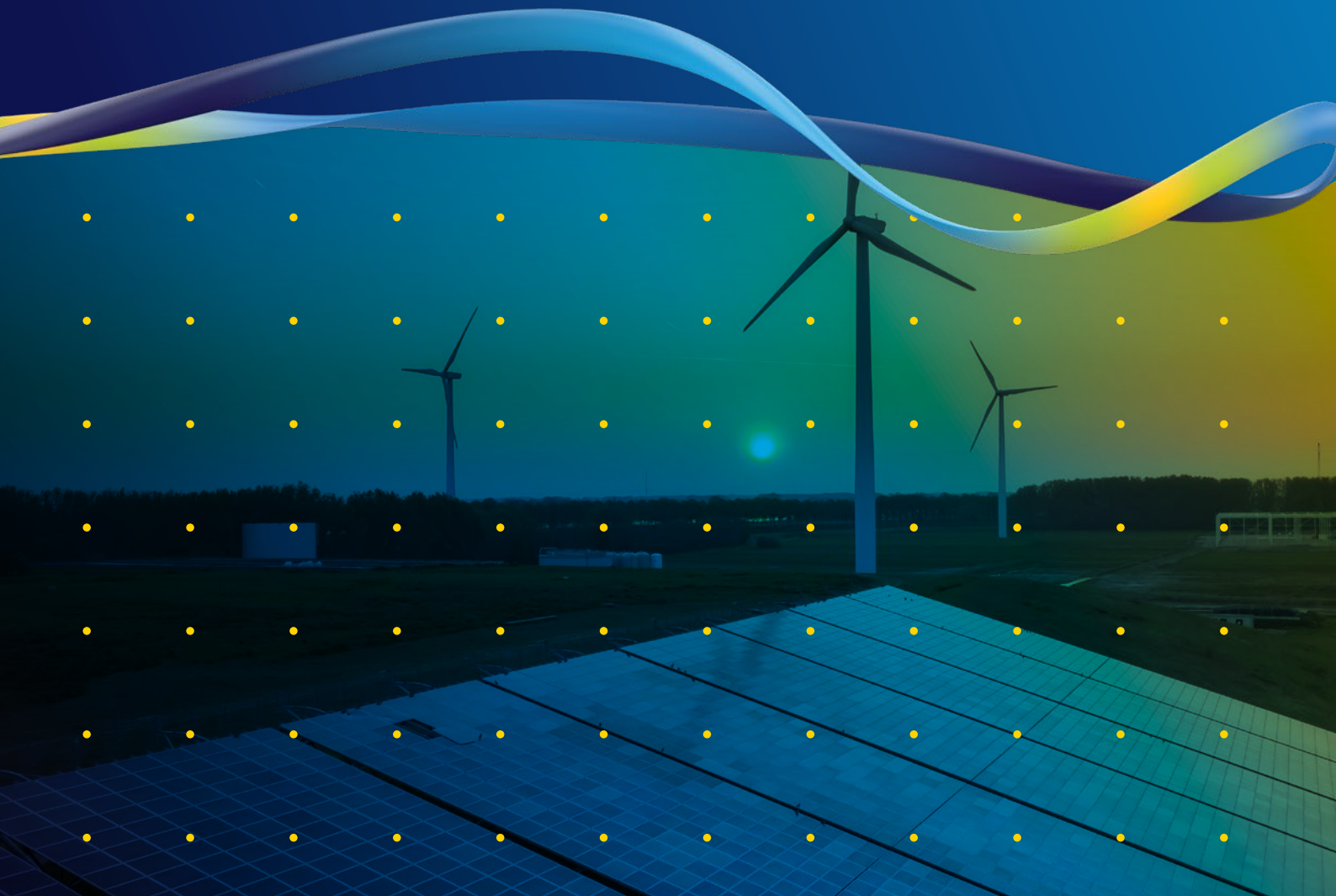
ESB NETWORKS

Quick User Guide

Microgeneration & Smart Battery Energy Storage

NATIONAL NETWORK, LOCAL CONNECTIONS PROGRAMME

DOC-301121-HFX



1 INTRODUCTION

This document provides an overview guidance for customer's looking to install microgeneration and smart battery energy storage in their home / farm / business.

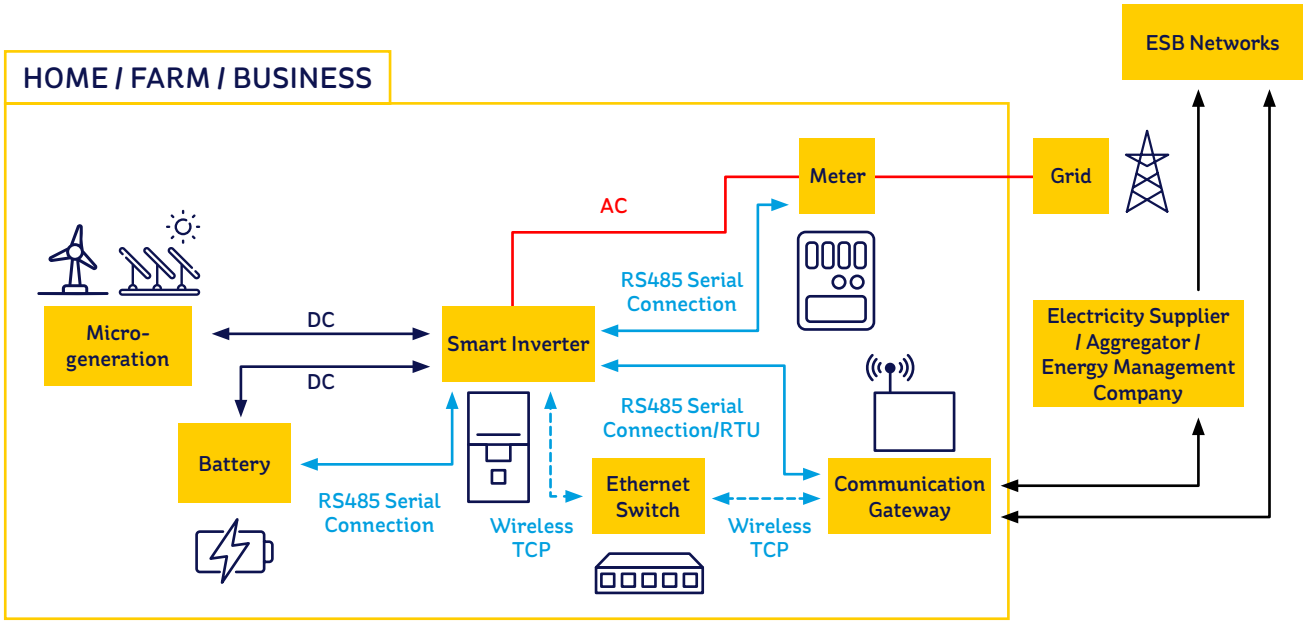
Customers should follow the guidance provided here to ensure they are aligning themselves to the future smart grid architecture that will enable their participation in future flexibility markets and system services.

Currently, the communication connections from a home / farm / business Gateway to ESBN is in development – this architecture may not be supported for early adopters but provides the recommend future component level system design.

Similarly, customer's may identify that their current electrical supplier does not provide this technology or services today – this guidance is a recommendation that these suppliers prepare for the future architecture changes and development.

2 OVERVIEW ARCHITECTURE

FIGURE 1 **OVERVIEW ARCHITECTURE**



Each component of Figure 1 – **moving left to right** – is addressed in sequence. The document provides details of the specifications and standards for each component in the architecture.

3 COMPONENT REQUIREMENTS AND STANDARDS

3.1 MICROGENERATION

REQUIREMENT	STANDARD
Microgeneration	• All microgeneration shall comply with ESB Networks Conditions Governing the Connection and Operation of Micro-generation. • Microgeneration is defined as generators that produce electricity from wind, solar, hydro, biomass and micro-CHP. • All microgeneration (<6kW/25Amps AC for single phase connections and <11kW/16Amps for 3 phase connections) shall complete a NC6 form from ESB Networks and submit by email or post to ESB Networks in advance of the installation.
AC Connected Battery	• This battery is also considered a microgenerator for ESB Networks purposes and should be included in the NC6 application as an additional generator to the microgenerator.

3.2 DC ELECTRICAL SYSTEM

REQUIREMENT	STANDARD
DC System / Components	• Shall fully comply with NSAI I.S. 10101 and be labelled to identify as such.
DC Isolator as per NSAI I.S. 10101	• A DC isolator switch (2 pole) shall be provided at the connection point to the Inverter, and accessible from the inverter location – for string inverter configurations. • Shall be labelled "DANGER Contains Live Parts" or an equivalent statement.
DC Cables as per NSAI I.S. 10101	• Shall be segregated from AC cables. • Shall be designed to minimise resistive losses, and voltage drop, to <3%. • Positive and Negative DC cables must be identified at either end of each circuit. • Shall be double insulated.
DC Connectors as per NSAI I.S. 10101	• Shall be rated to IP21, class II, shrouded, and shall be labelled positive and negative. • Shall comply with EN 62852, and EN 50521.

3 COMPONENT REQUIREMENTS AND STANDARDS

3.3 BATTERY - (BESS (BATTERY ENERGY STORAGE SYSTEM)

Battery Energy Storage System (BESS) is a system for storage of energy, generally which would otherwise export to the grid, within a battery.

REQUIREMENT	STANDARD
BESS / Lithium as per NSAI I.S. 10101	• EN 62133-2 OR EN 62619 • EN 62109 for AC connected BESS • EN50549 (With Irish Protection Settings) for AC connected BESS
BESS / Nickel based or Lead Acid battery as per NSAI I.S. 10101	• EN 62133-1 OR EN 62485 • EN 62109 for AC connected BESS • EN50549 (With Irish Protection Settings) for AC connected BESS
BESS System as per NSAI I.S. 10101	• Shall fully comply with NSAI I.S. 10101 and be labelled to identify as such. • AC connected BESS, must be included on the ESB Networks NC6 application, with the rated output (in kW) listed as an additional generator output. • The battery is installed and maintained aligning to the standards listed above.

3.4 SMART INVERTER

Inverters are the systems to convert DC power generated by the microgeneration modules and battery energy storage systems into AC power for connection to the consumer load and grid.

REQUIREMENT	STANDARD
Smart Inverter (The standards provided here shall be clearly identified within the smart inverter datasheet and if available preferably clearly labelled on the device nameplate / housing).	• Shall fully comply with EN50549 (With Irish Protection Settings). • Shall fully comply with NSAI I.S. 10101 • Meet the requirements of EN 62109 • Recommend a rated efficiency of >95% to maximise generation.
Smart Inverter (externally installed) as per NSAI I.S. 10101	• Shall have an ingress rating of IP65 or greater.
Smart Inverter Labelling as per NSAI I.S. 10101	• Shall be installed with clearly labelled, accessible (from the inverter location), DC and AC isolator switches. • Shall carry a warning label, prominently located – "Inverter - Isolate AC and DC before carrying out work" or an equivalent statement.
Smart Inverter Metering	• A separate metering device must be supplied, on the AC side of the inverter, which records the energy generated (in kWh) by system.
Smart Inverter Communications	• Meet the requirements Modbus TCP SunSpec • Meet the requirements Modbus RTU SunSpec (RS 485) • Meet the interface requirements of IEEE 2030.5 • Meet the requirements of IEEE 1547
Cybersecurity	• Meet the requirements of EN 303645

3 COMPONENT REQUIREMENTS AND STANDARDS

3.5 COMMUNICATION GATEWAY

The communication gateway is the in-home hub for the aggregator and ESB Networks to communicate with the smart inverter.

REQUIREMENT	STANDARD
Communication Gateway Device	For Future Connection with ESB Networks and your Supplier or Aggregator: • Meet the requirements of IEEE2030.5/ DNP3/IEC 61850/IEC 104/ IEEE 1815/ SunSpec Modbus. • Meet the requirements of NIS Cybersecurity Directives.

3.6 AC ELECTRICAL SYSTEM

REQUIREMENT	STANDARD
AC System	• Shall fully comply with I.S. 10101 and be labelled to identify as such. • The AC system must be tested and certified by a Registered Electrical Contractor and a Safe Electric certificate must be provided.
AC Isolator as per NSAI I.S. 10101	• An AC isolator (2 pole, switching live and neutral) shall be installed between the inverter and the consumer unit, and accessible from the inverter location. • AC isolator shall be labelled – Microgeneration / Battery or an equivalent statement.
Meter Box as per NSAI I.S. 10101	• The main incoming point of the dwelling (typically the meter box) must contain a warning label indicating the presence of a separate source of electrical supply to the building.

3.7 EMERGENCY ISOLATION / BACKUP OPERATION

REQUIREMENT	STANDARD
Emergency Isolation	• Shall fully comply with I.S. 10101
Backup Operation	• Shall fully comply with I.S. 10101