

Generation Compliance

SMALL SCALE GENERATION SCADA GUIDANCE DOCUMENT

20/12/2022

INTRODUCTION

The electricity industry is experiencing rapidly accelerating levels of change and development as a result of new innovative technologies, shifting customer opinions and demanding governmental policies. This has resulted in fundamental changes in the way electricity is generated, transported and utilized.

Northern Ireland had set and successfully achieved incredibly ambitious energy targets for Renewable Energy Sources for Electricity (RES-E) of 40% by 2020. A large measure of this performance has been demonstrated by 47.7% of electricity demand coming from RES-E in the 12 months up to March 2020.

In total 93% of this new generation has connected to the NIE Networks Distribution System. The increasing numbers of both renewable and traditional generation on the Distribution System has presented many technical engineering challenges for NIE Networks and SONI, the Transmission System Operator, such as bi-directional power flows, management of network voltages and inaccuracies in generation forecasting.

REQUIREMENTS

Many of these aforementioned issues can be remedied through the installation of Supervisory Control and Data Acquisition (SCADA) on generators.

Implementation of SCADA Systems will:

- Supply NIE Networks with real-time, high resolution data. This data will enable NIE Networks to more efficiently plan, operate and develop the electricity system.
- Allow for more accurate and granular generation forecasting to be completed to help to deliver efficiencies to the Wholesale Energy Market.
- Provide Alarms and Indications to NIE Networks surrounding the current status of generators. This information will assist with the safe operation of the Distribution System.
- Enhance the control of network voltage levels through Reactive Power management.
- Bring Small Scale Generators in line with Large Scale Generators.

All generators with a capacity greater than or equal to 200kW and connected to the Distribution System are required to install a Supervisory Control and Data Acquisition (SCADA) system. This was outlined in the NIE Networks Distribution Code 2010 (Issue 1) CC7.10. and has remained a requirement in all subsequent revisions of the Distribution Code.

Generators which meet the criteria outlined in the Distribution Code and have not installed SCADA, are presently non-compliant with the Distribution Code.

Generators which fail to comply with the Distribution Code, will be subject to NIE Networks Non-Compliance Procedures which can result in disconnection from the Distribution System.

SCADA will require each generator to accurately measure and communicate to NIE Networks the measurements and control signals outlined in Table 1. This list is not exhaustive and generators will require further signals or alarms. Full details of all signals and hardware requirements can be found in the SSG Settings Schedule (<https://www.nienetworks.co.uk/about-us/distribution-code/ssg-setting-schedule>).

Signal Name	Signal Type
Voltage (L1-L2/ L1-L3/ L2-L3)	Measurement
Phase Angle (L1/L2/L3)	Measurement
Active Power (kW)	Measurement
Reactive Power (kVAr)	Measurement
Power Factor	Measurement
HV Current ¹ (L2)	Measurement
RTU Received Signal Strength Indication	Measurement
Toggle Control Mode (Voltage Control/Power Factor)	Control
Voltage Set-Point Instruction	Control
Phase Angle Set-Point Instruction	Control
RTU Control Switch	Indication
Control Mode	Indication
Customer G59 CB	Indication
Emergency Voltage Control	Alarm
G59 Protection Trip	Alarm
NVD Protection Trip	Alarm
AC Mains Fail	Alarm
RTU Local Comms Fault	Alarm

TABLE 1

COMPLIANCE PROCESS

NIE Networks have initiated a Small Scale SCADA Implementation Program to assist these generators with the SCADA installation process to ensure Distribution Code Compliance.

¹ Required only for HV connected customers ($\geq 6.6\text{kV}$).

SCADA Commissioning involves the installation of a Remote Terminal Unit (RTU) at your generator. It is your responsibility to supply and arrange the installation and commissioning of the RTU. This is a specialist technical area which will require a suitably qualified and experienced engineer.

Due to the complexities of integrating RTUs to NIE Networks' SCADA Control System, NIE Networks have collated a list of verified SCADA Installers who have developed, tested and implemented an acceptable SCADA Solution. This list can be accessed using the following link: <https://nienetworks.co.uk/ssg-scada-installers>.

It will be the responsibility of each generator to agree and pay the costs for implementing SCADA with their SCADA Installers. The associated SCADA implementation costs incurred by NIE Networks were included in each generator's Generation Connection Offer. NIE Networks will not present any further costs to facilitate implementation between your installer and NIE Networks' own control systems.

To ensure your generator complies with the Distribution Code, NIE Networks request that the following actions are completed:

1. Confirm to NIE Networks by 31st December 2022 that you have engaged and appointed a SCADA Installer. This can be completed online at <https://www.nienetworks.co.uk/ssg-scada-reply-form>
2. Ensure that by 31st December 2022 your verified SCADA Installer has provided NIE Networks with a timeline for the completion of SCADA and Reactive Power control at your generator.
3. SCADA hardware is installed by a SCADA Installer at the generator. This will be in accordance with the SSG SCADA Setting Schedule available at <https://www.nienetworks.co.uk/about-us/distribution-code/ssg-setting-schedule>.
4. SCADA Installer will contact NIE Networks to establish a communications link to NIE Networks SCADA Control System.
5. SCADA Installer will liaise with NIE Networks to perform a SCADA Site Acceptance Test (SAT). This will determine if SCADA has been installed correctly at your generator. The SAT will ensure all required data and control signals are successfully communicated.
6. A SAT Certificate will be issued to each generator following successful SCADA Implementation.

FREQUENTLY ASKED QUESTIONS

Will NIE Networks alter my generator's Active Power (kWh) output?

SSG SCADA for G59 connected generation does not provide the functionality for NIE Networks to directly alter a generator's Active Power output and subsequently reduce the energy (kWh) produced from that generator.

Similarly Reactive Power control does not impact Active Power output. This control is utilized to influence local voltages on the NIE Networks Distribution System to enhance the quality of supply for all connected customers.

What approach will be taken by NIE Networks to monitor my generator once connected to SCADA?

NIE Networks will perform detailed software analysis on all SCADA connected generation on a weekly basis. This will determine each generator has operated within the limits as outlined in its Connection Agreement.

Whilst no generator should exceed the limits outlined in their Connection Agreement a small degree of occasional variance is permissible. The allowable threshold of this variance is continuously under review by NIE Networks.

Consistent violation of these limits, irrespective of variance, is highlighted and will be investigated further by NIE Networks.

What happens if my generator disconnects from NIE Networks SCADA System?

NIE Networks have completed detailed cell signal coverage studies at each generator to determine signal strength levels for 2G, 3G and 4G communications. This has determined that the majority of individual generation sites have adequate coverage to ensure a robust connection to NIE Networks' SCADA System.

During NIE Networks routine monitoring of SCADA Connected generation, it will be made apparent if any generators have lost connection. Frequent or sustained connection failures will be fully investigated to determine the source of this issue.

I want to choose a SCADA Installer who is not on the list. Can I do this?

Generators who wish to use a contractor not on the verified list must first inform NIE Networks of their decision to do so in the Acknowledgement Form. The prospective SCADA Installer will subsequently be required to demonstrate a viable technical solution within 2 months of return of this Acknowledgement Form. NIE Networks will provide reasonable support to prospective SCADA Installers throughout this process.

If no viable technical solution can be demonstrated within this timeframe, then the generator will be classified as not having appointed a SCADA Installer.

Generators will be notified if this occurs and asked to confirm another SCADA Installer Appointment.

My generator is incapable of providing Reactive Power Control, what do I do?

Generators are required to provide Reactive Power control as outlined in the Distribution Code without exception. If a generator is unable to provide this requirement then it is that generator's responsibility to complete the necessary modifications to ensure compliance.

NIE Networks may, on an individual basis, offer a Temporary SCADA Enforcement Deferral for generators who have implemented all other aspects of SCADA, but cannot meet the Reactive Power requirements.

Failure to comply with this aspect of the Distribution Code will result in that generator being subject to NIE Networks' Non-Compliance Procedures.

FURTHER INFORMATION

Further information or clarification surrounding any aspect of SSG SCADA may be requested by contacting NIE Networks. This can be through email at ssgscada@nienetworks.co.uk.