LCPDelta

Smart ReStart

WP2-Regulatory Code Review

Prepared for SP ENW

Final version

Report written by:	Clarissa Muliawan	Clarissa.Muliawan@lcp.com
Report reviewed by:	Jonny Buzzing Emma Carr	Jonny.Buzzing@lcp.com Emma.Carr@lcp.com

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Executive summary

This report presents a review of the regulatory codes and standards relevant to the Smart ReStart project, focusing on the feasibility of using smart meters to help mitigate Cold Load Pickup (CLPU) within the current Great Britain regulatory framework. As the energy system moves towards Net Zero, the growing uptake of electric vehicles and heat pumps will place increasing pressure on distribution networks, making the management of post-outage demand surges an urgent operational priority.

To assess the regulatory landscape, we examined key documents including the SMETS2 Technical Specification, the Great Britain Companion Specification (GBCS), the Smart Energy Code (SEC), the DCC User Interface Specification (DUIS), the Distribution Code, and relevant supplier and DNO licence conditions. Active consultations such as the Smart Secure Electricity Systems (SSES) programme and the EV Smart Charging Regulations were also reviewed to ensure alignment with the latest policy developments.

The review finds that the underlying functionality to support staggered reconnection through smart meters already exists within the SMETS2 and GBCS framework. However, DNOs do not currently have the authority to operate this functionality directly, and there is no standard process for consumer consent or liability management in restoration scenarios. These barriers are regulatory rather than technical and can be addressed through targeted code modifications, coordinated industry engagement, and evidence from future modelling work.

The RAG (Red-Amber-Green) assessment shows that there are no fundamental regulatory barriers to Smart ReStart. Most areas are rated Amber, meaning that while clarification or modification is required, the direction of policy and regulation remains supportive. No Red areas were identified. The broader regulatory environment is evolving towards more controlled and intelligent load management, creating a favourable context for Smart ReStart to progress from concept to implementation.

In summary, the regulatory review concludes that Smart ReStart is feasible within the existing framework, provided that permissions, consent mechanisms, and governance are further developed. Subsequent work packages will focus on operational modelling, consumer engagement, and policy discussions to build the evidence base for future code changes and industry adoption.

Contents

1. Introduction

This report assesses whether smart meters can be used to mitigate Cold Load Pickup within the current GB regulatory framework and identifies the changes needed for future trials and deployment.

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. Therefore, 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 capability 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:
    - Called upon during re-energisation through the supplier or DNO, or
    - Set as a pre-configured option that is triggered during re-energisation, or

[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.

- 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. Aims of this work package

This work package examines whether implementing Smart ReStart is permissible under current GB regulations and identifies what regulatory changes or derogations would be required for further testing and future deployment. This report is structured into three sections:

- Regulatory and Code Review – mapping current regulatory provisions and technical permissions for staggered reconnection.
- RAG Analysis – summarising compliance status and identifying gaps.
- Future Demand and Policy Assessment – evaluating the likelihood of regulatory change in light of rising LCT demand and ongoing policy developments.

1.3. 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 capabilities 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. Regulatory and codes review

This section reviews the rules and standards that govern smart meter use in GB, assessing whether these permit Smart ReStart today and what changes may be needed for future deployment.

Key findings

- Existing SMETS2 functionality provides the foundation for Smart ReStart. With targeted configuration of randomised offsets and ALCS scheduling, these meters can support staggered reconnection without hardware changes.
- Sending commands immediately after re-energisation is often impractical because of signalling and timing constraints. The most dependable approach is to pre-configure settings so that reconnection occurs automatically when power is restored. Implementing this at scale will require a Smart Energy Code (SEC) modification to extend control permissions.
- Current ALCS functionality requires explicit customer consent, which does not cover restoration scenarios. A uniform consent framework will be necessary, potentially through the National Terms of Connection and aligned SEC changes, to ensure compliance and maintain customer trust.

2.1. Research methodology

The regulatory and codes review is structured around four core questions:

- Technical capability: How do current codes and standards define the use of SMETS2 functionality for staggered reconnection, and do these provisions allow implementation without hardware modification?
- Access and permission: Do existing codes and licences permit a Distribution Network Operator (DNO) to send staggered reconnection commands via the Data Communications Company (DCC) directly to customers' smart meters, or is supplier consent required? Or is there a need for another solutions?
- Consumer protection: Would the approach comply with current obligations on consumer rights, Guaranteed Standards of Performance (GSOP), and privacy?
- Future policy alignment: Are there regulatory changes underway that would enable or constrain this approach in the future? This is explored in the next section.

The assessment draws on a targeted review of the specific documents that governs the functionalities of GB smart meter and the licence condition governing the operations of the DNO and suppliers. Documents reviewed includes: SMETS2 Technical Specification[2], the Great Britain Companion Specification (GBCS)[3], the Smart Energy Code (SEC), the DCC User Interface Specification (DUIS)[4], the Distribution Code, and relevant supplier and DNO licence conditions. Active consultations, including the Smart Secure Electricity Systems (SSES) proposals and the 2025 EV Smart Charging Regulations, were also considered to assess regulatory direction of travel.

Our desk-based findings were validated through direct engagement with stakeholders including:

- The Data Communications Company (DCC), which operates the national smart meter communications infrastructure.
- The Energy Networks Association (ENA), which represents network operators and supported understanding of cross-DNO perspectives and potential pathways for industry coordination.
- Distribution Network Operator (DNO) policy teams, who provided regulatory insight into outage restoration practices and future network resilience challenges.
- The Smart Energy Code Company (SECCo), which oversees the governance of the Smart Energy Code and advised on permissions, processes and the feasibility of potential code change

This approach ensures that both operational behaviour and practical constraints were accurately reflected.[5]

2.2. Smart Meter Functionality and Standards

SMETS2 meters support a limited set of around 22 remote commands, known as configuration service requests, that can be changed remotely via the DCC. These include actions such as enabling or disabling supply, setting load control schedules, and adjusting the randomised offset limit.[6] Each of these configurations is clearly defined and heavily regulated under the SEC, which specifies who can use the function, for what purpose, and under which conditions.

The randomised offset function is defined in both the SMETS2 Technical Specification and the GBCS. It was originally intended to smooth step changes in demand, for example, when switching time-of-use tariff periods or when reactivating loads controlled by an Auxiliary Load Control Switch (ALCS) or Home Area Network Connected ALCS (HCALCS). In practice, this means the meter can apply a random delay (up to a configured limit) rather than switching exactly on the clock boundary.

Relevant technical provisions include:

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[2] SEC-Schedule-9-Smart-Metering-Equipment-Technical-Specifications-2-29-Nov-2020.docx/, version 5.0
[3] GBCS describes the detailed requirements for communication between SMETS device and the DCC. For more details on the version use see: SEC Schedule 8 – GB Companion Specification, version 4.3
[4] dcc-user-interface-specification-v53-18-mar-2025.pdf, version 5.3
[5] The results of the engagements are incorporated into the next few sections where appropriate. For categorical summary of the engagements please refer to Regulatory and Compliance Workshop Report.
[6] smartenergycodecompany.co.uk/documents/code-required-documents/business-architecture-document-for-smart-metering/ , table 6 and 7

- SMETS2 Section 5.4.10 — Requires that, on disablement of supply, the smart metering system must be able to send a “request ad-hoc HAN-connected auxiliary load control switch state change” to open all switches.
- SMETS2 Section 5.17.1 — States that an ALCS may only close if supply is enabled and can open, close or maintain state on re-enablement according to its calendar.
- Command ECS38 – States that Import Supplier to set the Randomised Offset Limit on the Electricity Smart Meter

Engagement with DCC has also revealed that a latent “Load Controller” role exists in the SEC but is not currently assignable. This has been highlighted as a potential future solution for CLPU mitigation, although enabling it would require specification, firmware changes, and governance to map commands.

From a regulatory perspective, there are no conditions in the SEC or related standards that prevents the use of existing SMETS2 functionality for staggered reconnection. While the technical operation of these controls sits within the scope of work package 1, the regulatory review confirms that no rule changes would be required to enable their use, although permissions and roles would need to be clarified.

2.3. DCC User interface and roles

The DCC User Interface Specification (DUIS) defines the catalogue of service requests, eligibility criteria, and the process by which requests are transmitted and executed. Authorised users compose service requests, which are sent to the DCC and then routed to the relevant smart meter. The meter executes the command, provided it meets regulatory and technical requirements, and returns a response.

Within the current framework, Distribution Network Operators (DNOs) are registered DCC users, but their access is primarily limited to retrieving network data such as outage alerts, voltage information, and diagnostics to support fault restoration. In contrast, energy suppliers hold the permissions necessary to send control-related service requests, including those that affect the supply state of customer devices.

For example, the “Set Randomised Offset Limit” (ECS38) command is defined in DUIS but is associated with suppliers. Electricity Distributors do not currently have the authority to send service requests that alter a customer’s supply state without supplier involvement.

Engagement with the DCC and DNOs has clarified that, while meters support configurable randomised offset limits and ALCS/HAN schedules, there is currently no specific operational procedure that applies at the point of restoration after an outage. After an outage, devices typically return to their prior state unless a new schedule or override is sent. The timing of commands is also significant: DUIS “immediate” service requests are designed to transit the DCC network in approximately 30 seconds, excluding device execution time. Outage and restoration signalling is managed via comms hubs, which send “last gasp” alerts using a three-minute supercapacitor backup and “first breath” alerts upon restoration. DNOs typically receive the AD1 alert around six minutes after the event and the ATF36 alert approximately 30 seconds after power returns.

These operational realities suggest that sending a command immediately after re-energisation may not always be feasible. As a result, solutions may need to focus on pre-loading the necessary configuration, ensuring staggered reconnection can occur reliably when required. This solution will require an SEC modification.

2.4. Distribution code and supplier licence

The Distribution Code, supplier licence, and its associated Engineering Recommendations provide the framework for secure and reliable network operation. These codes do not prescribe the behaviour of individual customer devices but do recognise the value of operational measures that reduce CLPU risk.

Distribution code

The Distribution Connection and Use of System Agreement (DCUSA)[7]already requires suppliers to configure randomised offsets of at least 600 seconds (10 minutes), embedding staggered switching a. However, engagement with stakeholders suggests that this duration may not be sufficient, especially at the local level where diversity is lower than at the national level.

Engineering recommendations

Engineering Recommendation P2/8 acknowledges CLPU as a potential cause of post-restoration overload and permits demand-side actions to mitigate this risk, provided security of supply standards are met. It advises that when estimating Group Demand for security assessments, the DNO should account for the effects of CLPU and even the contribution of demand side response (DSR) in managing it.

Other Engineering Recommendations like EREC G98/G99 (connecting generation) and G100 (export limitation) have been reviewed for any interactions. These deal with customer generation and do not directly impose rules on how demand is restored after outages.

The Electricity Safety, Quality and Continuity Regulations (ESQCR) require voltage and frequency limits to be maintained. Since CLPU events risk breaching these limits, Smart ReStart would support compliance by reducing post-outage surges.

Electricity Supply licence

Delivering staggered reconnection through smart meters is further constrained by the current Electricity Supply Licence:

- SLC 12 (Matters relating to Electricity meters) — Assigns operational responsibility for metering to suppliers. No explicit clause in SLC12 forbids remote load control. This distinction is important because it suggests that staggered reconnection could be enabled within the current framework, provided responsibilities and permissions are clarified through supplier agreements or future regulatory change.
- SLC 42 (Installation code of practice) — Mandates compliance with the Meter Installation Code of Practice, including obligations to avoid undue consumer harm. For Smart ReStart, any participating customer should be fully informed and consent to the concept that after an outage their EV charger or heat pump might not come on instantly but within, say, 15 minutes. If not properly communicated, customers might be confused or feel treated unfairly.
- There's also a requirement in SMICoP which concerns not misleading customers about functionality and obtaining explicit consent for any demand control device.

In conclusion, while codes support CLPU mitigation in principle, the Electricity Supply Licence prevents DNOs from operating customer devices without supplier involvement. Relying on bilateral agreements with every supplier is impractical at scale. A universal

[7] DCUSA is a multi-party contract that defines the relationship, terms, and charges between DNO, suppliers and generators for connecting to and using the distribution network

solution, likely through SEC modification, DCUSA change, or Ofgem instruction, will be required. Any such change will also need to be developed in consultation with consumer groups to ensure that customer rights and interests are safeguarded.

2.5. Consumer protection, privacy, and Liability

The use of smart meters for remote load control brings several consumer protection considerations to the fore. At present, any load control using an Auxiliary Load Control Switch (ALCS) requires explicit customer consent, typically embedded within the supplier's contractual terms and conditions. This ensures that customers are aware of, and have agreed to, the possibility of their devices being controlled remotely for operational or system security reasons.

From a regulatory perspective, actions affecting a customer's load must comply with consumer law, including the Consumer Rights Act 2015. This provides a robust framework for customer rights and redress. In addition, the Guaranteed Standards of Performance (GSOP) set out minimum service levels for electricity supply. Short, controlled delays to the reconnection of secondary circuits, such as EV chargers or heat pumps, are unlikely to be classified as an "interruption" under GSOP, provided they are managed transparently and within agreed parameters. However, any significant delay or failure to reconnect could trigger compensation obligations.

Data privacy is also a key consideration. Under current licence conditions, DNOs are permitted to access customer SMETS data for network management purposes, but this access is governed by strict privacy and data protection requirements.

Looking ahead, the National Terms of Connection could provide a route to establish uniform obligations and consent processes across the industry, but this would require policy decisions and alignment with the SEC. It is important to frame Smart ReStart as an engineering restoration measure for secondary circuits, rather than a form of disconnection, to avoid confusion with SLC 27 provisions. Suppliers have also highlighted the need to update customer terms and conditions to clearly communicate the possibility of emergency-state reconnection windows.

3. Gap analysis and RAG status

RAG analysis assess how close Smart ReStart is to compliance today, where the remaining gaps lie, and what actions are needed to move from technical rules to regulatory approval.

Key findings

- The gap analysis confirms that Smart ReStart is technically feasible and consistent with policy direction. The main barriers are institutional: DNOs do not have authority to use ECS38 and consumer consent and liability frameworks are not defined. These issues can be addressed through targeted modelling, trials that could eventually lead to SEC code modifications.

3.1. Gap analysis and RAG status

The purpose of this section is to distil the detailed regulatory review in Section 2 into a high-level compliance assessment. Each regulatory area has been evaluated against its alignment with the Smart ReStart approach and assigned a RAG status:

- Red — not permissible without significant regulatory change.
- Amber — potentially permissible but requiring a code modification, derogation, or formal agreement.
- Green — fully aligned and permissible under current arrangements.

Table 1 – GAP analysis and RAG status

Regulatory Area	RAG Status	Key regulations	Key Gap	Mitigation / Next Step
Smart meter technical capability	Amber/ Green	ECS38 randomised offset and HCALCS control are fully supported in SMETS2, GBCS, and DUIS.	Coverage is not universal: not all meters are fitted with ALCS and HCALCS. There currently are active development with HEM providers and suppliers to look into incorporate HCALCS into their product. [8]	Further engagement with Home Energy Management (HEM) providers and network modelling is required to establish the minimum critical mass needed for effectiveness. If proven critical, next step of the project could involve building case for regulatory changes will be needed for new LCTs to be equipped with randomised offset.
Access and permissions	Amber	Whilst DNOs are able to access smart meter data, ECS38 sits within supplier-controlled functions under SEC.	No standing authority for DNO-initiated ECS38 exists. Current rules would force DNOs to rely on supplier cooperation, which is impractical at scale or pre-load functionality that will allow randomisation to be triggered during re-energisation	Demonstrate proof of concept through modelling. Seek an Ofgem derogation for a trial. Develop a multi-supplier operational protocol via ENA. Progress towards a targeted SEC modification that grants DNOs conditional rights to use ECS38 for CLPU events.

[8] Smart Meter Based Internet of Things Applications: Phase 2 Projects - GOV.UK

Consumer protection & liability	Amber	GSOP, licence conditions, and GDPR protect customers. Short, controlled delays are unlikely to trigger GSOP breaches if managed.	No standard process exists for securing consent for DNO-led ALCS control. Current supplier terms do not specify that ALCS may be used during emergencies, and customers may opt out. Liability is unclear if reconnection fails.	Engage with consumer representatives to test acceptability. Establish an industry-wide consent mechanism and liability framework. Work with suppliers and Ofgem to embed these safeguards into licence conditions or national agreement.
Future policy alignment (further detail on next section)	Green / Amber	DESNZ/Ofgem SSES proposals, EV Smart Charging Regulations 2025, and the Clean Flexibility Roadmap all signal a policy shift towards authorised demand control.	These supportive changes are not yet embedded in the SEC or distribution licences. The gap is therefore one of timing and codification rather than direction.	Use trial evidence to influence SEC Panel discussions and SSES implementation. Position Smart ReStart as a low-cost, low-impact flexibility measure that complements national EV and heat pump policy.

4. Future alignment

The case for Smart ReStart will grow as EVs and heat pumps increase demand on LV networks and climate change leads to more frequent severe weather. With outages becoming more common and prolonged, measures to manage restoration demand in a controlled way will be increasingly important.

Key findings

- The CLPU challenge will intensify as LCT uptake accelerates. Forecasts from FES and DFES show rapid growth in EVs and heat pumps through ED2 and ED3, increasing the risk of severe post-outage demand surges. Normal diversity assumptions break down during restoration, meaning coincident demand could far exceed diversified profiles.
- Regulatory momentum supports Smart ReStart principles. Live initiatives such as the Smart Secure Electricity Systems (SSES) programme, EV Smart Charging Regulations and the Clean Flexibility Roadmap all point towards greater demand-side flexibility and controlled load behaviour. These developments create a favourable environment for introducing staggered reconnection.

4.1. Direction of travel – will the problem get worse?

Throughout the engagement, it has become clear that the challenge of post-outage CLPU is directly analogous to the risk managed by time-of-use (TOU) tariffs, where a 10-minute randomised offset is already mandated in DCUSA Schedule 8 to prevent synchronised demand spikes. Smart ReStart seeks to extend this principle, enabling DNOs to pre-configure offsets for restoration events, using existing governance and customer consent frameworks.

Both FES 2024 and DFES 2025 highlight rapid growth in EVs and heat pumps. ENWL forecasts around 3.5 million EVs and 2 million heat pumps on its network by 2050. In the “Leading the Way” and “Consumer Transformation” scenarios, this uptake accelerates through the 2030s, meaning much of the new demand will appear during the current ED2 and early ED3 periods.

The UKPN Cold Start project demonstrated how CLPU scales with demand: peak restoration demand could more than double, individual customer load could exceed 4 kW, and LV feeders could face overloading of up to 50%. With higher concentrations of EVs and heat pumps, surges after outages could exceed feeder and substation capacity, risking further trips. Increasing extreme weather events in several FES pathways only heighten the likelihood that CLPU becomes a more frequent and severe challenge.

4.1.1. EV uptake and profile

The ENWL DFES 2024[9] forecasts show that EV uptake accelerates sharply through the 2030s, meaning a substantial proportion of the additional demand will materialise within the ED2 and early ED3 periods. By 2050, the number of EVs connected to a typical secondary substation increases from around 35 today to approximately 450 in the 75th percentile scenario. This represents an order-of-magnitude increase in both total load and the potential stress on LV feeders and distribution transformers.

The aggregated charging profiles in Figure 1 and 2[10] show forecasted diversified EV demand for 2024, 2030 and 2050. These assume significant improvements in diversity over time, reflecting both the spread of smart charging and the expected contribution of vehicle-to-grid (V2G) technologies. By 2050, average charging demand EV demand per vehicle is lower at times of system peak because V2G discharge can offset charging load.

However, these assumptions break down during CLPU events. Following an extended outage, EVs resume charging simultaneously, eliminating the diversity that smart charging or V2G normally provides. As a result, the coincident demand could exceed the diversified profiles by a wide margin. For example, while the diversified profile suggests 60–65 kW of demand per 100 EVs by 2050, the CLPU scenario could drive actual demand much higher, risking overloading of substations and feeders.

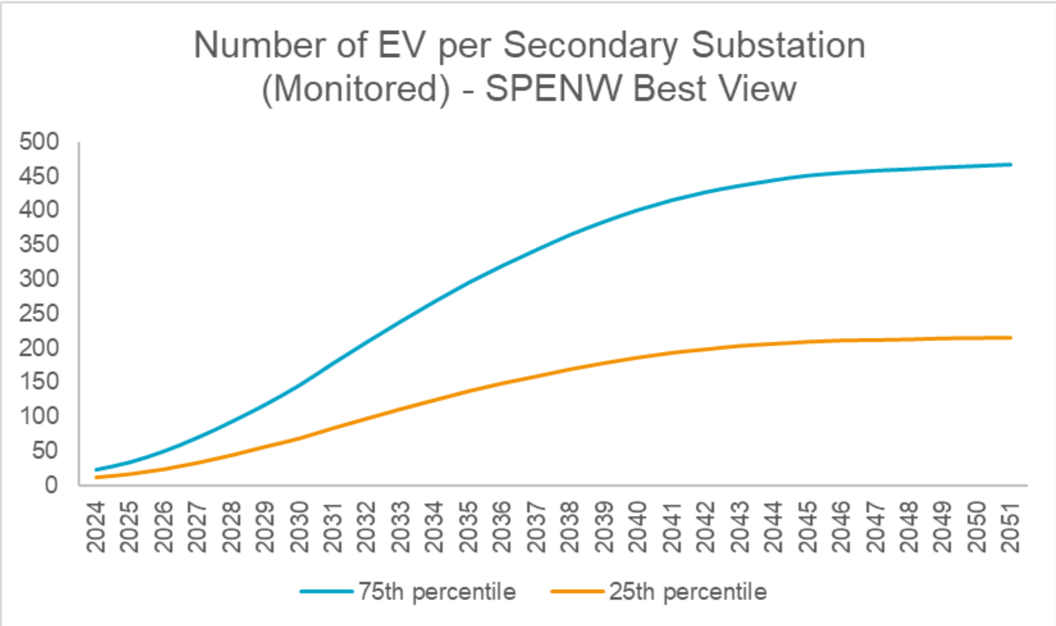

Figure 1: SPENW DFES figure on EV numbers per secondary substaion

[9] https://www.enwl.co.uk/get-connected/network-information/dfes/
[10] Figures taken from SP ENW DFES 2024 Main Workbook, "LCT profile" sheet, EV Charging Demand Profiles

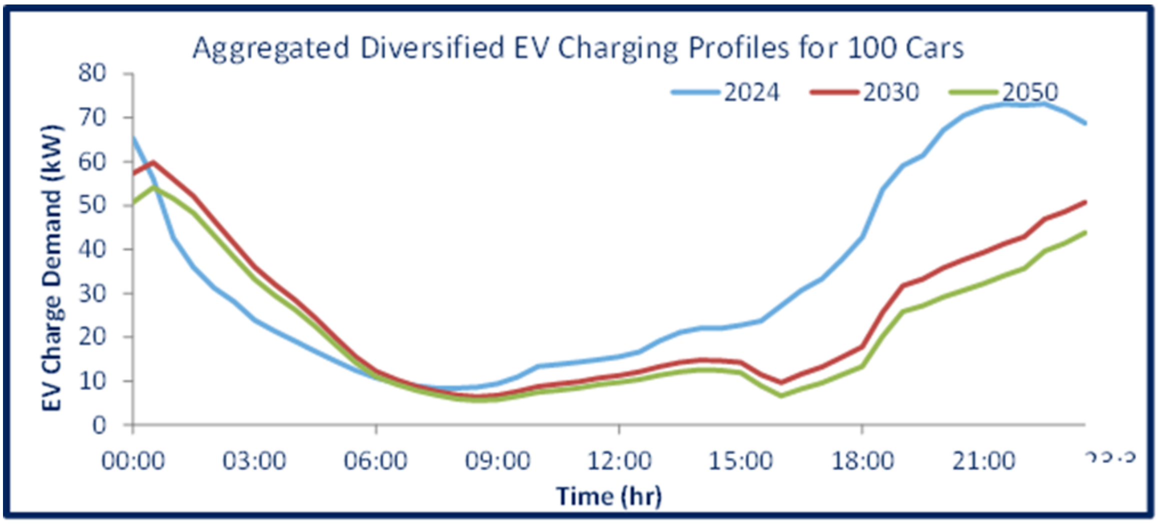

Figure 2: SPENW DFES assumption on aggregated diversified EV charging profiles

4.1.2. HP uptake and profile

Figure 4 shows the aggregated demand profiles for 100 domestic heat pumps. It assumes a consistent daily pattern across 2024, 2030 and 2050, with two pronounced peaks in the morning and evening. Unlike EVs, heat pump demand is relatively inflexible, with load concentrated around household heating needs. Diversity assumptions are more limited than for EVs, since heat pumps tend to operate in similar periods of high demand.

ENWL's DFES (Figure 3) indicates that most heat pump uptake occurs beyond 2035, meaning the most significant network impacts emerge in the later stages of ED2 and into ED3. This makes heat pump-driven Cold Load Pickup less of an immediate operational challenge compared to EVs, but one that grows rapidly in scale over the medium to long term.

During a CLPU event, the normal smoothing effect of household diversity is largely lost. If a large number of heat pumps restart simultaneously after an outage, the resulting coincident demand could be significantly higher than the diversified profile suggests, creating sharp restoration surges on LV networks.

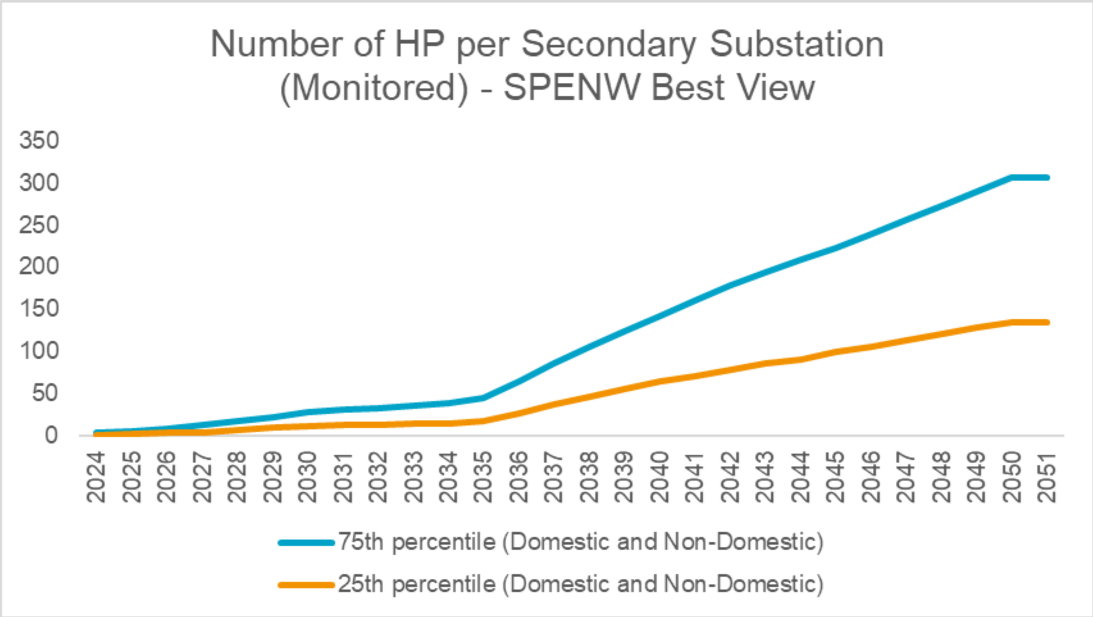

Figure 3: SPENW DFES Heat Pump (HP) number per secondary substation forecast

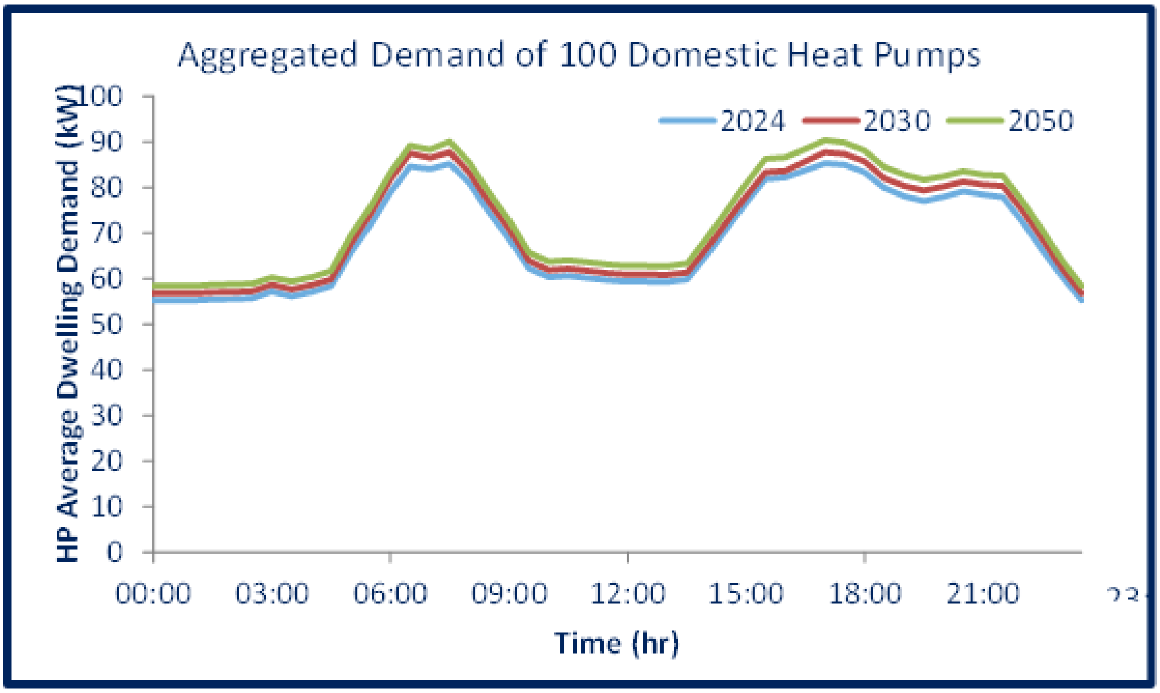

Figure 4: SPENW assumption on aggregated demand profile of domestic heat pumps

4.2. Active regulatory changes and code modifications

Although currently Smart ReStart solution can't be implemented without several regulatory changes. The regulatory direction of travel supports the Smart ReStart concept.

While DNOs cannot currently issue staggered reconnection commands, live changes such as SSES, the EV Smart Charging Regulations, and future SEC modifications all provide a pathway for this to become possible. The main challenge is timing, with trial results needed to influence these processes and secure the necessary permissions.

Stakeholders emphasised that this is the right time for regulatory change, as Ofgem and DESNZ are actively reviewing smart meter capabilities (e.g., through SSES and code reform). If action is not taken now, there is a risk that the necessary functionality will be lost as standards evolve.

Smart Secure Electricity Systems (SSES) programme, where DESNZ and Ofgem are consulting on licence changes to allow DNOs and other authorised parties to issue load control commands under defined safeguards. In response to this consultation the DCC proposed to the government to explicitly deem load controlling measures and expand access beyond energy suppliers to other licensed entities. The government response to this consultation did not mention this consideration, however, this change would allow DNOs to access auxiliary controls and remove responsibility from the supplier.

The EV Smart Charging Regulations, introduced in 2022, will require all new charge points to include default off-peak charging schedules and a built-in randomised delay. This mirrors the logic of Smart ReStart and will help make staggered reconnection a familiar and accepted feature for consumers. By the time EV numbers have grown significantly, many users will already be used to the idea that charging does not always begin instantly.

The ongoing development of the RIIO-ED3 price control is a key driver. Early indications are that resilience will be given greater emphasis than in previous periods, alongside a more structured approach to flexibility. For DNOs and DSOs this means building operational toolkits to manage the system at times of stress, including during outages as LV network use evolves with the uptake of EVs and heat pumps. Unlike commercial flexibility services, which are typically optional and incentive-based, Smart ReStart should be positioned as a mandated operational measure to protect network security and stability during restoration events.

In parallel, the SEC continues to evolve. Proposals such as SECMP0019, which expands the functions of the Auxiliary Load Control Switch (ALCS), and SECMP0025, which increases access to switching information, show that incremental changes to broaden DNO access are already being considered. Although SECMP0046 has not been fully implemented, partly because the EV Smart Charging Regulations address similar ground, the overall direction is towards more active use of smart meters in system operation. A targeted modification to allow DNOs to use ECS38 during restoration could be achievable once trial results show that it is safe and acceptable to consumers.

4.3. Case study

4.3.1. Australia

Distribution businesses in Queensland and New South Wales have long used controlled-load tariffs with ripple-control relays on domestic hot-water and, in some areas, air-conditioning circuits. Following a feeder outage, devices are brought back in groups or with an automatic random start delay so that demand rises over several minutes rather than in one step. The authority to control these circuits sits in the tariff terms that customers accept, and the practice is recognised in network operating procedures and by the regulator. Customer impact is small because the delay is short and applies to secondary circuits.

The operating model shows that short, planned delays on specific circuits are acceptable when they are clearly set out in customer terms and constrained by rules. The technical principle is the same as Smart ReStart: reintroduce diversity after restoration. The governance lesson is that explicit permission and role clarity remove ambiguity for the network operator.

4.3.2. United States

Many US utilities run demand-response programmes that fit load-control switches to air-conditioners and electric water heaters. Devices include a built-in random restart timer so that, after an outage or a control event, compressors and elements do not all start at once. Program terms give the utility the right to control the enrolled circuit, define the expected restart window and provide bill credits. After major storms, staged or randomised reconnection is used as part of restoration to avoid secondary trips.

5. Conclusion

Smart ReStart is technically viable today, but DNOs need new permissions and safeguards to deliver it in practice.

The use of staggered reconnection is already provided for in SMETS2 and the GBCS through the Set Randomised Offset Limit (ECS38) service request. From a regulatory perspective, there are no provisions that prevent this functionality from being used to support CLPU mitigation, although authority to send ECS38 currently rests with supplier. This mechanism has been proven in other load management contexts and can be applied to Auxiliary Load Control Switches (ALCS) to smooth post-outage demand recovery. Throughout the engagement it is also clear that the challenge of post-outage CLPU is directly analogous to the risk managed by time-of-use (TOU) tariffs, a problem that currently has very few mitigations in-place.

Under the current Smart Energy Code (SEC) framework, however, Distribution Network Operators do not have the authority to send ECS38 directly. That function sits with suppliers. Implementing Smart ReStart in live operation therefore requires one of three routes:

- coordinated supplier-led execution
- a targeted SEC modification granting DNO access for defined restoration scenarios
- or use of a regulatory mechanism such as an Ofgem derogation or sandbox arrangement.

For Smart ReStart to move be adopted into BaU, three conditions must be met:.

1. Access right to randomised offset must be secured to whoever will be best placed for CLPU this will be developed in the next work packages
2. Customer consent and privacy safeguards must be standardised across the industry with clear communication.
3. Liability for reconnection failures must be shared through formal agreements between DNOs, suppliers, and the DCC. Embedding CLPU mitigation into the SEC, the Distribution Licence, and business planning frameworks such as DFES and RIIO-ED3 would secure its long-term role.

The evidence shows that staggered reconnection is aligned with emerging changes such as Smart Secure Electricity Systems (SSES) and the EV Smart Charging Regulations. With targeted regulatory updates and industry coordination, Smart ReStart can transition from innovation to standard practice, delivering measurable resilience and capacity benefits for GB distribution networks and consumers.

The immediate next step is to prove the value case through modelling, customer engagement, and policy discussions. This should be followed by a trial under an Ofgem derogation or sandbox environment, allowing DNO-led use of ECS38 for defined CLPU scenarios with safeguards on scope, duration, and reporting. Alongside this, an operational playbook will be explored through the other work packages of the project, including high level options for how staggered reconnection could be configured and coordinated. Standardised consent terms and privacy notices should also be published, including reconnection windows and opt-out options, ensuring compliance with GDPR and the SEC Privacy Framework.