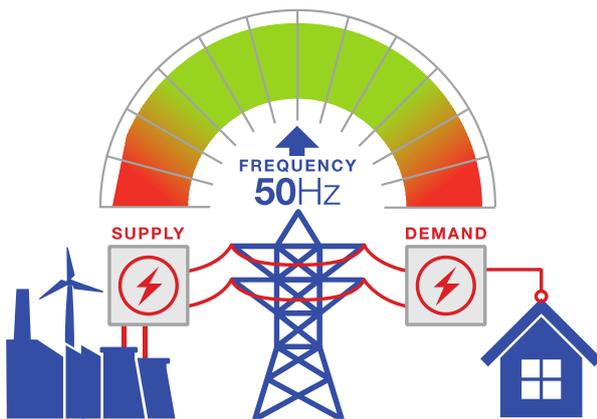


NIE G59 Grid Code Compliance

In Northern Ireland, the 2020 government target for electricity generated from renewables is 40%.

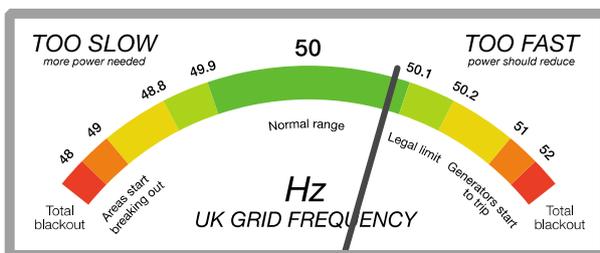
As more and more generating stations have been added to the network, (the total figure is now between 35 and 40%), further increase has been limited due to the impact of this additional generation on the transmission network (managed by SONI, the NI Transmission System Operator) and, in particular, on the stability of the network frequency and reactive power consumption.



Because renewable energy generators (e.g. wind turbines) are generally non-synchronous this causes difficulties for SONI in managing overall grid frequency. This is because non-synchronous generators are less responsive to changing grid conditions or requirements.

In order to accommodate a requirement for increased generation from renewables across Northern Ireland in line with both the existing 2020 targets and the likely 2030 Carbon Emissions targets due to be announced soon, SONI have made some adjustments to the transmission network.

As a result, NIE Networks have become concerned about the way in which a small disturbance or “loss of mains” on an individual generator can have a large effect on the surrounding grid, affecting transmission frequency potentially causing a significant loss in distributed generation.



All turbines above 50kW will have been connected to the Distribution Network under technical standards that require the generator to be tripped off at times of network disturbances. This is commonly referred to as the “G59 trip” or “G59 relay”.

G59 protection is required to ensure that turbines trip off following a loss of mains in order to avoid danger to the public and damage to the generator. Following the regulator’s approval of SONI’s new Rate of Change of Frequency (RoCoF) limit, NIE Networks were requested to move the G59 RoCoF setting on all distribution connected generation to accommodate the new standard.

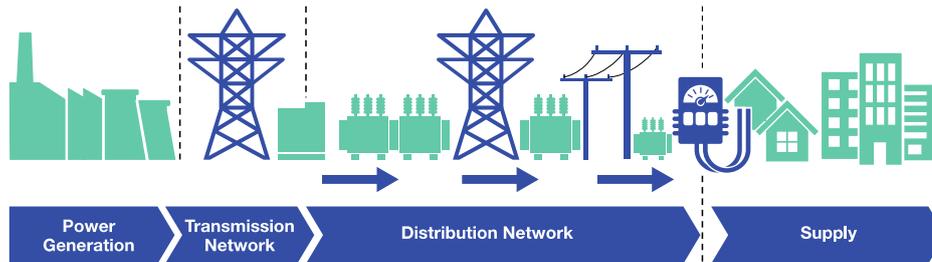
As a result, NIE Networks have begun to roll out a programme of changes to the overall network and individual generating sites such as wind turbines. Stage One, which is now complete, was designed to address the SONI grid frequency requirements and affect small scale generators of all sizes. However, Stages Two and Three are more focused on bringing small scale generators in line with large scale generators by giving NIE Networks more control over power factor and reactive power consumption through remote SCADA access to each individual generator. Currently NIE Networks are targeting these stages at generators with a grid connection capacity of 200kW or above except for some smaller turbines in more sensitive areas.

Similar programmes are being rolled out across the rest of the UK in the form of the Accelerated Loss of Mains Change Programme (ALoMCP).

The programme is intended to be in three stages:

Stage One – G59 settings adjustment - This programme is now complete and was rolled out across Northern Ireland during late 2018/early 2019. It involved a relatively simple process of changing G59 relay settings at each individual generating site to accommodate the new RoCoF limits.

Stage Two – Installation of Remote Telemetry Units (RTUs) and Control - To be completed by 30th September 2020 (subject to confirmation by NIE Networks) For larger scale generators, there has always been a requirement for the provision of a physical interface between the Distribution Network Operator's (DNO) Distribution Control Centre and the generating station. This has not previously been a requirement for smaller scale generators but, with increasing pressure on the network and more and more small scale, individual generators installed over the last few years, NIE Networks want to have better visibility of all the generating assets on their network and control overall grid performance to avoid major outages or frequency faults at transmission level.



In order to achieve this, all small-scale generators will be required to install a remote telemetry unit (RTU) which is compatible with the NIE Networks SCADA protocols.

Realise Energy Services have identified a suitable RTU solution that complies with NIE Networks requirements. Please contact us for more information.

Stage Three – Power Factor and Phase Compensation Compliance - Completion date still to be confirmed by NIE Networks. The aim of stage three is for NIE Networks to have greater control over individual generators in order to better control various factors such as reactive power, power factor, phase voltage etc at times when there are network issues to avoid an escalation of a localised grid issue into a major outage or similar.

However, while the NIE Networks required standards of compliance and specifications are clear, given the wide range of turbine types across Northern Ireland, it is likely the equipment needed will vary from site to site and turbine to turbine.

Although there are already a number of solutions being offered to comply with NIE Networks requirements for this stage, they are not yet proven to meet the individual site-specific and turbine-specific generator requirements. Therefore, with some time to go until this Stage needs to be complied with, we would advise caution and not to commit to any solution at this stage.

Realise Energy Services are in discussions with NIE Networks and the key individuals responsible for the programme. We are in the process of evaluating the NIE Networks requirements and how individual turbines will integrate with the proposed control methods. We are currently looking at a range of solutions to understand which will best meet NIE's requirements with minimal impact on the individual generators. We will keep our customers informed of any developments.

To find out more contact us on:

0800 042 0251 or enquiries@realise-energy.co.uk