

Harmonics Consulting Services

Commercial Engineering Services

National Grid has many years' experience managing the risks of harmonic compliance for onshore and offshore networks when connecting with our extremely high voltage (EHV) system in England and Wales.

In the last decade, the electricity supply industry has changed dramatically. Offshore and onshore wind generation has been connecting at an ever-increasing rate and fossil-fired synchronous plant is closing as we embrace the decarbonisation of our electricity supply. With these changes, power quality has increasingly been at the top of the agenda for grid integration of renewables.

In order to control the quality of the voltage waveform in the UK, the System Operator is obliged to ensure that all transmission networks are compliant with the applicable

standards for harmonic voltage distortion. The System Operator discharges this responsibility by requiring all network owners that host non-linear connections to perform harmonic assessments to ensure that they limit the impact of the connection on the quality of the system voltage.

Our specialist harmonic consulting services can assist customers in fulfilling their obligations, delivering key design outputs and providing advice and recommendations on how to ensure compliance.

For details of these services for onshore and offshore wind farm power supplies, as well as onshore interconnector and electric traction power supplies, see overleaf.

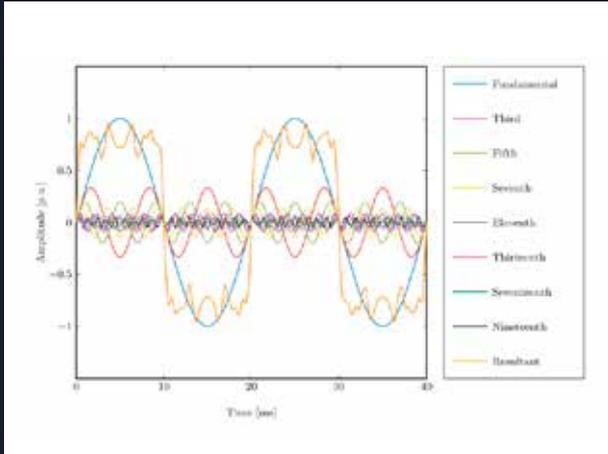
High Voltage Engineering Specialists

A unique combination of experience and expertise

Consultancy & Policy Support



Onshore Wind Farm, Interconnector and Electric Traction Power Supplies



We can manage the harmonic compliance of your connection

National Grid does a harmonic assessment as part of its licence requirement, providing harmonic limits and impedance loci to the developer.

The limits and loci act as an input for the analysis to see if the connection is compliant, and for the subsequent design of a harmonic filter if required.

National Grid can:

- Construct a suitable model of the developer's connection based on supplied manufacturer's data.
- Determine whether the connection will be compliant without mitigation.
- Produce conceptual design for an efficient mitigation solution if required.

Offshore Connections

In the case of offshore wind it is the responsibility of the developer to study the impact of their connection on all affected networks (transmission and distribution, onshore and offshore) by setting harmonic limits that ensure that no nodes will breach the planning levels of ER G5/4 once they connect. The developer must then design any mitigation required to meet these limits.

National Grid's harmonic experts are now available to do this task on behalf of the developers, offering the following distinct services:

- We can produce the Outage Study Specification (OSS) for submission to National Grid Electricity Transmission System Operator (NGET SO).
- We can set the harmonic limits and impedance loci for the connection of the OFTO network.
- We can construct a suitable model of the OFTO and wind farm connection based on supplied manufacturer's data.
- We can determine whether the connection will be compliant without mitigation.
- We can produce conceptual design for an efficient mitigation solution if required.

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