Smart ReStart

WP3 - Stakeholder Engagement Report

Prepared for SP ENW
Final version

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Contents

1. Introduction

This report provides a summary of the stakeholder engagement that was conducted as part of the implementation and methodology design work package (3). This is a companion to the WP3: Implementation and Methodology Design and Compliance report.

1.1. Project Background

As GB progresses towards Net Zero, the uptake of low-carbon technologies (LCTs) such as electric vehicles (EVs) and heat pumps is accelerating. Electricity North West's Distribution Future Energy Scenarios (DFES 2025) forecasts around 3.5 million EVs and 2 million heat pumps on its network by 2050. This growth presents new operational challenges for network operators, particularly in relation to cold load pick up (CLPU) events after prolonged outages.

CLPU occurs when many devices restart simultaneously after a power outage, producing a sharp surge in demand that can exceed network design limits. Evidence from the UK Power Networks' Cold Start innovation[1] project shows that, by 2030, peak demand following restoration could more than double, individual customer demand could exceed 4 kW, and low voltage (LV) feeders could face up to 50% overloading. In severe cases, this could cause further outages or require expensive and premature network reinforcement.

Existing black-start procedures manage system-level frequency but don't address reloading individual distribution substations or LV feeders. There is a critical need for a method to control and gradually ramp up demand after prolonged shutdowns to maintain network stability and reliability.

SMETS2 electricity smart meters already include a randomised 0 to 30 minutes offset functionality. This is designed to smooth national demand spikes during Time of Use tariff changes. In practice, any device linked to a meter control switch, such as an Auxiliary Load Control Switch (ALCS) or Home Area Network (HAN)-connected relay, waits for its offset period to expire before responding to a signal.

However, randomised offset in its current form is has not been proven to mitigate CLPU risk at local, LV circuit where the there is significant less diversity than national level.

The Smart ReStart project seeks to build on this inherent functionality by creating a controlled reconnection process. The approach would work by:

- Using the randomised offset function to stagger the reconnection of ALCS-controlled loads such as EV chargers and heat pumps.
- The randomised offset function can either be:

[1] UK Power Networks: Cold Start - Energy Systems Catapult, also see report from Smart ReStart – WP1: Technical Background report for more in depth review of Cold Start project.

- Called upon during re-energisation through the supplier or DNO, or
- Set as a pre-configured option that is triggered during re-energisation, or
- Other solutions identified in WP3 report.

For this approach to work, several conditions must be met:

- Technical: Smart meters must be able to control relevant loads (via ALCS or HAN-connected relays) and apply offsets within defined windows.
- Regulatory: Distribution Network Operators must have the authority to send staggered reconnection commands, either directly via the DCC, through supplier cooperation, or by pre-scheduling the offset in the smart meter configuration.
- Customer: Consent, privacy safeguards, and clear liability arrangements must be in place.

Smart ReStart therefore aims to assess both the technical feasibility and the regulatory requirements for enabling staggered reconnection. The goal is to determine whether the approach is permissible under current GB arrangements, and what changes or derogations would be required to make it a practical and scalable solution.

1.2. Definitions and scope

For the purposes of this report:

- SMETS2 – Refers to the second-generation Smart Metering Equipment Technical Specifications for electricity smart meters. These meters are the focus of this study due to their enhanced functionality, interoperability via the Data Communications Company (DCC), and built-in randomised offset functionality. SMETS1 meters are excluded as their functionalities are not standardised or universally DCC-enabled.
- ALCS (Auxiliary Load Control Switch) – A controllable relay within or connected to a smart meter, capable of switching dedicated circuits such as EV chargers or storage heaters on or off under scheduled or remote command.
- HCALCS (Home Area Network Connected ALCS) - similar concept using a wireless relay controlled by the meter
- CLPU (Cold Load Pickup) – The phenomenon where electrical demand surges above pre-outage levels when power is restored after an extended outage, driven by simultaneous restart of thermostatically controlled loads and other devices.

2. Workshop feedback

2.1. Purpose of the workshop

The workshop held on 14 January 2026 reviewed the high-level Smart ReStart process and gathered feedback on the WP3 Implementation and Methodology Design report. The session focused on operational feasibility, regulatory and governance dependencies, technical options, and the roadmap to move from concept to trials and ultimately Business-as-Usual (BaU).

2.2. Workshop Attendance

The following stakeholders attended the Smart ReStart WP3 workshop.

SP Electricity North West (SP ENW)

- Andy Howard – Innovation Programme Manager
- Ben Ingham – Innovation Technical Manager
- Michael Keddy – Outage Planning Engineer
- Liz Wilson – Innovation Customer & Stakeholder Programme Lead

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- Emma Carr – Senior Consultant
- Jonny Buzzing – Consultant
- Clarissa Muliawan – Associate Consultant
- Elnaz Azizi – Associate Consultant
- Tim Zhou – Associate Consultant

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- Matt Osborn – Innovation Strategist

2.3. Scope and Objectives

Participants agreed Smart ReStart should remain narrowly focused on emergency restoration rather than general demand management. Establishing clear boundaries helps avoid scope creep into market flexibility or tariff optimisation. The success criteria should therefore emphasise network safety, customer protection and rapid return to normal operation, with any extended control beyond the immediate restoration window explicitly out of scope unless separately justified.

2.4. Cold Load Pick-Up (CLPU) Risk

Stakeholders reaffirmed that the first 20–30 minutes after re-energisation are the most acute for CLPU due to simultaneous restarts of heat pumps, EV chargers and household appliances after anti-cycle checks. This could be extended to up to 2 hours particularly for heat pumps that may need this time to initially heat their loop of water before transferring to steady state operation.

For prolonged outages (e.g., 1–4 hours in winter), a sustained overload tail may persist while homes re-heat. Smart ReStart therefore needs both an immediate in-rush mitigation and, where justified, a short transitional steady-state safeguard to avoid secondary fuse operations.

2.5. Technical Feasibility, Latency and Pre-programming

The group discussed three principal mechanisms:

1. Extended randomised offset applied by smart meters to stagger device restarts
2. Auxiliary control of specific loads (ALCS / HCALCS for on-off; APC / SAPC for proportional control)
3. Whole-premise load limitation.

Today, SMETS2 randomised offset is linked to tariff and auxiliary switching rather than re-energisation, and household load-limit settings can only be set by suppliers. Code and firmware changes would be required to broaden these behaviours for restoration events.

Latency was highlighted as a constraint when sending commands today of restoration via the DCC path. The workshop noted that pre-programming devices and meters in constrained areas (e.g., setting an extended randomised offset in advance) would remove reliance on real-time messaging, thereby making latency far less critical. Pre-set behaviour also simplifies control-room operations during incidents.

2.6. Operational Complexity and Multi-Supplier Coordination

Because each LV feeder contains customers supplied by multiple retailers, any event-time orchestration that relies on supplier action introduces coordination burden and potential inconsistencies. The group therefore favoured approaches that either

- Can be set and forgotten in advance on the meter itself for constrained areas
- Are automated using simple, transparent rules triggered by restoration signals without bespoke per-supplier workflows.

2.7. Customer communication and PSR considerations

Attendees stressed the importance of clear, empathetic communication during interventions. Customers should understand what is happening, why it is necessary, and how long it will last. Messaging should avoid jargon and be framed around safety and fairness. For customers on the Priority Services Register (PSR), proactive communication such as SMS text alerts was considered valuable, especially where auxiliary control may temporarily delay heating or EV charging. Communications should be aligned with control-room status so estimated timelines are credible.

2.8. Technology-specific control preferences

A technology-specific approach was preferred to balance network protection with customer outcomes

- Heat pumps: use simple ON/OFF via ALCS to avoid risks associated with throttling compressors; restore in tiers with short, randomised offsets so homes begin warming while avoiding coincident starts.
- EV chargers: use APC/SAPC (proportional) control to provide partial charging rather than full disconnection, as throttling presents minimal equipment risk and preserves customer utility.