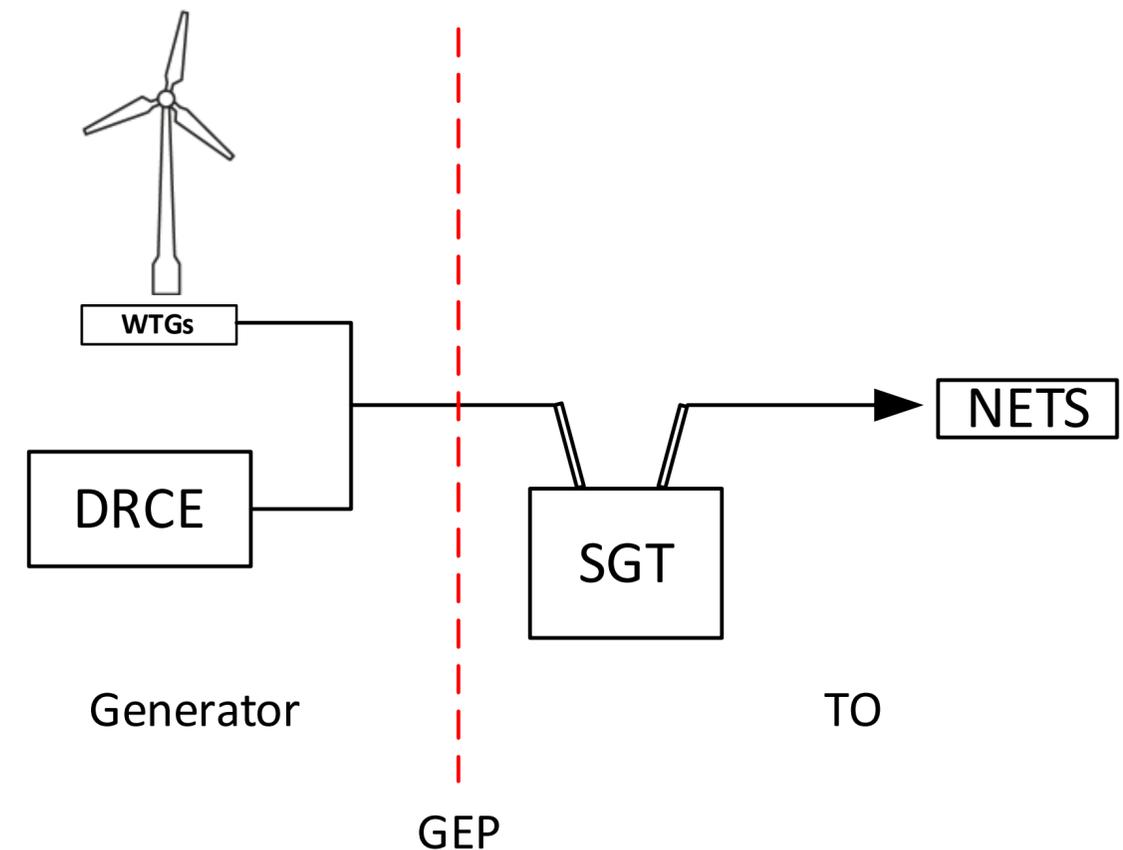
The diagram on the right show a typical arrangement for a Transmission connected onshore wind farm.

The Wind Turbine Generators (WTGs) are capable of injecting and absorbing reactive power. Some WTGs can meet the full Grid Code requirements on their own. If the WTGs do not have enough capacity, it is necessary to provide additional reactive power using Dynamic Reactive Compensation Equipment (DRCE).

This DRCE is located on the windfarm and connects to the same bus bar as the WTGs. It is fully owned by the Wind Farm operator and not subject to TNUoS charges.

Under the Obligatory Reactive Power Service and the Default Payment Mechanism, National Grid pays onshore windfarms for utilisation in £/MVArh.

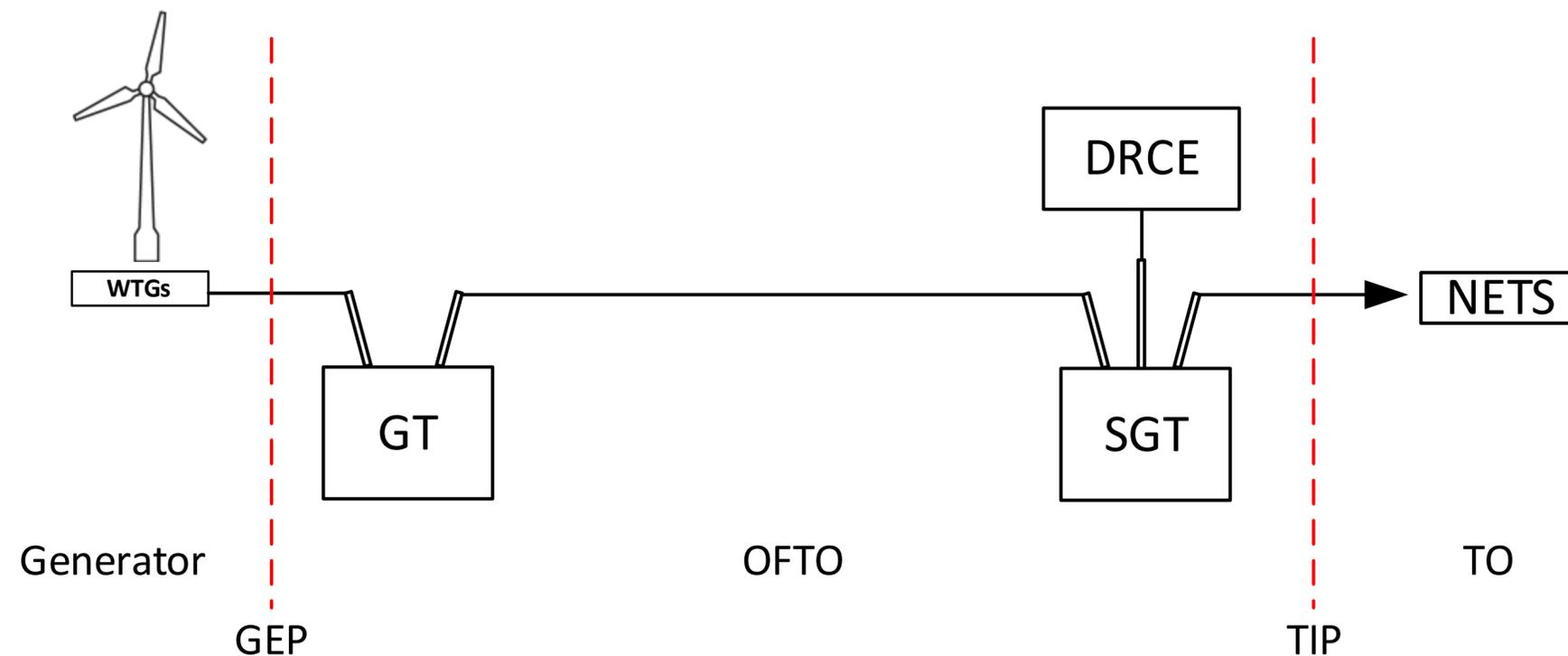
For an onshore wind farm the Super Grid Transformer (SGT) is owned by the Transmission Operator. The boundary for the wind farm is the Grid Entry Point (GEP) which is located at the secondary side of the SGT. Reactive Power Compliance is measured at the primary side of the SGT



Current set up - Offshore Windfarms

The diagram below show a typical arrangement for an offshore wind farm. The WTGs still have the capability to inject and absorb reactive power but due to the long cable routes on offshore wind farms there is not sufficient reactive power to meet the Grid Code requirements at TIP.

The normal arrangement is for the WTGs to be set to maintain the GEP at unity power factor. The Grid Code requirements are met by DRCE at the onshore substation which is connected to the SGT using a tertiary winding. On OFTO transfer time ownership of the DRCE transfers to the OFTO along with the rest of the substation. The generator is then liable for TNUoS costs for the DRCE and the other transmission assets.



Summary

(i) Current technical and commercial treatment of DRCE for onshore and offshore wind farms

	Installs DRCE?	Who owns DRCE?	Pays the cost of DRCE in TNUoS?	Who is paid via the Obligatory Reactive Power Service (ORPS) ?
Onshore Windfarm	Yes if the WTGs cannot meet the full Grid Code requirements on their own	Onshore Windfarm	No	Onshore Windfarms
Offshore Windfarm	Yes unless it is very close to shore (e.g. 0.5 miles)	Offshore Transmission Owners after OFTO transaction	Yes	OFTO - Remunerated as part of the Base revenue

(ii) Proposed technical and commercial treatment of DRCE for onshore and offshore wind farms

	Installs DRCE?	Who owns DRCE?	Pays the cost of DRCE in TNUoS?	Who is paid via the Obligatory Reactive Power Service (ORPS) ?
Onshore Windfarm	Yes if the WTGs cannot meet the full Grid Code requirements on their own	Onshore Windfarm	No	Onshore Windfarms
Offshore Windfarm	Yes unless it is very close to shore (e.g. 0.5 miles)	Offshore Transmission Owners after OFTO transaction	No	OFTO - Remunerated as part of the Base revenue

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